

UiO : **Faculty of Medicine**
University of Oslo

The PhD Programme: Periodic Programme Evaluation

Report from the Internal Evaluation

October 22, 2018



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1: Background

1.1. Introduction

The system for Quality assurance of education at the University of Oslo (for detailed description see section 10) requires regular monitoring of its educational activities. The coherence of the study programme must be evaluated within a six-year period to assess the quality of the programme and the need for changes.

The evaluation's aim is to assess the relationship between the programme's planned learning outcomes, academic content, the forms of work and teaching and assessment arrangements. Furthermore, internationalisation, relevance to working life, learning environment and infrastructure available for the PhD candidates should be addressed.

The internal evaluation is based on collection and analysis of existing data and information about the PhD programme, including data on all present and former PhD candidates for the years 2007, 2010 and 2015-17.

This report summarizes the internal evaluation.

The results of surveys among the enrolled PhD-candidates and supervisors can be found in separate documents.

The report starts with an overview of the Faculty of Medicine with its different institutes and a description the PhD programme's organisation, before details of the PhD programme's most important components are addressed.

1.2. About the Faculty

The Faculty of Medicine (the Faculty) at the University of Oslo (UiO) was established in 1814 and is Norway's oldest medical school. The teaching and research at the Faculty ranges from basic biomedical subjects, via clinical subjects, to public and community health subjects, and it has a prominent international profile. In addition to focus on high quality education and excellent research, the Faculty attaches importance to dissemination and innovation activities among our young researchers and academic staff.

The Faculty is divided into three departments and one centre:

- Institute of Health and Society (Helsam)
- Institute of Basic Medical Studies (IMB)
- Institute of Clinical Medicine (Klinmed)
- Centre for Molecular Medicine Norway (NCMM), an incubator for outstanding internationally young scientists

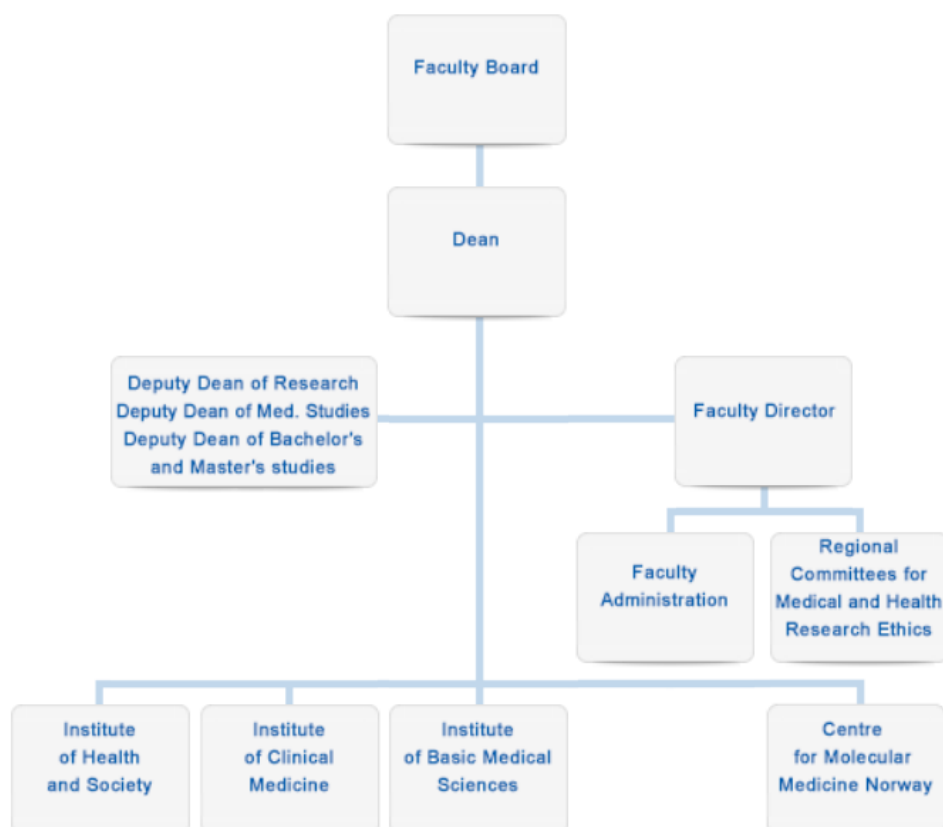


Figure 1: Organisation chart of the Faculty

Table 1. Key number on the Faculty's PhD Programme

2017						
Institute	Total number of candidates enrolled in the PhD Programme	New admissions				Number of disputations
		Total number admitted	Educational background			
			MD (cand.med.)	M.Sc.	Other	
IMB	159	27	6	10	11	24
Klinmed	1061	156	105	13	38	167
Helsam	219	28	11	6	11	28
NCMM	17	0	-	-	-	3
Faculty total	1456	211	122	29	60	223*

*The total number includes one candidate registered directly at faculty level

1.3. Organisation of the PhD-programme at the Faculty

The Faculty has organised its formalised PhD education into a single *PhD Programme for the Faculty of Medicine*. While many of the programme's activities are therefore centralised (e.g. the overall development of programme structure and learning outcomes, candidate reporting, etc.), many others are carried out on institute level (e.g. PhD recruitment and employment, informations about the programme among supervisors and candidates, PhD project development, evaluation of protocol prior to admission, candidate supervision, midterm evaluations, PhD courses) or in collaboration between the Faculty and Institute level (e.g. the admission process to the PhD programme).

In the following paragraphs, an overview is provided of some of the conditions that prevail at and influence the PhD education at each of the three institutes and NCMM. Relative to the other institutes, the number of PhD candidates from NCMM is very low. Each year, less than 5 of all completing PhD-candidates are from these two centres. Due to this low number, the following description is limited to the three institutes Klinmed, Helsam and IMB.

1.4. Institute of Clinical Medicine

At the Institute of Clinical Medicine (Klinmed), the research ranges from patient-focused clinical research to molecular biological studies of disease processes and testing of new technological equipment for diagnostics and treatment in close collaboration with Oslo University Hospital (OUS) and Akershus University Hospital (Ahus). A large percentage of the Professors employed at Institute of Clinical Medicine have full time positions adjunct with combined clinical consultant positions or vice versa at the university and the university hospitals.

A clear majority of the candidates enrolled in the PhD programme (>1000 candidates), are affiliated with the Klinmed. Most of the PhD research projects they are involved in are carried out in cooperation with the two university hospitals where more than 500 of the current PhD candidates receive their salaries directly from hospital budgets.

Klinmed, OUS and AHUS have coordinated leader structures (www.med.uio.no/klinmed/english/about/organization/organizational-chart/orgchart-klinmed.pdf). OUS and thereby the university's organisation in OUS is organised with 14 medical divisions in addition to the central unit Oslo Hospital Services, which provides non-medical services to the rest of the hospital. More than half of the divisions have leaders with combined affiliation to the University and the hospital. Each division has a research leader with affiliation as professor or associate professor and an administrator coordinator employed at Klinmed.

The university organisation at AHUS is divided into three divisions. The divisions have leaders with affiliation as professor or associate professor and one joint administrative coordinator.

The research leaders at OUS and AHUS are organized in a Forum for research leaders (*Forskningslederforum*) together with representatives from Klinmed's leadership as well as the OUS's research director. OUS and UiO also have a common research committee (*Forskningsutvalg*).

Consortium agreements regulate the research between the hospitals (OUH and AHUS) and the University of Oslo (UiO). OUH is Norway's biggest health trust in terms of patient treatment as well as in terms of research, innovation and education. Around 130–150 of the completed PhD degrees per year are affiliated with the university hospital and the Institute of Clinical Medicine.

The contracts between the university hospitals and UiO regulate research involving patients, health information and human biological material ("*Samarbeidsavtale mellom Oslo universitetssykehus HF og Universitetet i Oslo om avklaring av forskningsansvarlig institusjon ved medisinsk og helsefaglig forskning*" (2013) and "*Samarbeidsavtale mellom Akershus universitetssykehus HF og Universitetet i Oslo om avklaring av forskningsansvarlige institusjon ved medisinsk og helsefaglig forskning*", 2015). The contracts state that OUH and AHUS are the responsible investigators in accordance with the Health Research Act for any clinical intervention study involving research subjects from OUH; patients and/or human biological material and/or health information. Local regulations regarding management of sensitive data information have to be followed.

Key points: The University activities, especially at Klinmed, are totally embedded in the hospital organizations both at OUS and AHUS. The organizations share infrastructure, organizational structures and lines of responsibility.

Challenges: There is an ongoing challenge to rationalize the organization and to provide optimal support via research and treatment divisions. Candidates who are employed at OUS do their PhD in addition to clinical work, which leaves less time for their PhD and increases the time to completion.

1.5. Institute of Health and Society

The second largest number of PhD candidates are affiliated with Institute of Health and Society (Helsam), with a total of 223 PhD candidates enrolled in the PhD programme in 2016).

The institute has the following six departments:

- Community Medicine and Global Health

- General Practice
- Health Sciences
- Health Management and Health Economics
- Medical Ethics
- Nursing Science

Helsam represents a highly interdisciplinary research and teaching environment, and the interdisciplinarity is reflected in the very varied educational backgrounds among its PhD candidates. About 25 % of the candidates have a medical degree, while the others have a master degree. A large proportion of the latter group has a background as health professionals, while some have a disciplinary education in the natural sciences, the social sciences and the humanities. A considerable number of candidates are recruited from Helsam's seven master programmes.

