

**Erasmus MC**

Universitair Medisch Centrum Rotterdam



# Research Assessment

Theme SPIN  
(Spoed Perioperatief  
Intensief)



Research review according to the Standard Evaluation Protocol 2015-2021

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## Preface

In November 2020, our committee visited the departments of Anaesthesiology, Emergency Medicine and Intensive Care in the theme SPIN of the Erasmus MC in view of the SEP audit. Despite the online setting and impact of COVID-19, the departments made effort to give us a good understanding of the scientific activities in the departments.

We were welcomed by a group of enthusiastic staff members, researchers and PhD students, and interesting, lively, and at times critical conversations took place. Our dialogues with the PhD students and junior researchers were inspiring, and they gave us the impression that there resides potential in the theme that is not yet fully deployed.

We here present our evaluation of the scientific activities and quality of the SPIN Theme. Our main goal was to critically analyse the quantity and quality of current research and future opportunities within the theme, and to provide the department managements with constructive points for improvement. We realize that we were critical in the grading of the research quality and strategy, but the committee believes that the viability of the theme remains uncertain without clear feedback and suggestions for improvement.

We hope that Erasmus MC, the theme and the departments will use our feedback to develop a bright research strategy. We are convinced that there is potential in the departments to grow into national and international scientific leaders within the field of acute, perioperative and intensive care.

**Professor Christa Boer**  
**Committee chair, Theme SPIN**  
January 14 2021, Amsterdam



## I. Introduction

### Assignment to the committee

The Executive Board of Erasmus University Medical Centre Rotterdam (Erasmus MC) initiated an assessment of scientific research done at the institute during the period 2013-2018. This quality assessment was part of the regular six-year evaluation cycle of the research of Dutch Universities and University Medical Centres (UMCs).

The primary units of research at Erasmus MC are its 48 departments, which are (financially) responsible for carrying out the institute-wide research strategy. Each department is led by a Department Head appointed by the Executive Board of Erasmus MC. The Department Head is fully responsible for the core functions (research, education and, if applicable, patient care) as well as for the atmosphere and working environment (diversity & research integrity) of the department. Historically, departments are distributed over nine overarching themes:

1. Biomedical Sciences (6 departments)
2. Brain & Senses (6 departments)
3. Daniel den Hoed (3 departments)
4. Diagnostic & Advice (7 departments)
5. Dijkzigt (8 departments)
6. Health Sciences (4 departments)
7. Sophia (Paediatrics, 7 departments)
8. SPIN (3 departments)
9. Thorax (3 departments)

For the purposes of this assessment, the Executive Board of Erasmus MC appointed a separate committee of international experts for each of its nine themes, consisting of international experts in the fields of the underlying departments. Each committee conducted its own assessment, amounting to a total of nine assessments. The respective digital site visits to Erasmus MC took place in the period June 2020 to April 2021. The SPIN site visit took place on 1-2 November 2020.

Originally, the members of each committee were intended to meet with one another and with institute, theme and department representatives during onsite meetings. These were scheduled to take place in the spring of 2020. However, due to the global Covid-19 pandemic, the site visits to Rotterdam were first postponed and later replaced by remote meetings via a digital platform. In order to partially compensate for the loss of interpersonal interaction during physical meetings,

it was decided to schedule additional online meetings between committee members and use interactive working methods.

The committee did not attempt to compare Erasmus MC departments working on different research topics to each other. This might lead to differences in determination of a certain score, for example when it comes to critical mass and size of department, or amount of external funding obtained. The committee emphasizes that the assessments made by the nine committees are not comparable and thus should not be used in a comparative manner. For example, the scores that are given are not coordinated between committees and should therefore not inform funding strategies at the Erasmus MC level; each committee assessed the theme in question on its own merits.

### Assessment criteria

The assessment of the Theme SPIN was guided by the Standard Evaluation Protocol 2015-2021 (SEP) of the Royal Academy of Sciences and Arts of the Netherlands (KNAW), the Netherlands Organisation for Scientific Research (NWO) and the Dutch Association of Universities (VSNU). The three assessment criteria specified in SEP – (1) research quality, (2) relevance to society and (3) viability – formed the starting point for the assessment. In its report, the committee both qualitatively and quantitatively assesses these criteria, scoring them on a four-point scale, ranging from world leading/excellent (1) to unsatisfactory (4). The meaning of the scores is explained in appendix 2. In accordance with SEP, the assessment also includes a qualitative appraisal of Erasmus MC's PhD program, and its research integrity and diversity policies and practices.

In addition to the SEP criteria, the committee took three specific research-related targets into consideration. These are part of Erasmus MC's current strategy ([Strategy23](#)), which designates 'Technology & Dedication' as its guiding principles. In the Terms of Reference (ToR) for the research assessment the Executive Board of Erasmus MC describes the three research-related targets as follows:

1. Positioning ourselves as a partner;
2. Using technology to lead the way in innovation;
3. Focusing on our staff and internal organization.

## Committee composition

Members of the committee that assessed the departments of Theme SPIN were:

- Prof. Christa Boer (chair), Amsterdam University Medical Centre;
- Prof. Lars I. Eriksson, Karolinska Institutet and Karolinska University Hospital, Sweden;
- Prof. Marc Sabbe, KU Leuven, Belgium;
- Prof. Mervyn Singer, University College London, UK.

Dr Meg van Bogaert was appointed as independent secretary to the committee. A short curriculum vitae of each committee member is included in appendix 1.

All members of the committee signed a statement of impartiality and confidentiality to ensure a transparent and independent assessment process. Any existing professional relationships between committee members and departments under assessment were reported. The committee concluded that there was no risk in terms of bias or undue influence.

## Documentation

Prior to the site visit, the committee received the self-evaluation report of the theme and its underlying departments, including the information and appendices required by SEP. The following additional documents were provided:

- Standard Evaluation Protocol 2015-2021;
- Terms of reference;
- A Beginner's Guide to Dutch Academia (The Young Academy, 2018);
- Addendum to the self-evaluation report.