The PhD projects at Helsam span a wide spectrum of topics and scientific approaches. They cover all levels of health care services, although the institute has a special obligation to focus on primary health care and community medicine, including disease prevention and health promotion. The research comprise studies of structures of relevance for health care and public health (e.g. policy, organizational issues or financial systems), implementation (e.g. health care policies, care models), processes (e.g. care models or user involvement), technology and infrastructure (e.g. assessment systems, Smartphone apps), outcome (e.g. randomized controlled trials or observational studies), costs (health economic evaluations), service provision (e.g. interaction between user, next of kind and health care provider, clinical decision making or knowledge translation) or medical ethics. Helsam also has a long tradition for applying critical perspectives and for providing theoretical analyses of the foundations for health care.

Several of the ongoing PhD projects are carried out in collaboration with external institutions, either locally (e.g. the City of Oslo and local hospitals), nationally (e.g. other universities or national research institutes), or internationally (e.g. through collaboration arrangements with universities in Ethiopia, Tanzania, and Myanmar).

Helsam hosts two national research schools: "[The Norwegian Research School in General Practice](#)" and "[Research School of Municipal Healthcare Services](#)". Through these the candidates have access to a broader set of courses and seminars that complement the PhD-programme (see also chapter 6.11).

A number of doctoral projects at any given time focus on global health issues. In the recent past, a major source of funding for such projects was discontinued (the Quota Programme, a Norwegian government programme which offered funding to students from developing countries and countries in Central and Eastern Europe and Central Asia). While other government programmes have in part replaced this programme, these do not offer funding support for entire degrees at Norwegian institutions, but rather short term internationalisation stays.

Key points: The Institute of Health and Society makes up a highly interdisciplinary academic environment at the intersections between biomedicine, the health sector and the wider society. Research thus spans from natural sciences to social science and humanities, and from applied to theoretical approaches. The institute links medicine and health to a wide range of societal arenas, e.g. local communities, primary health care, working life, education, childhood environment, government and public administration and non-governmental organisations. These characteristics are reflected in the broad spectrum of the PhD candidates' doctoral projects.

Challenges: The institute is heavily involved in capacity building nationally and globally. The wide range of academic traditions and approaches is both a strength and a challenge. Working at intersections is always associated with the challenge of meeting quality standards of several different disciplines/areas at the same time.

1.6. Institute of Basic Medical Sciences

The Institute of Basic Medical Sciences (IMB) is responsible for the basic sciences in the professional study programme in medicine and for the master's programme in clinical nutrition. 155 candidates from IMB were enrolled in the PhD programme in 2016.

The institute has the following four departments:

- Behavioural Sciences
- Biostatistics
- Molecular Medicine (encompassing Anatomy, Biochemistry and Physiology)
- Nutrition

Interdisciplinarity characterises IMB. The majority of candidates that completed their PhD in 2016 had an educational background other than medicine. Of all three institutes, IMB has the highest number of PhD candidates financed by a UiO scholarship, and the highest number of international candidates, most of which from other European countries. PhD candidates at IMB also complete their PhD within the shortest time compared to the other two institutes.

Key points: Candidates from IMB come from a wide range of national and educational backgrounds. As many of them have fulltime PhD-scholarships, they can fully concentrate on their PhD, which is also reflected in their comparably lower time to complete the PhD degree.

Challenges: The high number of PhD candidates with non-medical background leads to more uncertain career perspectives, as they do not have a medical profession to revert to. IMB struggles with recruiting PhD candidates and researchers with a medical background.

2: Description of the PhD programme

2.1. Rules and regulations

The general rules for the PhD programme are laid down in the *Regulations for the degree of Philosophiae Doctor (PhD) at the University of Oslo* (forskriften):

www.uio.no/english/about/regulations/research/doctoral-degree/phdforskreng.html

and the Faculty's *Supplementary rules for the degree of PhD* (supplementary rules):

www.med.uio.no/english/research/phd/regulations/supplementary-rules-pertaining-to-the-regulations.html

2.2. Program plan and expected learning outcomes

The PhD Programme has a stipulated length of 3 years, equivalent to 180 credits. Thesis work is stipulated to 2,5 years. The PhD degree is conferred on the basis of completion of the educational component, a doctoral thesis, and a PhD examination. The PhD examination includes a trial lecture and a public defence of the thesis (disputation), cf. *Section 2 of the Regulations for the degree of Philosophiae Doctor (PhD) at the University of Oslo*:

www.uio.no/english/about/regulations/research/doctoral-degree/phdforskreng.html.

The PhD education at the University of Oslo aims to educate independent researchers of high international standard, in accordance with recognised scientific and ethical principles. The education shall qualify candidates for research and other work requiring high levels of scientific insight. In addition to conducting independent research, the doctoral candidate shall acquire advanced theoretical and methodological competence and general academic skills in accordance with the Norwegian Qualifications Framework:

www.nokut.no/siteassets/nkr/20140606_norwegian_qualifications_framework.pdf

After successfully completing the PhD programme at the Faculty of Medicine the candidates should have acquired the following knowledge, skills and competences, as defined in the PhD Programme's expected learning outcomes:

Knowledge

- The knowledge status and needs within your own field of research nationally and internationally
- The diversity of research approaches and research methods relevant to medical and health research
- Standards for quality research within your own field and within medical and health research in general
- Strengths and weaknesses of your own research methods and methodological challenges within your own field
- The foundation of science and principles of knowledge acquisition in medical and health research
- Ethical dilemmas and principles within medical research including the Health Research Act and other relevant legislation

- Principles for convergence and interdisciplinarity in medical and health research
- Forms and principles of research innovation

Skills

- Demonstrate original, independent and critical thinking in your research
- Identify and develop innovative research questions
- Keep up to date on research in your field
- Participate in academic discussions nationally and internationally, for instance through participation in workshops, seminars and conferences
- Read and critically assess the breadth of medical research literature in medical and health research
- Discuss, select and apply relevant research methods to answer a research question
- Reflect on and discuss the strengths and weaknesses of your own research methods and results
- Reflect on and discuss ethical and epistemological dilemmas in research
- Apply national and international principles and rules of ethics, including the Health Research Act (pdf)
- Publish articles in internationally recognized journals within your field
- Disseminate research finding to non-scientists and the public
- Draw on interdisciplinary knowledge and expertise when approaching complex research questions

General competence

- The programme will give you a general competence to:
- Receive and utilize supervision
- Work in multidisciplinary teams with complex research questions
- Use databases and information and communication technology-based research tools
- Participate in the organization and management of meetings, conferences and seminars
- Work in a structured and independent manner in order to reach your objectives
- Gain an overview of and acquire advanced knowledge
- Develop innovative and critical thinking
- Express yourself clearly and concisely both orally and in writing
- Analyse, evaluate and communicate your own strengths and weaknesses
- Develop your knowledge, competencies and skills continuously and purposefully
- Provide constructive and critical feedback on others' academic work
- Build and manage professional networks
- Constructively contribute to a good working and learning environment

2.3. General organisation of the PhD Programme

The Deputy Dean of Research organizes the PhD program through the **Council for Research Education** (Forskerutdanningsutvalget), the Heads of Postgraduate

Studies (see below) and the Group for Research Education. The Council for Research Education is led by the Deputy Dean of Research, and consists of the institutes' Heads of postgraduate studies, the faculty's Research Director, and a representative for the PhD candidates (MedDocs). The faculty administration acts as secretariat.

The faculty's Council for Research Education aims to develop and quality assure the research education in accordance with current rules and regulations. The Council for Research Education is the Faculty's strategic organ for research education and the link between the dean's office, the faculty administration, the institutes and the PhD candidates.

Its tasks are to:

- ensure that the Faculty's research education is in line with academic development
- strive to make the faculties at the University of Oslo (UiO) correspond with each other
- facilitate national and international cooperation between the universities
- be responsible for quality assurance of the research education and follows up the various responsibilities of the Faculty, institute, supervisor and candidate.

The Council for research education

- shall keep the Faculty's supplementary rules up to date and ensure that they are followed
- shall further develop the Faculty's training of supervisory skills
- shall assist in cases of conflict when the institutes require help
- shall ensure the quality of the PhD examination (thesis, trial lecture and public defence)
- has the formal responsibility for admission and sets the admission requirements
- is responsible for preparing the Faculty's annual quality reports for research education.

Klinmed has two Heads of postgraduate studies, and IMB and Helsam have one each. They have permanent academic positions and the following mandate:

- help to assure the quality of admission into the PhD programme
- coordinate the research training at the institute
- contribute to the development of the research training at the Faculty of Medicine in collaboration with the Dean of Research
- develop strategic documents and participate at meetings concerning the research training
- constitute an academic contact locally for both PhD candidates and supervisors
- participation in the course committee

Course-related issues are handled in the course committee (see section Educational component).

2.4. Recruitment and funding of PhD candidates

Recruitment of PhD candidates is a multifaceted process that rests on initiatives from the three institutes and NCMM

There are three main ways to be funded as a PhD candidate:

1. 3- or 4-year scholarship from UiO (either three years research time or three years research plus one full year of teaching)
2. 3-year scholarship from external funding institutions (e.g., Norwegian Research Council (NFR) or Health Region South East (HSØ), EU, K.G. Jebsen Foundation, foundations in various professional associations, different user organizations/associations (e.g. The Rheumatism Society) and state lottery funded research initiatives (e.g.ExtraStiftelsen). These can either be personalised (awarded to a particular candidate) or not.
3. Salary from a full-time position (e.g. physician) where a minimum of 50 % working time can be used for the PhD.

OUS and other regional hospitals are major funding sources for PhDs. At the department or division levels, hospital funding is set aside for clinical positions where 50% of the hospital salaried work time is reserved for PhD research. This strategic recruitment policy is usually reserved for junior consultants or physicians that are finalizing their specialization.

Figure 2 gives an overview of the different funding sources.