## Working method

In an online kick-off meeting, approximately six weeks prior to the site visit, the committee was introduced to the Standard Evaluation Protocol (SEP) and the Dutch academic landscape, and agreed upon procedural matters. The committee members were asked to read the documentation provided and to formulate preliminary assessments and questions for the interviews. In a second online meeting, approximately three weeks prior to the site visit, the committee discussed its preliminary findings and formulated questions on relevant topics. These questions were afterwards sent to the Department Heads of the SPIN Theme and Erasmus MC in order to assist in their

preparations for the site visit. In the week prior to the site visit, the theme and departments provided the committee with a document that included answers to most of the committee's questions. On the day before the start of the digital site visit, the committee held a third preparatory online meeting to prepare the interviews.

Each member of the committee was primarily responsible for the assessment of one specific department. As 'first assessor' he or she took the lead in preparing for the assessment of this department, chaired the sessions with its staff and subsequently drafted an assessment based on the SEP criteria. For reasons of continuity, a 'second assessor' was appointed to each department. As opposed to the first assessor, the second assessor was not necessarily an expert in the field of that department.

The site visits of Theme SPIN took place on 1-2 November 2020. During the site visit, the committee met with the Dean as a member of the Executive Board of Erasmus MC, as well as with representatives of the departments. Each department was given a time slot, which it filled with presentations and interviews. The committee also spoke with PhD students of the departments. Prior to the site visit the secretary of the committee had a digital meeting with the selected PhD students. Prior to this meeting the PhD students were requested to fill out a questionnaire, by way of follow-up questions the secretary was able to provide the committee with information on the selection, training and supervision of the PhD students. The committee members used this information in two consecutive speed-dates with PhD students.

To conclude the visit, the committee presented the main preliminary conclusions to the Executive Board of Erasmus MC and the Heads of the departments of the Theme SPIN. The schedule for the site visit is included in appendix 2.

After the site visit, the secretary drafted a first version of the committee report, based on the assessments drawn up by the first assessors. This draft report was circulated to the committee for all members to comment on. Subsequently, the draft report was presented to Erasmus MC for factual corrections and comments. In close consultation with the chair and other committee members, the secretary used these comments to finalize the report. The final report was presented to the Executive Board of Erasmus MC.



## II. Theme SPIN

This report describes the findings, conclusions and recommendations of the committee that assessed the three departments that are part of Theme SPIN (Spoed Perioperatief Intensief). Each department is assessed in relation to research programmes and institutes worldwide in similar disciplines. The committee has taken many aspects into account in its assessment, particularly in assessing the viability of the departments. In doing so, the committee has been strict, with scores that apply to the continuation of the current situation. The committee is convinced that, with the help of Erasmus MC's Executive Board, the departments will be able to make changes that will enhance their viability. In essence, the committee sees potential for these three small and important Erasmus MC departments. In particular, collaboration between the departments is an important element for the future of research in SPIN.

### Theme

The formation of the Erasmus MC Theme SPIN was based on patient care and clinical collaboration. The clinical collaboration of the three departments functions well. However, the evaluation revealed that scientific research is not yet part of this structural collaboration. The committee is of the opinion that a thematic organization (such as SPIN) within a university medical centre setting should ideally serve as the base for care processes upon which cutting edge research and education are built. Moreover, such generic principles for the theme will enhance the quality of academic activities and create opportunities within all three departments. In this report, therefore, the committee not only gives an assessment of the research carried out by the three departments, but also looks in detail at the challenges and possibilities for the SPIN Theme. The committee's aim is to help the theme and the departments to decide on future steps that need to be taken in order to conduct high-quality research.

As will be evident from the assessment of the various departments, the committee is of the opinion that those involved in research are enthusiastic and conduct good to very good research on the basis of intrinsic motivation. The committee also noticed the will and dedication of both researchers and departments to improve the quality of research. At the same time, the committee noted a general struggle to devote

sufficient time to research. Moreover, the departments lack a coherent research programme and vision. The various research projects conducted within each department are isolated. There are many islands where good to very good research is carried out, but without mutual coherence or synergy. Anesthesiology, Intensive Care Medicine and Emergency Medicine are specialities that face similar challenges worldwide in building up and sustaining strong academic organizations. Notably, there are limited funding possibilities that can support the development of the next generation of researchers as well as academic leaders. There are huge opportunities for collaborations with non-medical specialities like engineering, data science, medical technology etc. Leading collaborative initiatives, however, requires a track record, a clear and realistic research strategy and vision, and critical mass.

### Conclusion

Scientific research in acute, perioperative and intensive care should be a core activity of the SPIN Theme. Without prioritization and support from the central level, the challenges in generating research in all three departments, mainly related to a high clinical workload and lack of research funding, would require a long time to take significant steps forward. An in-depth independent analysis of the strengths and weaknesses of the research activities of the three departments, better alignment of research investments, insights in societal directions for research grants, and more collaboration with respect to research activities, talent development and a strategic vision is advised.

### Research strategy and vision

All departments currently lack a clear research vision and strategy for the future. This may partly be explained by the limited number of active research staff and the size of the translational research portfolio. Other factors of importance behind this observation are the time devoted among the Department Heads to developing an active and dynamic research culture. Here, the organizational structure within Erasmus MC, with the Head of Department responsible for the three main tasks of a university medical centre, i.e. patient care, education and research, seem to play a crucial role. The Heads of Departments lack the time needed to focus on developing a strong research strategy and vision, and how they could integrate and collaborate more closely. The committee believes that clear research leadership, a vision and strategic plan for academic research and a roadmap for the underlying departments are

vitaly important to take the next steps to enhance the quality of research. The committee is of the opinion that the Department Head should not be responsible for the three main activities of an academic department at this moment since the building up of the scientific research requires a lot of attention, time and dedication. From the committee's point of view, it makes sense to address this at SPIN Theme level. The committee suggests temporarily hiring an external expert to carry out an in-depth analysis, and to supervise and stimulate the drafting of a strategy.

The committee is convinced that, with the right strategy, commitment and support, all three departments and the theme as a whole will be able to develop into an international acknowledged stakeholder in the field of acute, perioperative and intensive care research. In the discussions with the mid-career researchers, it was obvious that this group is capable and willing to bring work force and intellectual input into a novel strategy and vision for translational research. This group of future research leaders is not currently involved in any strategic decision-making. The committee strongly suggests that the theme and departmental leadership systemically involve this group of key clinician-scientists.