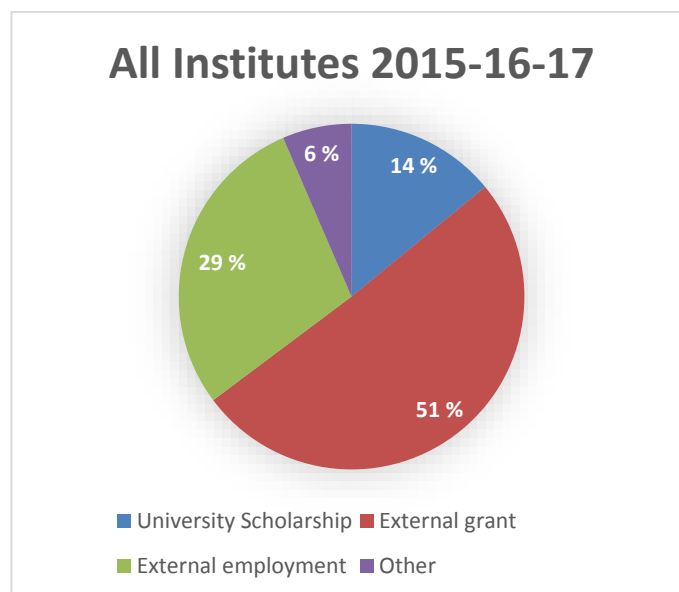


Figure 2. Funding sources of candidates at the Faculty at admission averaged across the years 2015-2017. The category “other” includes funding schemes to increase collaboration with low and middle income countries (e.g., NORAD, QUOTA programme). The category “external employment” includes hospital doctors and other positions where a candidate has been granted (part- or full-time) leave of absence to take the PhD degree.

The amount of candidates funded by the different sources differs across the three institutes, see Figure 3.

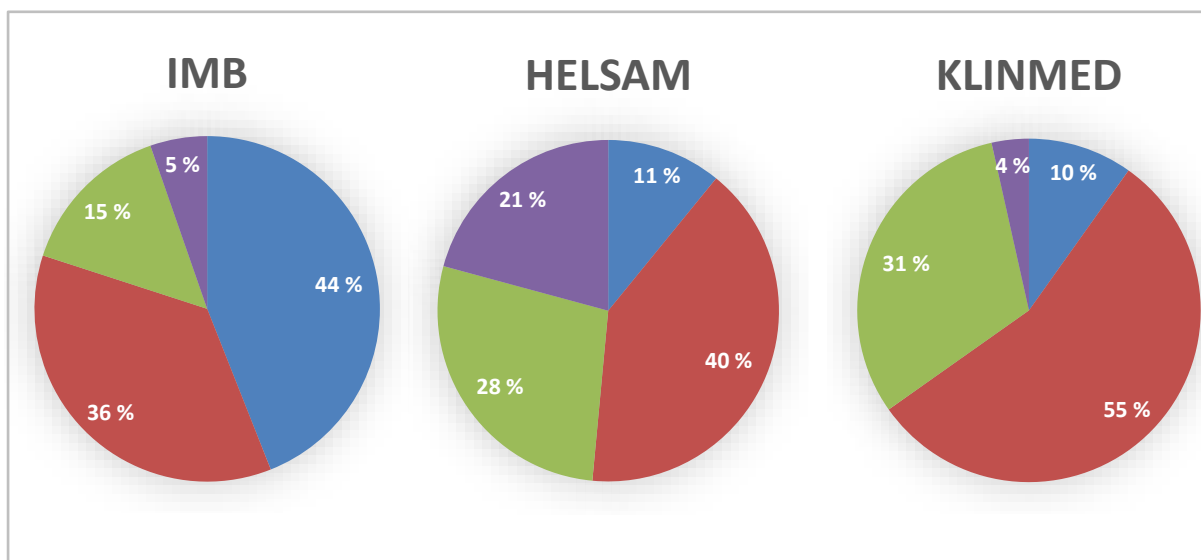


Figure 3. Funding sources of candidates at each institute at admission averaged across the years 2015-2017. The category “other” includes funding schemes to increase collaboration with low and middle income countries (e.g., NORAD, QUOTA programme). Whereas the category “external employment” at Klinmed contains mainly physicians and other health personnel in hospitals, this category contains a larger variety of professions at Helsam and IMB (e.g., researchers at external research institutes, nutritionists, physiotherapists).

2.5. Admission procedures

The candidate hand in their application consisting of several obligatory parts: application form, project description, plan for educational component, plan to complete the project within the stipulated time, employment contract, confirmation of funding, copy of diploma and transcript of records, ethical approvals, and TOEFL or IELTS test results for international applicants.

These applications are then checked by the Heads of postgraduate studies at the institutes. Together, they screen 200-250 applications per year.

Applicants are admitted if they meet the following requirements:

- 1) Project descriptions must meet the quality standards of research that are either externally or internally peer reviewed.
- 2) Projects must have received all necessary ethical approvals.
- 3) PhD candidates must have work contracts and research funding that will ensure completion within three PhD work years.
- 4) Projects must have the required minimum of two supervisors – where at least one is employed at the UiO.
- 5) Projects must include two (or three) party contracts with external parties where the external parties define the obligations of the partners in respect to the PhD candidate and the project. The two/three party contracts have to be signed by a person with budget authority.

- 6) PhD candidates must meet the formal requirements of completed Master degree (or equivalent as defined by NOKUT, The Norwegian Agency for Quality Assurance in Education) and also comply with the set grade minimum of the Faculty (or have real world experience that outweigh any grade deficits).

When approved and signed by the Heads of postgraduate studies, the application is sent to the Faculty for final approval and registration. Candidates are affiliated to a research group within one of the Faculty's institutes or centres (see Figure 4).

When registered at the Faculty, the PhD candidates get access to an internet service called StudentWeb. Here, they can enrol in PhD courses, do their semester reporting and review registered information regarding their admission period, appointed supervisors, approved course credits etc.

It is important to note that the candidates come from a wide range of educational and also national backgrounds. Although most of them are medical doctors, there are also psychologists, nurses, physiotherapists, (micro)biologists, pharmacists, mathematicians, sociologists, mechanical engineers, and others. In addition, as about a third of the candidates are recruited from abroad (see also section Internationalisation), a number of candidates received their degree from outside Norway. This heterogeneity has to be taken into account, for example, when developing courses for the candidates.

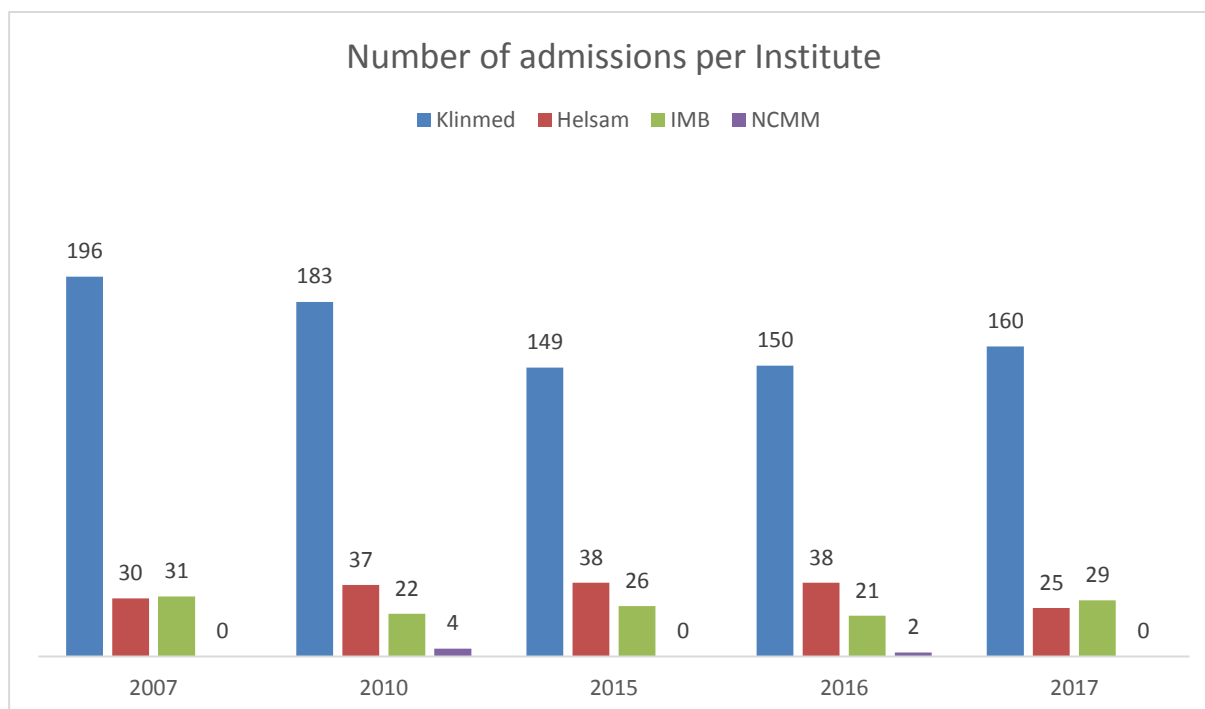


Figure 4. Number of admissions per Institute and at NCMM.

Key points: All applications for admission are checked and approved by the Heads of postgraduate studies before admission is granted by the Faculty. Project descriptions are usually peer reviewed (as they come from funded projects that were granted under strong competition). There are rules for open advertisements, and interviews and rankings of applicants and institutional employment boards. All these increase the quality of PhD recruitment.

Challenges: The strategic recruitment policy of the Hospitals and Health institutions allow major recruitment of clinical PhD candidates. The Institutes and Faculty need to strike a balance between quality assurance, department strategies and local user demands for health care research. The balance includes internal peer review as well as admission control.

2.6. Infrastructure and learning environment

The Faculty has excellent research environments where the PhD candidate is given accesses to state-of-the art infrastructure (scientific equipment). All PhD candidates should be associated with a research group to ensure they are trained on the practical competences required for their particular research.

At admission, it needs to be assured that the candidate has access to the necessary services needed for progress and implementation of the PhD project. This refers to office space, supervision, running costs, IT and laboratory facilities, etc. Access to office space, supervision and IT and library facilities is guaranteed by the work contract for employees of UiO. Running costs and access to laboratory facilities need to be agreed upon depending on the respective research project. For externally funded candidates, all this is ensured by a separate agreement with the external employer/research institution which needs to be added to the admission documents.

3: Special tracks to a doctoral degree

3.1. Medical student research program (MSRP)

During the 1990s there was a steady decrease in the proportion of medical candidates in Norway who pursued an academic career and completed a doctoral degree. This development reflected international trends and caused concern as the reduced recruitment involved all medical fields, including basic, clinical, para-clinical and public health research. In Norway, this challenge was met by a concerted effort to establish the Medical Student Research Program (MSRP), <https://www.med.uio.no/english/research/student-research-programme/>. It was established by the Norwegian medical faculties, the Research Council of Norway, and the Norwegian Department of Education and Science and funded by the research council.

There are about 70 MSRP-candidates on a parallel fast track to the PhD degree (for distribution across institutes see Figure 5).

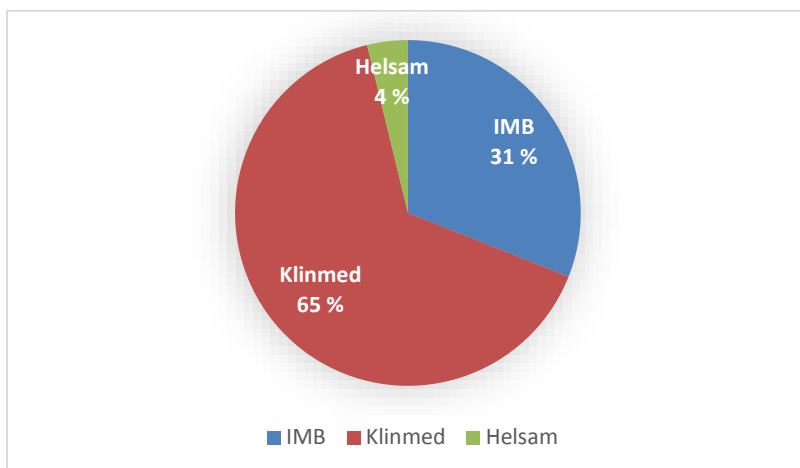


Figure 5. Distribution of students enrolled in the MSRP per institute

Students are invited to recruitment seminars after their second year where research groups present potential projects. Ten MSRP fellows are funded per semester. MSRP fellows attend faculty PhD courses as well as a national annual scientific conference. The conferences are organized and headed by MSRP fellows as well as alumni, and hosting rotates among the four universities with medical faculties.

The four faculties very recently evaluated the effect of the MSRP on recruitment and conducted a national controlled questionnaire study among all medical candidates who completed the MSRP since 2002 through the academic year 2013/14.

The evaluation showed that the MSRP increased the rate of completion of the PhD degree by about 10-fold and that the program also doubled the academic aspirations of MSRP-graduates. Additionally, the time before completion of the thesis was significantly reduced and the publication track was significantly higher compared to other PhD candidates.

3.2. Industrial PhD/Public Sector PhD

There is an option to do an Industrial PhD or Public Sector PhD. The Industrial PhD scheme for funding for industry-oriented doctoral research fellowships was established in 2008 to facilitate the recruitment of researchers to Norwegian industry. In 2014 a similar scheme was established for Public sector PhD.

Companies or public sector enterprises may apply for support for a three-year period for an employee seeking to pursue an ordinary doctoral degree. The doctoral candidate must be employed by the company/public sector enterprises and the doctoral research project must be of clear relevance to the company's activities/the public sector. These candidates require a cooperation agreement, but are otherwise enrolled in the ordinary PhD-programme.

3.3. The Dr. Philos.-degree

In addition to the PhD-program, the Faculty also offers the possibility to obtain the comparable degree of Dr. Philos (Doctor Philosophiae). This degree may be awarded to academics who have qualified for a doctoral degree on their own, without formal supervision. Such candidates have no formal affiliation to UiO until their application for the doctoral examination has been approved. Course requirements do not apply to these candidates. For regulations on this degree, see

www.uio.no/english/about/regulations/research/doctoral-degree/drphiloseng.html

Key points: The MSRP is an efficient recruitment channel that promotes academic career choice in medical students. The Dr. Philos. provides an alternative route to a doctoral degree, since the PhD programme may not fit all candidates.

Challenges: We have not successfully included the Institute of Health and Society in the MSRP. The number of Industrial Sector PhDs can be increased. Although the Dr. Philos. provides a comparable degree to the PhD, it is not always accurately perceived as such, since it is sometimes believed to be of lower quality or as a phase-out model.

4: Supervision

4.1. The supervisory team

The PhD candidate must have one principal supervisor and at least one co-supervisor. As a general rule, the principal supervisor should be employed at the Faculty of Medicine. When relevant for the project, a candidate can submit a short application giving his/her reasons for choosing an external principal supervisor. If the principal supervisor is external, at least one co-supervisor must be employed by the Faculty. All supervisors must hold a doctoral degree or equivalent qualifications.

More than 900 of the principal supervisors are registered as internal (employed at UiO), more than 600 are externally employed (see also Fig. 6). Among the co-supervisors more than 1500 are internal, while more than 1200 are external.

Candidates have the possibility to change supervisor (both co-supervisor and main supervisor). Any resignation or new appointment of a supervisor must be approved by the faculty. As Table 2 shows, the number of supervisor changes has increased in the last years. Changes also include appointments of additional supervisors and substitution of retiring internal supervisors. In recent years, the necessity to always have at least one internal supervisor has been emphasised by the Faculty, which may have contributed to the increased number of changes of supervisors.

Detailed information about the supervision process and the duties and responsibilities of supervisors are described at the Faculty's web site:

www.med.uio.no/english/research/phd/supervision/index.html

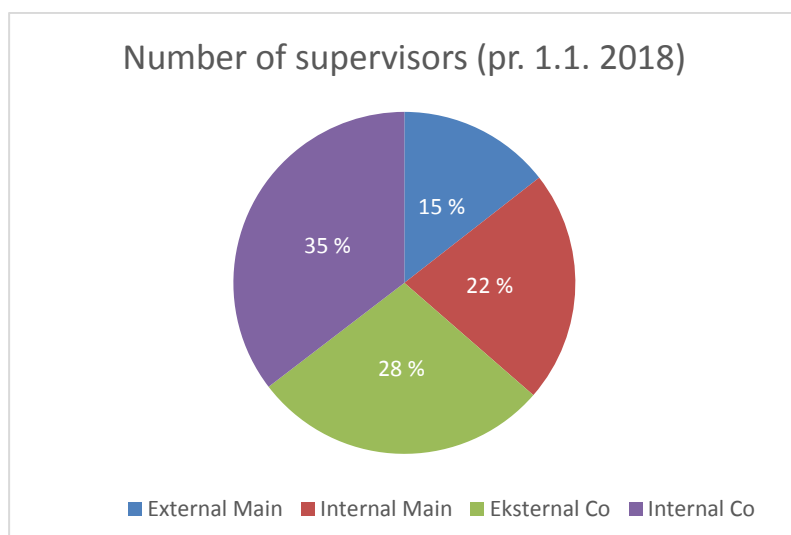


Figure 6. Proportion of internal and external principal and co-supervisors in January 2018 (total number: 1564 Main supervisors, 2733 Co-supervisors). The graph shows that the majority of appointed supervisors is externally employed.

Table 2: Number of changes of supervisors in different years

	Supervisor changes			
	2010	2015	2016	2017
Number of changes of supervisors	9	61	93	111

4.2. Training of Supervisors

As part of the Faculty's quality assurance system for the PhD program, we have focused on quality assurance and improvement of the supervision role.

From spring 2015 it has been compulsory for all new candidates as well as their principal supervisor to attend the first half day of the introductory course Intro I. Supervisors are required to attend once every 3rd year. It is also recommended, but not compulsory, for co-supervisors to attend. The aim of the compulsory part is to provide information about the PhD program at the Faculty of Medicine, including rules and regulations regarding application and admission to the program, PhD training and completion, compulsory PhD courses and research schools. Information about duties and responsibilities of both PhD candidate and principal supervisor, including ethics, is also given: www.med.uio.no/english/research/phd/courses/compulsory/#toc3

Moreover, reflections on the supervisor-candidate relationship are addressed. Both supervisors and candidates are also invited to the social get-together at the end of this introductory day. In May 2016 an info-package booklet was sent out by post from the Faculty to all registered supervisors. The booklet contained information about the rules

and regulations of the PhD programme, the PhD handbook, and the quality assurance system for the PhD programme at the Faculty.

In 2017 an online training course in data protection and information security for research (PIFF) was developed in cooperation with OUH. This course will be compulsory for all employees working with research. At the hospital level it is already compulsory for all personnel involved in clinical research.

Since 2007 the “Research leadership programme” has been annually offered by UiO. This programme at UiO is an intensive course consisting of four joint events corresponding to a total of ten days’ study. The main topics covered are: 1) Leading and developing research groups, 2) Leadership challenges related to the framework conditions for research, future research systems and the possibilities both within and outside the organisation, 3) Self-awareness and development of personal leadership skills.

The postdoctoral programme at the Faculty provides courses aimed at boosting research careers including research management and supervision of PhD candidates. The supervision module encompasses the following topics: 1) The supervisor-candidate relationship, 2) Giving feedback, 3) Supervision in medical academic writing, 4) Ethical aspects and dilemmas, 5) Phases in the supervision trajectory, 6) Institutional contexts /the PhD program. The course provides both theoretical introductions and practical training.