Support from Erasmus MC is crucial in this respect. In order to strengthen the research of the departments and to ensure that external grants can co-finance research, an initial investment will be required. The committee is of the opinion that Erasmus MC needs to incentivize and facilitate collaboration within and between the SPIN departments in the field of research. In particular, the fields of research in which SPIN engages to obtain significant research funding due to the specific clinical pressures on their departments and the nature of the research field. The expected reduction of primary research funding from the Executive Board of Directors will further aggravate this situation. The budget for research is extremely small in relation to the clinical care budget; the committee is of the opinion that return of investment is something which the Erasmus MC should consider.

Mutual collaboration and a joint focus and strategy will strengthen the theme. This requires Erasmus MC's Board to make an explicit choice and commitment that research in this theme and these departments is as important as patient care and education.

## Collaborations

An important first step is to improve research collaboration both within individual departments, and between departments within the theme. There are some collaborative projects, in particular between the Emergency and ICU Departments, but these are not structural nor strategic. The committee even received signals that inter-departmental collaboration is made more difficult by department management. By having a structural collaboration and an overall vision within the theme, more critical mass can be created. The SPIN Theme can then present itself as an important partner in international collaborations or initiate its own projects.

The SPIN Theme is characterized by the fact that it has a large patient flow which, in the committee's view, makes the departments an important collaborative partner for other clinical departments at Erasmus MC. Although the departments participate in a number of Academic Centres of Excellence (ACEs), these ACEs are not considered useful to promote collaboration for the departments within the SPIN Theme.

In each of the departments there were examples of excellent international collaborations. However, many of the researchers are still building their expertise and networks. Participating in – and even more so - leading a collaborative project requires these departments to bring a certain expertise to the table, which is sometimes missing. The committee is of the opinion that more coherence in research within the SPIN Theme will increase collaborative opportunities and future funding.

## Research infrastructure

The committee recognizes that the clinical researchers from the various disciplines are skilled and dedicated yet generally working separately on their own projects. The limited resources and lack of joint research infrastructure within the theme is one reason why collaboration is currently weak. The committee considers that it would be beneficial to set up a joint generic platform for clinical and laboratory research in the coming years. Within the theme, the departments can merge resources, for example by co-localization of experimental resources, clinical research, data management and biobanking. The committee is of the opinion that the individual wishes of the departments can be readily accommodated within such a structure. With regard to collaboration, a joint platform may also be attractive to other

departments, both inside the Erasmus MC (e.g. immunology, infectious diseases) or externally.

The committee was surprised by the existence of two small laboratories within one theme with significant overlap in interests. It appears from the interviews that this was not planned, yet a merger of labs was deemed unfeasible due to location limitations. The committee is of the opinion that a merged laboratory, forming a mechanistic backbone for basic/translational research and offering sufficient opportunities for individual researchers from different departments, is an obvious move. Overhead costs can be shared, collaboration would become easier, and the joint lab will be attractive for departments outside the SPIN Theme.

### Research culture

With respect to research culture, there are several good aspects to be mentioned, for example, the focus on research integrity and supervision of PhD students. However, the committee perceived there was a lack of a general, widely supported research culture within these highly clinically oriented departments. This applies to the theme as a whole.

There were indications from the clinical researchers that research time was not always valued by their purely clinical colleagues and was sometimes addressed as 'free time'. This is concerning for an academic medical centre where research duties should be equivalent to clinical work and education in terms of dedicated time and acknowledgement. However, this insufficient integration of clinicians and clinical academics is not only a problem within this theme, but rather a national problem. In general, there is a limited understanding among clinicians of the importance of combining clinical work and academic research. For instance, it was uncommon for all three departments to discuss research highlights during the general department rounds.

The committee considers it important that research is seen as a fully-fledged part of activities within this theme. This means that research should not be carried out in leisure time and that research time should be distributed in a transparent manner. A challenge here is the relative lack of external funding, which means that the total research time available is very limited. This results in many staff members having one day per week or less for doing research. There were quite a few examples of staff members doing a large part of their research in their own time, i.e. over evenings and weekends. The committee considers that one

day a week is insufficient to generate excellent research, especially if the departments wish to generate collaborations and external funding. In several interviews it became clear that junior and mid-career researchers often did not feel valued. This negative attitude can be detrimental to promoting a strong research culture, as it will demotivate young researchers and deter attracting new talent.

### Research funding

The budget allocation is (partly) historically determined, implying that young disciplines such as those in SPIN receive relatively little direct funding. In addition, all three departments are struggling to obtain significant grant funding. It is recognized that grant possibilities for these relatively young disciplines are more limited and that time to write applications is virtually absent. However, the committee holds the view that a good talent policy can assist candidates in obtaining personal grants, such as a ZonMW Veni or Vidi scholarship or Dekker scholarships from the Dutch Heart Foundation. This calls for a restructuring of the distribution of the already limited research time. The committee believes that a (temporary) investment from Erasmus MC could kick-start this process.

### Career development

The committee repeatedly noticed during the interviews that the younger researchers within the SPIN Theme are keen to develop their academic careers. The committee feel their ambition would be facilitated by having a clear research focus, a well-articulated strategy and forward career planning. At present, for many junior and (in particular) mid-career researchers, it is insufficiently clear what is required for a future research career and who is eligible. The committee observed that individual researchers are given opportunities, but this does not appear to be structured nor transparent. In order to develop a future generation of strong research leaders, the committee believes that there must be a clear career policy that encourages talent to develop. This includes dedicated research time, support in writing grant applications, and offering mentorship and clear criteria for successful scientific career development. At Erasmus MC level there are several career development programmes that provide coaching and support for talented researchers to shape their academic careers. Moreover, the Erasmus MC Research Development Office could assist in grant writing. The committee identified many bright and motivated researchers

who, with the right support, could become the next research leaders in their departments. The committee recommends using the central services of Erasmus MC to improve talent attraction and development within the SPIN Theme.

### Strategy23

The committee considers that Erasmus MC's strategy dovetails seamlessly with departments within the SPIN Theme. The committee therefore agrees with the Dean that research in this theme is valuable to Erasmus MC, although the committee does see a considerable distance between the objectives of Erasmus MC and the departments in this theme. Alignment of the research focus of the SPIN Theme with Strategy23 is weak.

### PhD training

#### *Supervision*

The PhD students interviewed by the committee were overall very positive about their supervision. All meet their daily supervisors on a regular basis (often weekly). Meetings with the entire supervision team are structured, but less frequent (once every one-two months). An important observation is that all PhD students not only have structural planned meetings, but also have regular, informal contact with their supervisors. This is greatly appreciated. Most of the PhD students indicated that they were still given adequate latitude in steering their research towards certain directions and to set personal development goals. The research culture is open and PhD students feel that they can easily approach their supervisor with any issues. They are aware of the existence of a councillor (vertrouwenspersoon), but had not had reason to call upon this service. The committee is positive about the quality of individual supervision but believes that PhD students would benefit from setting up a mentoring system involving an external mentor. This mentor can advise PhD students with an external, objective view and be involved in annual evaluations. The number of PhD students who defend their thesis is high.

#### *Training*

Most PhD students interviewed by the committee are members of the COEUR research school and follow training and courses provided by this research school. One PhD student followed courses offered by MolMed. Some of the PhD students indicated that the research themes of COEUR are not relevant to their own research focus, and they have little connection with COEUR researchers. The PhD students mentioned a lack of structure in their

training, for example the absence of an overview of courses that are available. A Graduate School is being set up, which the committee considers a very good development. An important point of attention for the Graduate School is structured provision of information, e.g. through a website. Although information is available, it often takes the PhD students time and energy to find it. Many PhD students rely on word-of-mouth information from older students and run the risk of receiving outdated facts.

#### *Challenges*

A specific point of attention for PhD students of the SPIN Theme relates to their dual role as clinical residents. These PhD students not only do research, but are also in training as residents. In their year of training in a peripheral hospital, they have three supervisors with different priorities (academic education/training, peripheral training, research). The PhD students struggle with these conflicting demands; the aforementioned (external) mentor could help them deal with this.

Similar to many of the other research staff, many of the PhD students are having to do research in their own time, in addition to clinical work. Although the committee is impressed by their dedication and motivation, it is of the opinion that a department that considers research an equal component to clinical work should provide dedicated research time to PhD students.

The committee was surprised that PhD students did not know their colleagues within the department. They mentioned that no regular (weekly) departmental research meetings were organized where they could present their work and learn from others. Although PhD students do collaborate with other departments, they largely work on their own individual projects with little overlap. This relates to the research culture and the appreciation of research within the clinically dominated departments. By organizing regular research meetings, a research culture can be initiated that would also include peer review and feedback. Not only would PhD students benefit from this, but also mid-career and senior researchers. The current approach sends out a wrong signal to these young researchers, in addition to the lack of talent scouting and career development.

#### *Future career*

Most PhD students are intrinsically motivated to do research and would like to continue after obtaining their PhD. However, with little to no

dedicated research time for clinicians and the lack of clear career planning, it is not generally considered to be an attractive proposition. By introducing a clear research culture and strategy within the departments, with transparent guidelines for dedicated research time and career perspectives, the next generation of academics can be nurtured.

#### *Conclusion*

PhD students are generally positive with respect to their research projects, daily supervision and departmental support. However, due to the lack of a strong research culture and talent development programme, they all act as individuals. Structured mentoring and training programmes are missing, although this could be solved with the institution of a Graduate School. Junior researchers are expected to perform their research duties out-of-hours. In some cases, this is difficult to combine with a normal family life or clinical duties. A more structured PhD programme within the SPIN theme may offer better support and development for these junior researchers.

#### **Research Integrity**

Erasmus MC endorses the Code of Conduct for research of the Association of universities in the Netherlands (VSNU) and the revised European Code of Conduct for Research Integrity. Its policies on academic/scientific integrity are outlined in the Erasmus MC Research Code that covers the following aspects:

- Research with patient data and biomaterial;
- Data management;
- Guidelines for publishing and authorships;
- Guidelines inducements by companies;
- Intellectual property.

After the Poldermans affair, the Anaesthesiology Department invested in improving cultural safety and data integrity. The committee noticed an open attitude of the three management teams towards research integrity, and from the perspective of the management team, researchers and PhD students there were currently no integrity issues.

With respect to data integrity, the committee is concerned about the decentralized data storage in local databases and advises to invest in larger platforms, such as Castor EDC and make use of Research Suite.

#### **Diversity**

The diversity policy at Erasmus MC level is adequate, but this was not reflected in the SPIN Theme. The committee notices that management of the departments is predominantly male and not representative of the younger generation of researchers or the multicultural city of Rotterdam. The committee acknowledges that efforts are being made, although these did not yet result in an increase of diversity. The thus recommends to the departments to continue working on improving diversity and including more female role models at the department management level.





### III. Anaesthesiology

Research quality	Very Good (2)
Relevance to society	Very Good (2)
Viability	Unsatisfactory (4)

#### Strategy and targets

The mission of the Anaesthesiology Department is to be an internationally leading, innovative university centre for anaesthesiology, as it improves care for patients receiving perioperative, acute or intensive care, or (chronic) pain treatment. The department performs translational research, clinical studies, and population-based research in collaboration with other departments, (inter)national partners and industry.

The majority of the research is organized in three sectors (general research lines):

1. Centre of Pain Medicine
2. Perioperative risk assessment and management
3. Tissue oxygenation and oxygen metabolism (translational)

The Anaesthesiology Department is one of the largest clinical departments at the Erasmus MC, with approximately 80 staff anaesthesiologists and 60 residents. However, compared to this clinical workforce, the dedicated research part is small. During the evaluation period, the scope of the research in numbers of FTEs even decreased. In 2013, the Anaesthesiology department had an income equal to 9.66 FTE research capacity. By 2018, this had decreased to 5.74 FTE. Also, the relative contribution of direct funding is high and has increased from 66% to 83% of total research funding in the evaluation period, while the amount is insufficient to support ongoing research lines. Income through contract research was stable around 15-20% of total income. The department does not seem to be able to rely on stable direct funding. This makes it difficult for a small research group to plan a feasible future scenario. The department would benefit from stable direct funding.