In addition, the university requires basic pedagogic competences of employees with permanent scientific positions, and offers courses which include one module on academic supervision (“Forskningsveiledning”).

New guidelines for supervision of PhD candidates are planned and a more specific training program for supervision at the Faculty level is under discussion.

Key points: PhD supervisors are offered formal courses, and are required to participate in introductory courses together with their candidates to become oriented about regulatory and organizational aspects of the program. Supervisors are also required to undertake an ethics course exam (PIFF). The Faculty has extensive career development programs for postdocs and research group leaders.

Challenges: Except formal academic track record, there is no formalized requirement for the role of PhD-supervisor, even though the Faculty offers such courses. Supervisors that are in need of an update regarding supervision are not always motivated to do so.

5: Research ethics

According to the law on organization of research ethical work (forskningsetikkloven), each researcher has an independent responsibility to follow recognized research ethical norms at all stages of the research process (e.g. authorship, data handling). The research institution, in turn, is required to provide the necessary training in recognized research ethical norms and to have procedures on how to follow up on potential misconduct (see also paragraph Breach Management further down). UiO has a strong focus on research ethics and has developed its own systems and procedures to ensure this.

All PhD-projects need institutional approval and must comply with relevant regulations. Most clinical research projects are covered by the Health Research Act (<http://app.uio.no/ub/ujur/oversatte-lover/data/lov-20080620-044-eng.pdf>) or the Data Protection Official for Research (NSD) (<http://www.nsd.uib.no/personvernombud/en/index.html>). This concerns all projects which intend to generate new knowledge about health and disease. In case of clinical projects, UiO has an agreement with all hospitals that these research projects follow procedures at the hospital.

Projects involving animal research must be approved in advance by the Norwegian Food Safety Authority (FOTS).

All candidates must along with their supervisors consider whether their project requires institutional approvals (REK, NSD, FOTS), or from other bodies. If the project requires approval, a full application must be submitted. If there is doubt whether approval is necessary REK must be asked for a preliminary assessment. When applying for admission to the PhD project, copies of ethical permissions or an explanation why none is required, are mandatory.

Key points: There have been substantial changes in legislation in the last years. UiO implemented a system for quality assurance that encompasses ethics. Data is often collected under different regulations (e.g., rules for animal research, GDPR for patient data). There is increasing international exchange, which means data may be collected under different ethical regulations, and issues such as data sharing and data ownership become relevant.

Challenges: Not every PhD-candidate acknowledges potential ethical issues in their research, and they are not always updated regarding current regulations. There has been a number of regulatory changes in the last years, and reaching out with updated information to all supervisors and candidates is a challenge. It needs to be ensured that researchers actually use the technological solutions (e.g. TSD) for handling and storing data. Also, new developments in science (Open Science, Data sharing) require solutions. Publication pressure may have unwanted consequences, e.g. plagiarism, publication in predatory journals, undeserved co-authorships, etc. It is not always clear to PhD candidates and supervisors where to turn to in case they need help regarding ethical issues.

6: From admission to thesis

6.1. Mandatory elements

Currently, the Faculty of Medicine has about 1500 candidates enrolled in the program (see Figure 7).

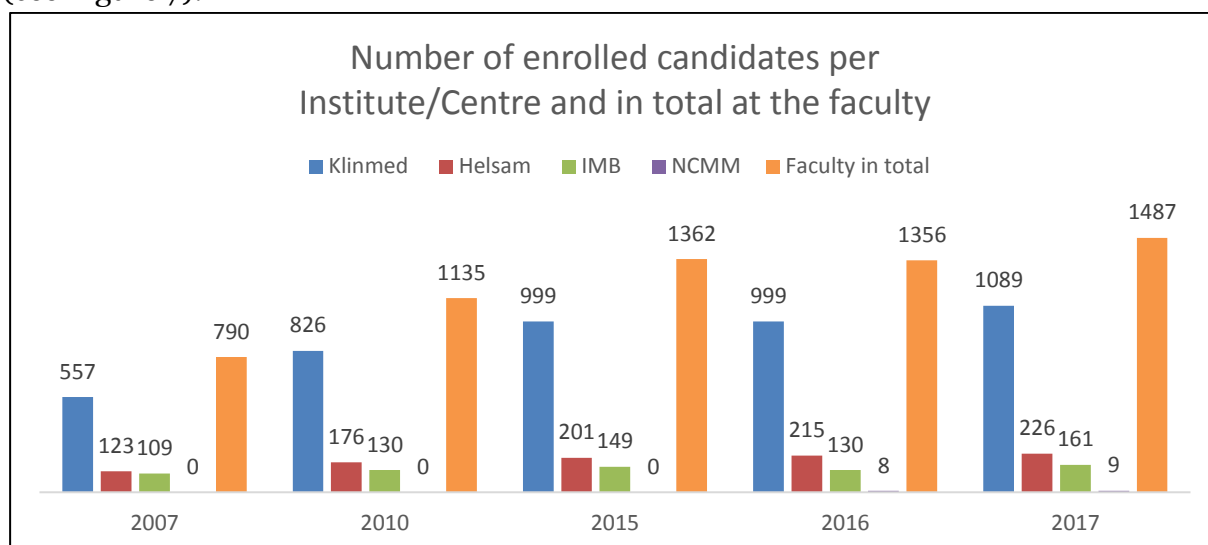


Figure 7. Number of enrolled candidates per Institute/Centre and in total at the Faculty.

When admitted to the PhD programme the PhD candidate is supposed to complete several elements during the course of study, as shown in Figure 8.

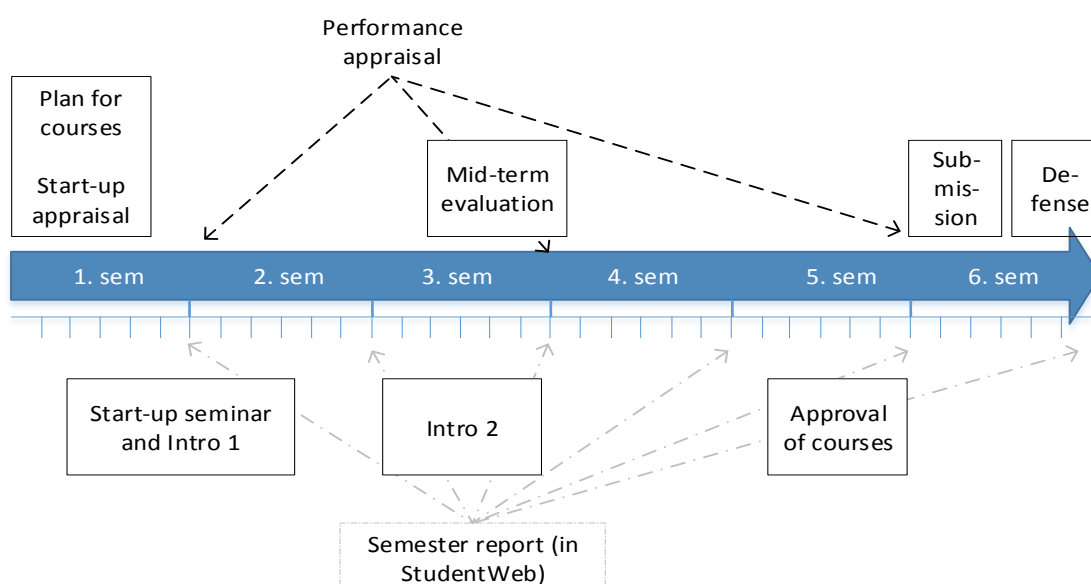


Figure 8. Elements and their scheduled occurrence in the PhD Programme. Elective courses not shown.

6.2. Start-up and performance appraisals

Candidate and principal supervisor should carry out regular appraisals and discuss the different aspects of supervision during the course of study. The first appraisal should be held when starting up on the PhD project when supervision and mutual expectations are discussed and determined. The PhD education's expected learning outcomes should be reviewed. Candidate and supervisor should together consider what training is required according to the expected learning outcomes.

The next appraisal should be carried out 6 months later, and should focus on project progress and collaboration. If relevant, the head of division may also participate in the appraisal.

Annual appraisals should thereafter be held throughout the admission period. The appraisals should be reported on a separate form and submitted to the Faculty's administration for filing.

6.3. Semester report

The candidate should submit electronic reports every semester on the progress of research and the educational component (see Figure 1 for its occurrence during the PhD course). Any significant deviation from the original time schedule or other particular aspects should be specified. The semester report system was implemented for the first time in December 2017.

6.4. Mid-term evaluation

All PhD candidates undergo a mid-term evaluation fifteen to eighteen months (see Fig.8) after admission. It is the responsibility of the principal supervisor to organize the mid-term evaluation and to appoint an evaluation board that will evaluate the progress and scientific development of the project.

Three weeks prior to the evaluation the candidate sends the following to the committee/evaluator: a short self-report on a standardized form, a maximum of 20 pages from selected manuscripts in preparation, and the original PhD project plan.

The candidate also prepares a presentation of about 15 minutes showing achieved results and explaining any deviations from project plan. This presentation is followed by a 45 minutes discussion with the committee/evaluator. Topics for the discussion are: Progress according to project plan, evaluation of the hypothesis, chosen methods, preliminary results, presentation of results, coherence in the work and possible suggestions for adjustments. This discussion is open to the supervisor and an audience.

The evaluation ends with a closed talk between the committee/evaluator and the candidate without the supervisor present.

The total time frame for the midterm evaluation is 90 minutes. The mid-term evaluation was implemented autumn 2015, and is compulsory for all candidates admitted after 1 January 2015.