While there are differences between the three research clusters in the department, they have all developed both national and international network collaborations to the benefit of their research output. It is obvious that the department holds a number of prestigious collaborations with major international networks within Australia, Canada, USA and within the frame of the European Society of Anaesthesiology. This is a nice basis for further

collaboration. Most often, the Anaesthesiology Department is a participant in a collaborative project rather than the leader. It would be a logical next step for the researchers to lead a collaborative international research project and have more first/second and last authorships.

As mentioned before, this large department has a small group of research staff. The research focus is, however, very broad and includes the whole width of anaesthesiology. The committee suggests to develop a more focussed research portfolio. Within the Erasmus MC there are several collaborative projects, for example with Paediatric Anaesthesia and in the field of oncological research. However, these collaborations are often fragmented and after a project is finished, it seems difficult to continue the collaboration. The collaboration of the Anaesthesiology Department within the SPIN Theme is very limited. While the department tries to focus on diversity and scientific integrity, it is unclear to the committee how independent assessment of data quality or research focus is guaranteed. It is difficult to understand why the researchers on oxygen biology do not intensively collaborate with the researchers on microcirculation in the ICU Department. The committee observes that, although there are some collaborations, the long-term plans for further collaboration, international, national (TU Delft) and local (SPIN) are unclear.

#### Research quality

The department has a high research output with a very good citation pattern. The research focus (pain, perioperative outcome, oxygen biology) has a strong relevance for perioperative care but also intensive care. All three clusters contain international leaders within their field of expertise. The scientific impact of some of these leaders is high, but it remains difficult to assess for the individual research clusters.

Research focus is very broad with only a small group of key research staff and the research topics are mostly historically determined. The Pain Medicine research line is well-known, and output is of VERY high quality. The Perioperative Medicine research group is also known, though with a more common focus when compared to the Pain Medicine theme. The oxygen research focus is unique and innovative, with smaller generalisability. Although the work in all three sectors is well known by themselves, they do not show strong coherence. The perioperative and tissue oxygenation clusters could benefit from better alignment and such collaborations could

open up for a broader perioperative outcome setting. The availability of both small and large animal models is to be congratulated. This bridging facilities between molecular/cellular models and humans will prove to be very important for the success of the department in the future.

The department has been struggling to find external funding that will help to build a strong academic unit. The Pain Medicine group is able to find external funding and does experimental fundamental work. The clinical research has not put enough effort in over the past period.

Overall, the evaluation on the research quality of the department is very good, the quality and impact of the output is high in relation to the resources. Although individual staff members are well-known for their scientific contributions, this is not the case for the department as a whole. Lack of focus includes the risk that high quality research projects are invisible between more average projects and publications. There should also be room for more conscious focus on a limited number of translational research programmes, taking the preclinical-clinical-outcomes approach for only a few major research questions where the department can develop frontline international research. Moreover, by not following the money (focus on strategy of national and international grant organisations) it is difficult to find additional research support. For the perioperative and oxygen biology research lines it might be helpful to focus more on clinical situations that are related with severe morbidity or mortality or have a high societal impact (e.g. long-term quality of life after surgery).

### Relevance to society

The department has a strong interface to society in general by the international centre for pain medicine. The Pain Medicine line has high impact on regulations and guidelines and is well-known for its research focus and outcomes. There are also clearly developed networks for integration with social sciences and industrial partners.

There is considerable relevance for to society by the output from this research unit because more than 10% of the population in the Netherlands are being exposed to perioperative medicine on an annual basis. As such, the department of Anaesthesiology will have a strong impact of the society as a whole and in-patient care in general. With focus set on improved pain management and perioperative outcomes the research from the

department will have a strong impact on the society.

The committee was pleased to learn that those involved in the basic research in cells are looking for ways to do translational research and connect to clinical research.

### Viability

Although the overall quality of the research in relation to the resources is considered to be very good over the period of evaluation, the committee has major worries for the future of research in this department. This is motivated by the lack of a clear and focused strategy, dedicated and well-known research leaders (except for Pain Medicine), limited and declining resources, lack of collaboration within the SPIN Theme and somewhat of a disconnection between the senior and mid-career researchers.

The Anaesthesiology Department has an academic tradition with several senior and internationally well-known clinician scientists. As such the department should be able to build a strategic plan upon a large body of experience and knowledge. However, it is unclear to the committee how the department sees the future of basic science, translational science and outcomes research in the light of the overall strategic plan. Also, the vision towards precision medicine and personalized medicine is not clearly defined.

There are a number of improvements possible in the view of the committee. In addition to those mentioned in the general chapter of this report, improvements could be aimed at combining the overall Erasmus MC strategy on medical technology, co-utilization of critically important infrastructure and a closer collaboration between research clusters 2 and 3 combined with broader perioperative outcome mission. Moreover, the department management should rely more on the creativity and innovation skills of younger staff members.

The department collaborates in many projects, both internationally and at Erasmus MC level. However, especially local collaborations seem to lack structural embedding. According to the committee, the department has a major opportunity to become a key player in Erasmus MC in precision medicine as approximately 10% of the Dutch population is experiencing perioperative care. This embodies a number of opportunities for the department. Strategic funding as well as an ambitious mindset is required to setup a research



environment step-by-step and over a number of years. Building-up a major biobank is not only important for this department, but for the entire country.

While current research lines are active, there is no plan on how to improve the impact of research and increase funding opportunities. This seems to result in all researchers working in isolated settings, without a clear connection to other research in the department. According to the committee this lack of coherence makes it even more difficult to obtain external grant funding. The committee recommends the department to work on a clear strategy that improves focus and identifies possible funding opportunities (follow the money). Over the period of evaluation, the department was in a steady state, although funding and research staff declined. There are opportunities to improve, but this requires research leadership, a clear strategy, more focus of research lines, a research platform, dedicated research time and better alignment with research opportunities of Erasmus MC.

Similar to the other departments in the SPIN Theme, the Anaesthesiology Department urgently needs a research leader who not only draws up a mission and strategy, but also deploys and implements it. In view of the size of the research units in all three departments, it seems logical to

the committee that the department works together on such a position with the Emergency Medicine and ICU Departments. In doing so, the committee is thinking of an overarching strategy, with room for the three different departments, and a joint research leader who has a certain degree of autonomy with regard to research activities.

### **Conclusion**

The committee is of the opinion that in the current situation the research in this department is hardly viable. The department needs a new academic vision that can move the department into a key position in academic and clinical anaesthesiology. In addition, there are major issues and challenges that should be dealt with, not only by the department, but also at the level of the Board of the Erasmus MC. The committee is convinced that, with the right external support, there could be a bright future for this department. It has a great opportunity to use in-house expertise and knowledge in translational research management and performance to further develop the three existing research clusters. This will need to include cross-departmental development of infrastructure, career programmes and a much-sought-after regeneration of a new generation of senior research group leaders.

## IV. Emergency Medicine

Research quality	Very Good (2)
Relevance to society	Good (3)
Viability	Good (3)

### Strategy and targets

The mission of the Emergency Medicine Department is to improve the early recognition of critically ill patients and to improve diagnosis, treatment and outcome in all patients that are treated at the department. This is achieved by performing clinical and implementation studies in close collaboration with national partners.

The research team is small, and the research is subdivided into two research lines:

1. Early Identification of Critically Ill Patients
2. Emergency Medicine and Public Health

The Emergency Medicine Department has two research lines with a clear focus and appropriate scientific output for this small research group. The committee observes good collaboration within Erasmus MC.

Erasmus MC's trauma centre is very large and covers a large part of the south-west of the Netherlands. Collaboration with the many hospitals in this area is important, which is also clear to the department. However, the research capacity of the Emergency Medicine Department is extremely small. In 2018, the department employed three scientific staff members, together with 0.46 FTE of research time. The entire research budget consisted of direct funding. Based on the function and size of the trauma centre, the committee had expected the research group to be larger. After all, research can already start at the ambulance.

The committee is of the opinion that national cooperation is sufficient, but advises the department to also orient itself internationally.

### Research quality

The research lines of the Emergency Medicine Department have clear focus and appropriate scientific output for a young, enthusiastic and small research group. Observational studies are the starting point of all Emergency Medicine research groups and the publication output is high in relation to the resources. The scientific journals are Emergency Medicine oriented. When placed in perspective, the committee is impressed by the

quality of the research output that only started very recently (2010) and is produced by a limited number of researchers who are also clinically active.

Emergency Medicine is a very young - and in the Netherlands not yet fully recognized - discipline of research. Not having the funding to grow into academic positions is definitely a set-back. Not having a full professor in this department means that academic staff is dependent of other departments to supervise and promote PhD students. The number of PhD students is high in relation to the size of the research staff. It is clear to the committee that this young research group has too little research capacity and academic positions. Related to this, although this department has a very good national reputation, the international reputation is still lacking behind. The productivity strategy is realistic but - according to the committee - may even be more ambitious, especially at the academic and international level.

As mentioned in their own SWOT-analysis, the funding and specifically dedicated staff for research is very limited. The department is clearly in need of an academic chair to further develop the academic position of the department. In this respect, but also more general, the committee appreciated the open attitude in the interview with representatives of the department.

### Relevance to society

Currently, the societal relevance of the research is somewhat limited. However, the committee is of the opinion that by further improving of the quality and size of research output, the societal relevance will also increase in the upcoming period. The collaboration with the Public Health Department is a good basis for further improvement of the scale and societal relevance of the output. The initiative the committee learned about during the site visit with the website and app for patients is excellent, although this is predominantly the result from clinical reality rather than research output.

The department is clearly building on its research products for societal target groups, and the use of these products. This young dynamic research group is positioning themselves in a clearly relevant research environment.

### Viability

The small size of the research staff makes collaborative efforts with other

departments inevitable. The focus on collaboration of the Emergency Medicine Department with other Erasmus MC departments makes sense, for example by joint PhD students. The committee stimulates the department to continue to build partnerships and be more ambitious. A more leading role for emergency medicine could be envisaged for the future. After all, many patients go to other clinical departments for research via the Emergency Medicine Department.

The committee appreciates the department's strategy not to want to grow too fast and understands the department's dilemma in being dependent on collaboration on the one hand and wishing to be an independent and recognizable research group on the other. Another challenge ahead is the fact that emergency medicine is not a field where research grants are numerous, making it difficult to obtain significant external funding. Both attraction of grants and being a coherent research group are more difficult due to the absence of a full professor. The committee learned that the department has a vision and plan to continue the research in two dedicated research lines. For a small research department such as this, the committee recommends to continue the focused approach and build up a reputation in limited areas. This will then lead to increased opportunities for funding and collaboration.

Similar to the other departments in the SPIN Theme, the Emergency Medicine Department urgently needs a research leader who not only draws up a mission and strategy, but also deploys and implements them. In view of the size of the research groups in all three departments, it seems logical to the committee to work together on this. In doing so, the committee is thinking of an overarching strategy, with room for the three different departments, and a joint research leader who has a certain degree of autonomy with regard to research activities.

The research staff as well as the PhD students are dedicated, enthusiastic, and hard working in slack time. The committee is of the opinion that this group has a lot of potential. However, this small research group requires external support to take the next step in advancing research quality. If Erasmus MC is interested in academic Emergency Medicine, the committee strongly recommends that both the SPIN Theme and this promising department are supported.

### **Conclusion**

This young and small productive group is worth to further be supported and provide academic perspectives to increase the retention policy.

## V. Intensive Care

Research quality	Very Good (2)
Relevance to society	Very Good (2)
Viability	Unsatisfactory (4)

### Strategy and targets

The mission of the Intensive Care Department is to improve the care for critically ill patients through translational and clinical research. To achieve this, the department collaborates with (inter)national partners.