6.5. Educational component

The programme's educational component consists of a compulsory 10-ECTS part and an elective 20-ECTS part. Candidates are encouraged to complete most of the training component during the first year of their doctoral period.

Compulsory part

A start-up seminar is mandatory for all new PhD candidates and their supervisors. At this seminar, the structure of the PhD programme is presented, along with rules and regulations for the PhD programme, PhD training and completion, and duties and responsibilities of both supervisors and candidates.

The compulsory part of the training component consists of two courses, or three for candidates working on research projects involving animal testing. The compulsory courses are listed in Table 3. The courses are multidisciplinary and expose candidates to a wide range of problems, methods, and topics in medical and health science research, and opportunities to get to know the considerable breadth of research activities and researchers that characterize the Faculty of Medicine. Each obligatory course is offered four times a year, twice in Norwegian and twice in English.

Table 3. Compulsory courses offered by the Faculty of Medicine.

Course	ECTS
Compulsory for all PhD candidates	
MF9010E - Introductory course to the medical PhD program, INTRO I	5
MF9030E - Introductory course to the medical PhD program, INTRO II	5
Additional compulsory course for candidates working on research projects involving animal testing	
MF9490 - Course in laboratory animal handling	5

The principle aim of the first of the obligatory courses (Introductory course I; six days duration) is to prepare candidates for complex and interdisciplinary problem solving. The course discusses basic insights from philosophy, theory of knowledge, history, ethics and methods of science. It also discusses the ongoing convergence in the life sciences and exemplifies convergence by showing how research projects can be addressed from different angles.

The second obligatory course (Introductory course II; 5 days duration) aims to provide participants with practical skills in scientific writing, writing the thesis, popularization, and writing for the public and media, as well as presentation skills, including poster presentations, layout graphical representation of data and the graphical abstract. Innovation, entrepreneurship, and the technology transfer office (Inven2) are also presented and discussed in this course.

The third obligatory course (Course in Laboratory Animal Handling) is mandatory only for candidates working on research projects involving animal research. The course meets the demands for skills required by the Animal Welfare Act 1997 and in the

Regulations of 2015 on the use of animals in experiments. It qualifies for animal testing in accordance with Articles 23 and 24 of the EU Directive 2010/63/EU.

Elective part

The elective component consists of 20 ECTS. A minimum of 15 ECTS must consist of PhD courses from a Norwegian or international educational institution. Up to 5 ECTS can be taken as other activities than PhD courses.

As shown in Table 4, 35 courses are currently offered by the Faculty of Medicine and its three institutes. 25 of these courses are regarded as the “core” of the course portfolio and assumed to be of relevance for PhD candidates from all the three institutes.

Table 4. Elective courses offered by the Faculty of Medicine and its institutes.

Course	ECTS
Provided on Faculty level	
MF9010E - Introductory course to the medical PhD programme, INTRO I	5
MF9030E - Introductory course to the medical PhD program, INTRO II	5
MF9120 - Introduction to infectious disease modelling	3
MF9120BTS - Molecular Medicine (national course)	10
MF9125 - Introductory course to cardiovascular research and medicine	5
MF9130E - Introductory course in statistics	8
MF9135 - Biomarkers in clinical research	5
MF9140 - Qualitative research methods	5
MF9150 - Essentials of Neurophysiology: from neurons to circuits to behaviours	5
MF9155 - Introduction to statistics and bioinformatics for the analysis of large-scale biological data	5
MF9165 - Psychosocial measures, psychiatry, and communication skills	5
MF9170 - Flow cytometry in medical research and diagnostics	3
MF9175 - Helsetjenesteforskning (health services research)	3
MF9185 - Critical perspectives on health and disease	5
MF9195 - OMICs in medical research	5
MF9215 - Life science, cell and animal research	3
MF9225 - A molecular approach to genetic and epigenetic gene regulation, from basic research to the clinic	5
MF9230 - Course on clinical, epidemiological and public health research	5
MF9250 - Methods in Cardiac Research	2
MF9295 - Global health	5
MF9490 - Course in Laboratory Animal Handling	5
MF9510E - Logistic regression, survival analysis and Cox-regression	4
MF9555 - Analysis of repeated / correlated measurements	5
MF9570 - New statistical methods for causal inference	4
MF9580 - Epidemiological methods, beyond the basics	4
Provided by Institute of Health and Society	
HES9265 - Community-Based Participatory Action Research	5
HES9280 - Introduction to medical anthropology	5
HES9285 - The Economics of Hospitals: Competition, Price Incentives, Non-profit status and Waiting Times	5
HES9320 - Medical history: sources, methods and historiographic questions	3
HES9325 - Register-based epidemiology	3
HES9355 - Reproductive and sexual health and rights in global health	3
Provided by Institute of Basic Medical Sciences	
IMB9270 - Quantitative biology, or mathematics is biology's next microscope	2
IMB9275 - Prediction (in Molecular Biology)	5
IMB9335 - Modern methods for analysing survival and time to event data	4
IMB9345 - Neuroscience data integration through use of digital brain atlases	1

These courses are funded and managed by the Faculty centrally. The remaining 10 courses are referred to as “institute courses” and normally have candidates from the respective institute as its most important target group. These courses are financed and managed by the institutes.

The programme encourages candidates to take relevant courses at other faculties at UiO as well as at other universities in Norway and abroad. Several candidates take courses provided by other faculties than the Faculty of Medicine. Courses at UiO’s Faculty of Mathematics and Natural Sciences are popular, and a few candidates take courses at the Faculty of Social Sciences. PhD candidates also attend courses offered by the School of Health Innovation which teaches practical innovation and entrepreneurship skills (a joint undertaking by UiO’s Faculty of Medicine, the NTNU in Trondheim, and the Karolinska Institute in Stockholm) and Inven2 (an innovation company owned by the University of Oslo and Oslo University Hospital).

Researcher schools (see chapter 6) offer a variety of PhD courses related to the schools’ theme and these courses are also open to PhD candidates outside the schools if they have capacity.

Other educational activities

Up to 5 ECTS can be granted for other activities than PhD courses according to current rules:

- *Participation in a national congress with a presentation* (oral or poster presentation):
1 credit per congress. A maximum of 3 credits can be achieved in this manner. The presentations must be on different individual projects.
- *Participation in an international congress with a presentation:*
2 credits per congress. A maximum of 4 credits can be achieved in this manner. The presentations must be on different individual projects.
- *An original lecture:* 1 credit per hour, up to a maximum of 2 credits.
- *A popular scientific article/chronicle written on the candidate’s subject area:*
1 credit per article, up to a maximum of 2 credits.
- *A study or research period at an institution abroad:*
1.5 credits for the first two weeks, followed by 1 credit per week. A minimum duration of two weeks is required. The plan for the stay abroad must be approved by the principal supervisor and its completion must be confirmed by the external institution. A written report must be submitted after completion.

6.6. Revision of the educational component

The educational component of the PhD programme was revised in 2014 and 2015, and the current version of the programme has been under implementation since 2016.

Some key objectives of the revision was to provide an educational component that would be:

- Academically up to date

- Fully in line with the national qualification framework for PhD
- Better tailored towards the needs of the candidates across the three institutes
- Dimensioned to accommodate the growing number of PhD candidates.
- To ensure that resources were spent as wisely as possible.
- Interdisciplinary approaches should be taken when possible

6.7. Capacity

Some of the most popular courses had waiting lists until the spring semester of 2017, especially the basic methods courses in epidemiology, statistics and qualitative research methods. The capacity has been expanded, and waiting lists are no longer an issue.

Apart from candidates enrolled in the Faculty's PhD programme, around 100 doctoral candidates from other faculties at UiO or universities in Norway and abroad attend courses each semester.

6.8. Exam assessments and results

All courses have exams. These can take the form of home exams, oral presentations, or ordinary written exams. Exams are graded on a pass/fail scale. In case of a fail grade, candidates can re-sit an examination twice (i.e. a maximum of three times in total).

6.9. Continuous evaluation of courses

All courses are routinely evaluated by course participants. As illustrated in Figure 9, courses overall currently receive very good evaluations. The figure shows how candidates evaluated their overall satisfaction with the courses they attended in the autumn semester of 2017. The minimum score for a course was 1 and the maximum was 5. Only five of the courses had ratings below 4.0.