The research concerns the pathophysiology, treatment, outcome and ethics of critically ill patients in the ICU and is focused on four areas:

1. Shock, sepsis and microcirculation
2. Mechanical support of ventilation and circulation in the critically ill
3. Brain injury and brain dysfunction
4. Outcomes and Ethics

Experimental research takes place in the Laboratory for Translational Intensive Care Medicine located in the medical faculty.

There has been a small increase in scientific staff sessions which, in 2018 totalled 4.41 FTEs spread over 11 staff members. Funding through research grants is low. Contract research accounted for approximately 15% of the total budget in 2017 and 2018.

The committee observed that despite the small size of the research staff, the research is spread across a wide number of topics. Neither in the documents provided, nor in the interviews with senior or middle-grade researchers, could the committee identify a clear core strategy that is readily realizable. This is recognized by the department management, although broad expertise was considered an advantage. They contended that the department could respond quickly to new developments, for example the COVID-19 virus. According to the department leads, their strengths lie in circulation and ventilation and they envision an innovative ICU with personalized cardiorespiratory optimisation that also includes AI and prognostic models. However, there is a clear need for a roadmap that supports taking the next steps to fulfilling this vision. The senior members are moving towards the end of their careers and there are no obvious successors currently within the department who share these research interests or necessary skillsets.

### Research quality

Over the last two decades, the Intensive Care Department has gained widespread national and international recognition with a steadily increasing research output and a good citation index. The department includes several internationally well-established clinical and non-clinical research leaders. covering shock, sepsis, ventilation and circulation, AI, brain function, outcomes and ethics. Considering the size of the department, these research efforts could be more focused to improve competitiveness and increase external funding. In line with this is the publication pattern. The department has the potential to regularly target even higher impact journals. The Intensive Care Department should be able to build on this platform if recommendations on improving collaborative efforts within both SPIN and with other themes, and rationalizing/co-utilizing infrastructure resources are met. Research clusters would benefit from an increased focus in areas where the department could maintain, if not enhance, their role as international leaders.

The research in the department is overall very good, although the committee identifies both excellent but also less strong areas. The department displays originality and innovation and it possesses many talented researchers. Improved coherence within the department would further enhance research quality.

### Relevance to society

The department communicates regularly with society and has participated in a series of key questions related to outcomes, organ donation and ethics concerning the critically ill. In addition, the department has developed a broad approach to study and communicate the importance of outcomes, ethics and quality of life aspects on survival of critical illness. This also holds perspectives on staff, performance and management.

Similar to research quality, the committee observes both excellent initiatives and projects related to societal relevance. A clear strength of this department is its translational research interests, bringing research from the lab to the clinic and towards society. This could be enhanced still further.

### Viability

Past performance indicates that the Intensive Care Department has generated high-quality research.

There is clear potential to develop further. The ambition and culture of the department contains essential elements that could provide such an academic trajectory; however, the current fragmented approach needs to be addressed. While there are good ideas on future topics for research, this is not yet articulated within one overarching strategy. Some proposed developments require significant investment and support from the Board, for example AI and data science. This could be gainfully linked with Emergency Medicine and Anaesthesiology/Perioperative Medicine, and perhaps Epidemiology/Public Health to assess longer-term outcomes.

The department has four key areas where cross-departmental collaborations and the utilization of advanced experimental and technical platforms within the SPIN Theme could be enhanced. External research funding could be increased by joint collaborations with other departments within SPIN, other groups at Erasmus or Delft, or externally to develop the research into an internationally leading position. However, this requires a clear strategy and focus, adequate external and institutional funding, and more dedicated research time.

A specific point of attention for this department is academic succession planning. The committee observed a discrepancy between the view of the current research management and that of the mid-career researchers. For the latter group – which includes a number of major talents - there is no transparent career planning nor a strategy to develop the next generation of academic leaders. The lack of coherency of research within the department adds to this lack of transparency. For

the mid-career and junior researchers, it might be helpful if there are structural incentives to collaborate, especially within the department, but also within the SPIN Theme.

Similar to the other departments in the SPIN Theme, the department would benefit from introducing a Director of Research with responsibility for the development of the theme and department-wide infrastructure and collaborations/core facilities. This research leader should not only draw up a mission statement and strategy, but also deploy and implement them. In view of the relatively small size of each research unit within all three departments, the committee recommends they work together on this.

## Conclusion

Based on the good quality output and visible profile achieved over past decades, the committee considers that this department should be viable. However, in the current situation there are considerable challenges ahead that threaten the viability of research in this department. Research is currently performed in separate islands that are poorly connected. The most important issues to tackle are the lack of a coherent forward strategy, succession planning, and career development for mid-grade researchers. Similarly to the other departments in the SPIN Theme, the department needs a new academic vision to move towards a key position in academic research and clinical work. In addition, there are major issues and challenges that should be dealt with, not only by the department, but also at the level of the Board of the Erasmus MC. The committee is convinced that, with the right external support, there could be a bright future for this department.



## Appendices





## Appendix 1: Curricula Vitae of committee members

**Christa Boer** (chair), MSc, PhD, was professor of anesthesiology and is currently vice-dean for education in Amsterdam UMC, location VU and professor of medical education.

After her study Biomedical Sciences at the University of Leiden, Christa Boer completed her PhD in Physiology and Anesthesiology at the VUmc. In 2007, she was given the opportunity to install and lead an experimental and clinical research group within the Anesthesiology department at VUmc as professor of Research in Perioperative Care. She has published over 200 original papers and is member of the editorial board of the British Journal of Anesthesia and former chair of the Human Subjects Committee of VUmc. Her translational research focused on the interplay between microcirculatory perfusion, endothelial activation and coagulation during cardiopulmonary bypass and hemorrhagic shock and on postoperative care. She was member of the subcommittee Transfusion, Haemostasis and Thrombosis of the ESA, and chair of the subcommittee Transfusion & Haemostasis of the EACTA and published guidelines focusing on Patient Blood Management and Cardiopulmonary Bypass in Cardiac Surgery. In addition, she was member of the SCA Blood Conservation workgroup and NATA scientific committee.