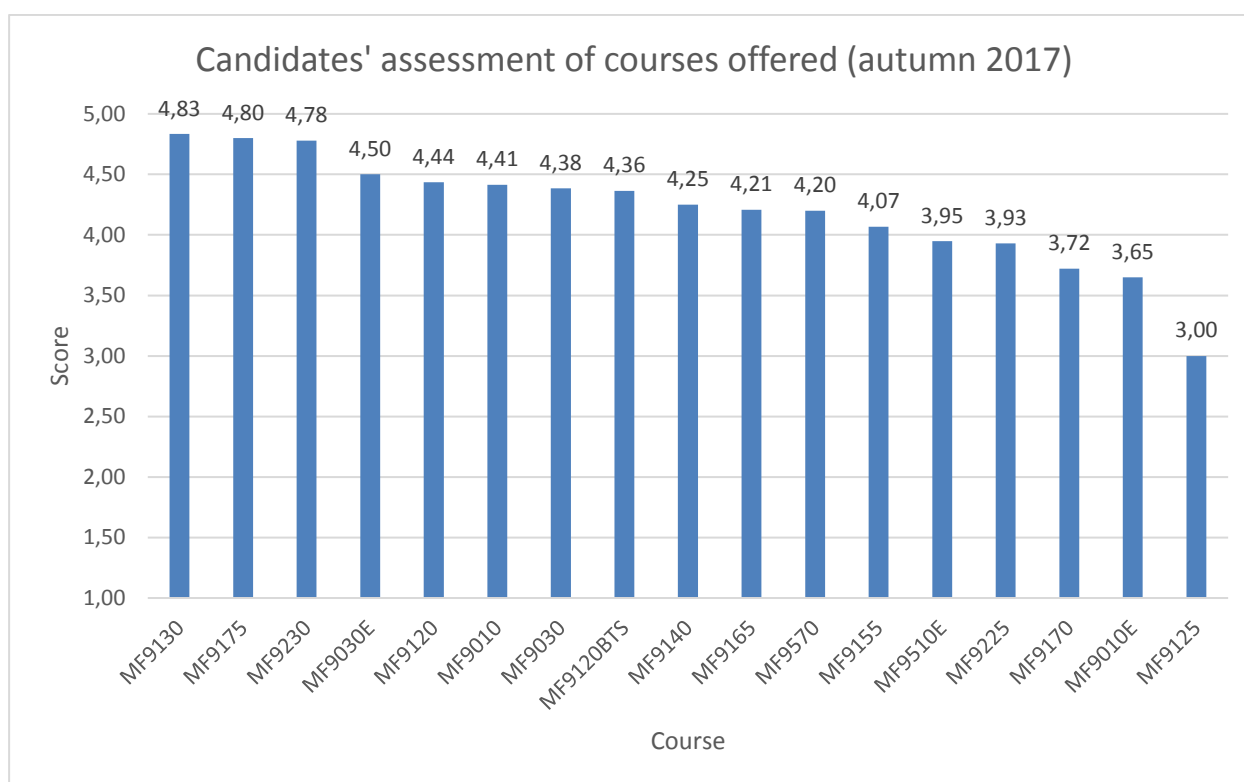


Figure 9. The figure illustrates how participants rated the following statement: “Overall, I am satisfied with the course”. They could choose from the following response options: Entirely disagree (scored as 1), partly disagree (2) neither agree nor disagree (3), partly agree (4), and entirely agree (5). The overall score is a weighted average of responses provided by course participants who chose to complete the evaluation questionnaire. The course codes in the chart correspond to course titles as explained in Tables 3 and 4.

6.10. Course committee

A course committee oversees the educational component of the programme. It consists of the research dean, the four Heads of postgraduate studies, one additional faculty member from each of the Faculty’s three institutes, the Research director at the Faculty, and an advisor from the Group for Research Training.

The committee meets two to three times a year. Its mandate is to:

- Maintain overall overview of the course portfolio and continuously assess the need for changes in it
- Approve new courses and award them their ECTS credits
- Carry out quality assurance/evaluation of courses
- Stay in communication with course directors
- Continuously monitor students’ course evaluations and take action on the basis of these.

Key points: The course portfolio is well-organised. The application and admission process is efficient, waiting lists are rare, and the management and delivery of courses appear to be smooth in most cases. Course evaluations appear to have improved. The

course portfolio offers a rich variety of methods courses in many fields and on different levels, and these courses are generally receiving very good evaluations from the PhD candidates

Challenges: The course portfolio does not provide many courses with a thematic focus, especially within clinical medicine. It is difficult to find a balance between offering courses meeting the specific interests of each PhD candidate and not having too many and very small courses (too specified and therefore, too few attendants).

6.11: Researcher Schools

The Research Council of Norway has a scheme for national graduate-level researcher schools (forskingskoler) that currently provides funding to 22 national researcher schools across the country. The scheme is funded by the Ministry of Education and Research. These schools supplement existing doctoral degree programmes at the various institutions and their goal is to improve the quality of the PhD education and enhance the internationalization of researcher training in Norway.

Each school consists of a network of institutions that have entered into binding cooperation on doctoral-level training in a specific field.

The Faculty of Medicine hosts three national graduate-level researcher schools and is a partner in three additional researcher schools. The participating institutions collaborate on PhD courses, seminars, summer schools and the like, with reciprocal use of their respective laboratory facilities in fields where this is relevant. Researcher schools can thus provide broader-based researcher training than each individual institution could on its own.

For more information about existing researcher schools, see:
www.med.uio.no/english/research/schools/

Key points: Researcher schools provide a good complement to the courses offered at UiO. They also support net-working and are highly accessible due to the provision of travel support

Challenges: PhD candidates are not always aware of the travel support. Since the courses are hosted by different faculties and universities and there are different rules for example for remunerating lecturers, the administrative aspect is not always easy.

6.12: Time to completion and degrees per year

The time to completion (see Table 5) is clearly above the scheduled three-year-period. However, the table shows the time from enrolment to submission of the thesis and does not consider any leaves of absence. Given that a high number of the candidates has one or more leaves of absence due to parenting during the course of their PhD, this increases the completion time.

Table 5. Average time to completion for women and men.

Time on the PhD program from admission to submission					
	2007	2010	2015	2016	2017
Women					
IMB	4.5	4.8	5.8	4.7	4.6
Helsam	4.5	5.5	6.0	6.0	5.2
Klinmed	4.5	4.2	5.5	5.6	5.3
NCMM			4.1	3.75	5.4
Sum	4.5	4.4	5.6	5.4	5.2
	2007	2010	2015	2016	2017
Men					
IMB	4.4	5.3	4.9	4.2	3.9
Helsam	5.4	5.0	4.4	5.8	6.1
Klinmed	4.6	4.3	5.4	5.8	5.5
NCMM				3.8	
Sum	4.7	4.5	5.2	5.5	5.4
Average (men + women)	4.6	4.5	5.5	5.4	5.3

Moreover, a rather large part of the PhD candidates takes the PhD programme part-time in order to combine it with clinical or other kind of work.

The main priority of the programme is to make sure that the candidates complete their PhD, not that they do it within exactly three years. Therefore, we deem these numbers to be satisfactory, but will continue our work to decrease them.

If leaves of absence are not considered in the time to completion, the average time to complete the PhD in the years 2010 to 2017 ranges from 3.7 to 3.9 years (averaged across institutes).

Table 6. Total number of candidates and percentage of women with passed grades per year and institute.

	Degrees per year and institute									
	2007		2010		2015		2016		2017	
	Total #	% women	Total #	% women	Total #	% women	Total #	% women	Total #	% women
IMB	11	64 %	26	65 %	27	63 %	29	59 %	24	61 %
Helsam	4	25 %	21	76 %	31	81 %	20	70 %	28	61 %
Klinmed	47	66 %	136	55 %	143	63 %	135	63 %	167	60 %
NCMM					1	100%	6	66 %	3	67 %
Total	62	63 %	183	59 %	202	66 %	190	64 %	223*	60 %

*The total number includes one female candidate registered directly at faculty level

Key points: The PhD programme is often not completed within three years, which presumably can be explained by leaves of absence and part-time work. Work on reducing the time of the PhD programme needs to continue.

Challenges: The high number of leaves of absence and part-time working PhD-candidates delays the completion of the PhD. There is still a need to focus on reducing the time to completion in general.

9: Thesis submission and evaluation

9.1. Requirements

The thesis must contribute to the development of new scientific knowledge and be of sufficiently high quality to merit publication. The thesis requirements are laid down in *Regulations for the degree of Philosophiae Doctor (PhD) at the University of Oslo (§ 10.1.)* and the *Supplementary rules pertaining to the regulations*.

A PhD thesis should normally consist of at least three scientific articles published in or submitted to international peer-reviewed journals and an overall presentation of the scientific results with a thorough comparative discussion (kappen). On submission of the thesis, at least one of the articles should be accepted for publication. The PhD candidate should be the first author of at least two articles or otherwise have made a substantial contribution to data collection, interpretation and writing.

The number of articles required depends on the size and quality of each separate article and on the extent of the candidate's contribution. The number of articles may be reduced if the candidate has put an unusually large amount of work into an article of very high quality.

The thesis' overall presentation must be an independent scientific document in which the candidate has the opportunity to elaborate and potentially correct certain aspects of the articles. It must show a thorough grasp of scientific perspectives and maturity as well as the ability to investigate specialised scientific issues.

Unpublished monographs can also be approved as theses for the PhD degree. These must be assessed according to the same criteria as article-based theses. However, monographs are an exception at the Faculty of Medicine.

9.2. Evaluation committee

The committee is composed of three members: first and second opponent (external examiners), and a committee chair who administers the committee's work. It is the supervisor who proposes the persons to serve as committee members.

The first step of evaluation by the committee is a written report (review) of the thesis. The report ends with a recommendation. The recommendation could either be positive, recommending to proceed with the next steps of PhD examination, negative (failed), or minor revision. If fundamental changes regarding the theories, hypotheses, material or methods employed in the thesis are necessary before the work can be

recommended as meriting a public defence, the committee shall not recommend minor revisions, but shall fail the thesis. Following minor revision, the thesis needs to be re-submitted within a maximum of six months. A revised thesis following “minor revision” can still be failed. Following fail, the thesis can be re-submitted earliest six months later. There is only one chance to re-submit after a fail.

On the basis of the evaluation committee's recommendation the Faculty decides whether a doctoral thesis is ready for public defence. The Faculty can seek further clarification from the evaluation committee and/or appoint two new experts to give individual statements on the thesis.

When the Faculty has found the thesis to be worthy of defence the PhD candidate shall deliver a trial lecture. The trial lecture is an independent part of the PhD examination. The purpose is to test the candidate's ability to acquire knowledge of matters beyond the thesis topic, and to impart this knowledge in a lecture setting. The title of the trial lecture will be decided by the evaluation committee and announced to the candidate ten working days before the trial lecture. The topic of the lecture should not be too close to the topic of the thesis.

The evaluation committee decides whether the trial lecture merits a pass. The committee's recommendation must be substantiated if the committee recommends a fail. The trial lecture must be passed before the public defence may take place.

During the public defence, the opponents' role is to stimulate and maintain a discussion with the candidate while making the candidate defend the thesis. The first opponent has approximately 75 min to question the candidate, and the second opponent has 60 minutes. The evaluation committee decides which of its members are to take the roles of first and second opponent. Members of the audience also have the opportunity to comment.

The evaluation committee delivers its recommendation to the Faculty as to whether the defence should be approved. The committee's recommendation must be substantiated if the committee does not recommend approval of the defence.

In recent years, the number of non-approved theses has increased (see Table 7), most likely due to stricter requirements for thesis content, especially for the overall presentation with a comparative discussion (kappen), and increased quality control.

Table 7. Number of fails and rejections of theses from 2015 to 2017 (no data available for the years before). None of the theses with minor revisions failed at resubmission. One thesis in 2015 and one in 2017 failed twice.

Number of revised and/or failed theses			
	2015	2016	2017
Minor revisions	21	14	18
Failed degree	3	9	17
Total number of submitted theses	191	253	249

Key points: The examination contains several elements which provide a comprehensive picture of the candidate's competences.

Challenges: It is not always clear to candidates and supervisors that three published articles are not obligatory, but that the number of articles is flexible. The experienced press of three publications may foster practices such as salami slicing. Furthermore, the overall presentation ("kappen") is at times not of sufficient quality. This may partly be due to the fact that concrete guidelines for the overall presentation are absent. Another challenge is that the Faculty's thesis requirements are not always well-known for candidates and opponents from foreign countries.

10: The Faculty's quality assurance system for the PhD programme

10.1. Purpose

UiO has developed a quality assurance system for education which also includes the PhD education: www.uio.no/english/about/regulations/studies/quality-assurance/system-description.html

Based on this, the Faculty of Medicine has developed its own system for the PhD programme in Medicine and Health Sciences:

www.med.uio.no/forskning/phd/oppbygging/kvalitetssystem_medisin_2015.pdf (only in Norwegian).

The quality assurance system shall help doctoral candidates to complete theses of high academic standard, help ensure that the education is completed as close up to the stipulated length of time as possible and ensure that doctoral theses from the UiO comply with good research practice and current regulations.

10.2. Elements

The quality assurance system includes the following elements:

- 1) Strategy for maintaining quality in the PhD Programme
- 2) Descriptions of the PhD Programme's learning outcomes
- 3) Evaluation tools
- 4) Feedback cycle
- 5) Plan for evaluations and quality improvements

The semester report, mid-term evaluation and annual appraisals are all part of the quality assurance system.

Key points: Semester report, mid-term evaluation and appraisals are conceived as measures to tightly follow up the progress of the PhD.

Challenges: Supervisors and candidate do currently not receive notice that the mid-term evaluation is due. Some candidates take the mid-term evaluation very late in the PhD course, which is rather late for incorporating changes or to intervene in cases where candidates struggle. Acceptance for the mid-term evaluation is not always present among supervisors.

11: Breach Management (conflict management)

11.1. General

Compliance with laws, regulations and ethics requirements is a line responsibility at the Faculty of Medicine (and the institutions with which it collaborates about researcher training).

For research projects where the Faculty of Medicine is the entity responsible for research (Forskningsansvarlig), key routines, roles and responsibilities are described in the university's Quality System for Medical Research (only in Norwegian):

www.uio.no/for-ansatte/arbeidsstotte/fa/regelverk-og-forskningsetikk/kvalitetssystem-helse

11.2. Conflicts

Any conflict arising between candidates and their supervisor(s) should be sought to be solved at the lowest possible organisational level.

The PhD-coordinators are available to assist the parties with conflict resolution, if necessary in collaboration with the institute leader, the Research Dean and the administrative team for research education at Faculty level.

In the case a solution cannot be found, the Supplementary rules for the degree of PhD state: *"If the parties do not find a solution to the situation, one or both can ask to be released from the supervisor agreement. A request to be released from a supervisor agreement must be sent to the Group for research training."*

11.3. Handling bodies

Cases related to research ethics and breaches, are handled in the following manner:

The Faculty of Medicine has until recently had a Research Ombudsman mandated to provide advice on research ethics and assess cases of deviations and breaches. The ombudsman recently retired, and the position is currently vacant. The plan is to replace the single ombudsman with two ombudsmen in the future, one for the Institute of Clinical Medicine and Oslo University Hospital, and another for the other institutes (and also for the Faculty of Natural Sciences).

As long as these positions are not filled, the PhD-coordinators together with their institute leader, and at Klinmed research leaders/group leaders, are available to assist with issues related to compliance with breaches related to laws, regulations and ethics guidelines. A Research Ethics Committee (Redelighetsutvalg) is established for the Faculty of Medicine and the University Hospitals (OUH and AHUS). They are handling all cases related to medical research, while the Research Ethics Committee on the central University level (Forskningsetisk utvalg) handles all other cases.

Key points: It is important to pick up ethical issues at an early stage. This is the aim of the use of semester reports and midterm-evaluations.

Challenges: Due to the current absence of an ombudsman it is not always clear whom to address in case of ethical questions.

12: Internationalisation

The UiO and the Faculty of Medicine have a marked international profile. About a third of our PhD candidates are recruited from abroad either via international advertisement, via research networks or via international collaborations and consortia. These candidates are often not fluent in any Nordic language and therefore depend upon English language communications and PhD course curriculum. Most Faculty communications are sent in English. Further, the Faculty newsletter *MedNytt* has both Norwegian and English versions¹. In addition, the UiO research news channel *Apollon* has an English version. Most web pages are available in English. The PhD program also has a PhD Handbook that presents the PhD program “from A to Z” where all aspects of the PhD education are covered. This handbook is only available in English.

However, there are exceptions where essential information is only provided in Norwegian, for example annual strategy plans for the Institutes and nominations for teaching and communication prizes where information remains in Norwegian.

¹ <https://www.uio.no/english/for-employees/unitpages/med/news/newsletter/2018/january/index.html>

PhD candidates are encouraged to travel, and therefore can get course credits for performing research abroad, participate in international conferences and take courses abroad (see section 5.5. Education component). However, travel funding is up to the institute to which the candidate is affiliated.

At the moment, we lack comprehensive statistical data about the mobility of PhD candidates going abroad. However, the results from the candidate survey performed in the context of this evaluation (see separate document) suggests that around 70% of candidates have travelled or are planning to travel to international conferences, courses or other kinds of international research stays abroad. European countries outside the Nordic countries were the destinations that most candidates report having travelled to.

The Faculty of Medicine has strategic cooperation agreements on the PhD level with several academic partner institutions: The Norwegian University centre in St. Petersburg (Russia), University of Jimma (Ethiopia), School of Medicine, Zhengzhou Medical University (China).

Helsam has several PhD projects funded by the Norhed Programme (The Norwegian Programme for Capacity Development in Higher Education and Research for Development) e.g. MY-NORTH (Myanmar), SACCADE and NORPART Excel Smart (Ethiopia/Africa).

Key points: The Faculty and UiO have a high level of international recruitment and integration of internationals in research groups. Web pages and course content as well as standardised information is delivered in English.

Challenges: The University and the Faculty do not fully make use of the potential that the international background of the candidates provides. The aspect of cultural differences (e.g., in hierarchy, communication and ethical standards) is not fully addressed. Although travelling abroad is encouraged, funding is not always available. Moreover, the candidates' interest in longer research stays is limited.

13: Work relevance: How the PhD programme contributes to the candidates' employability

The PhD training aims to prepare candidates for complex working tasks in and outside academia. Emphasis is made on providing a general academic education to candidates and preparing them for complex interdisciplinary problem solving. The first mandatory course, INTRO I, gives an overview of diverse research topics and methods within the medical field at large. Convergence between disciplines and approaches is a key issue. Hence, candidates are trained to share and draw on each other's knowledge and to see themselves as part of a larger academic community.

Solid training in generic skills is an important part of the programme and the main focus of the second mandatory course, INTRO II. Here, the candidates are introduced to topics such as: How to make an interesting lecture? Content and style to engage your audience, creative use of visual aids, body language and coping with nervousness, writing to a scientific and non-scientific audience, oral communication and research-driven innovation. They are also given practical training and feedback from various specialists. All these topics are highly relevant across diverse working contexts.

Through the School of Health Innovation PhD candidates are offered tools and knowledge to innovate services, create new companies with their research ideas, or bring their research ideas and talent into existing companies. School of Health Innovation is an initiative by University of Oslo (UiO), NTNU in Trondheim, and Karolinska Institutet (KI) in Stockholm developed with Nansen Neuroscience Network. Other collaborators in the business community are Oslo Medtech and Oslo Cancer Cluster. The program of the School is also developed in collaboration with University of Bergen (UiB) and University of Tromsø (UiT).

The School of Health Innovation provides e.g.:

- understanding of the opportunities of health innovation and entrepreneurship for utilization of research
- knowledge of health innovation to address challenges and develop services and products within a clinical setting and a biopharma/medtech setting
- various business tools for ideation and feasibility studies; to develop, prototype and test solutions in response to user needs
- ability to develop a business plan based upon a novel idea and communicate a business plan to people within the start-up world
- understanding of how Tech Transfer Offices and other innovation support actors can support the commercialization process
- the basics in financing a start-up company from private and governmental funding bodies

Key points: Candidates receive training in generic skills during the Intro 2 course. The School of Health Innovation provides early insight into the business sector. To date there is no career advice on the PhD-level, but support for creating a career development plan is offered on the postdoc-level. The Faculty plans to offer some form of career advice for PhD students in the years to come.

Challenges: A large number of candidates still hope for a career in academia (see survey results), which is not realistic. Awareness for alternative careers needs to be increased. The portfolio of the School of Health Innovation is presently not widely known, despite information on the home page, e-mail information and its mentioning in diverse courses. So far only very few candidates take part in the School of Health Innovation. Cooperation with the commercial sector is limited to date.