**Lars I Eriksson**, MD, PhD, FRCA is professor of anesthesiology and intensive care medicine at the Karolinska Institutet and Head of Research and Education and staff anesthesiologist at Function Perioperative Medicine and Intensive Care at the Karolinska University Hospital, Stockholm, Sweden. Over the last three decades, he has headed a major research programs in neuromuscular physiology and –pharmacology and is the primary investigator for a major translational research project focusing on longterm brain dysfunction after anesthesia and surgery and the role of the immune system behind longterm cognitive decline and dementia. His research project includes national and international collaborations within experimental, clinical and outcomes research. He has strategically built a translational research platform for perioperative medicine and intensive

care at the Karolinska University Hospital and Karolinska Institutet, consistent of integrated units for experimental research, patient-oriented clinical research and epidemiology. Funded by major national and international bodies, he has published over 150 original papers and reviews and more than 30 book chapters. Since 2007, he serves as co-editor for the Miller's Textbook of Anesthesia and has been awarded the T. Cecil Gray Honorary Gold Medal from Liverpool University, UK, The James E Eckenhoff Honorary Lectureship at University of Pennsylvania, Philadelphia, USA and holds an Honorary Fellowship at the Royal College of Anaesthetists, London, UK.

Prof. Dr. **Marc Sabbe** is a Specialist in Emergency Medicine and Disaster Management. He is a staff member and clinically active in the Department of Emergency Medicine, University Hospitals of Leuven, Belgium. Sabbe is a full professor in Emergency and Disaster Medicine at the Faculty of Medicine, Catholic University of Leuven. Sabbe is one of the founders of the Belgian (BeSEDiM) and European Society for Emergency Medicine (EuSEM). He was for a long time a Board member of EUSEM. He is also member of EM advisory boards and international working parties and an editorial board member of the European Journal of Emergency Medicine. As a scientist, he published on many different areas of Emergency Medicine, clinical toxicology and disaster management.

Professor **Mervyn Singer** MB BS MD FRCP(Lon) FRCP(Edin) FFICM is Professor of Intensive Care Medicine at University College London. His research focusses primarily on sepsis, tissue oxygenation, shock, and novel monitoring techniques. Funding comes from the UK National Institute for Health Research, Wellcome Trust, Medical Research Council, EU and Innovate UK, as well as industry grants. He was the first intensivist to be awarded Senior Investigator status by the NIHR, is current Chair of the International Sepsis Forum, led the 'Sepsis-3' international taskforce that redefined sepsis, and has authored/edited several textbooks including the Oxford Textbook of Critical Care.

## Appendix 2. Schedule of the site visit

### Monday 2<sup>nd</sup> November 2020

Time	Topic
08.30-09.00	Welcome & general introduction by the Dean (Dean, Theme Board members and Committee)
09.00-09.15	Introduction and preparation <b>Anaesthesiology</b> Attendees: Secretary and committee members
09.15-09.30	Committee members: break
09.30-10.30	<b>Department of Anaesthesiology session 1</b> Management/Leading staff
10.30-10.45	Debriefing first session Anaesthesiology Attendees: Secretary and committee members
10.45-11.00	Committee members: break
11.00-12.00	<b>Department of Anaesthesiology session 2</b> Academic staff
12.00-12.15	Debriefing second session <b>Anaesthesiology</b> Attendees: Secretary and committee members
12.15-12.45	Feedback with committee members and discuss concept report <b>Anaesthesiology</b> Attendees: Secretary and committee members
12.45-13.45	Lunch break committee members
13.45-14.00	Introduction and preparation <b>Emergency Medicine</b> Attendees: Secretary and committee members
14.00-15.00	<b>Department of Emergency Medicine session</b> Management/Leading staff
15.00-15.30	Debriefing second session Emergency Medicine Attendees: Secretary and committee members
15.30-15.45	Committee members: break
15.40-15.45	General introduction of online speed date session by secretary
15.45-16.10	Speed date round 1
16.10-16.35	Speed date round 2
16.35-17.00	General session PhD-students and committee members
17.00-17.45	Debriefing/discussion day 1 Attendees: Secretary and committee members

**Tuesday 3<sup>rd</sup> November 2020**

Time	Topic
09.00 - 9.30	Questions by committee to Dean about initial findings
09.30-09.45	Introduction and preparation <b>Intensive Care Adults</b> Attendees: Secretary and committee members
09.45-10.45	<b>Department of Intensive Care Adults session 1</b> Management/Leading staff
10.45-11.00	Debriefing first session Radiotherapy Attendees: Secretary and committee members
11.00-11.15	Committee members: break
11.15-12.15	<b>Department of Intensive Care Adults session 2</b> Academic staff
12.15-12.30	Debriefing second session <b>Intensive Care Adults</b> Attendees: Secretary and committee members
12.30-13.00	Feedback with committee members and discussion of draft report Intensive Care Adults
13.00-14.00	Lunch break committee members
14.00-15.00	Preparation for giving general feedback
15.00 -15.30	Feedback session for Heads of Department, Dean by committee
15.30-15.45	Time for questions by Heads of Department and Dean
15.45-16.00	Final appointments/conclusions of site visit by committee

### Appendix 3. Quantitative data on the departmental composition and financing

#### Anaesthesiology Department

##### Composition of the department

	2013		2014		2015		2016		2017		2018	
	#	FTE	#	FTE	#	FTE	#	FTE	#	FTE	#	FTE
Scientific staff	11.0	6.38	12.0	5.09	11.0	4.43	7.0	4.69	9.0	3.43	9.0	3.97
Support staff	5.0	3.28	6.0	2.97	7.0	3.54	4.0	3.05	3.0	1.71	3.0	1.36
<b>Total staff</b>	<b>16.0</b>	<b>9.66</b>	<b>18.0</b>	<b>8.05</b>	<b>18.0</b>	<b>7.97</b>	<b>11.0</b>	<b>7.74</b>	<b>12.0</b>	<b>5.14</b>	<b>12.0</b>	<b>5.34</b>

##### Financing of the department

	2013		2014		2015		2016		2017		2018	
	FTE	%	FTE	%	FTE	%	FTE	%	FTE	%	FTE	%
Direct funding	6.41	66%	5.27	65%	5.93	74%	6.25	81%	4.13	90%	4.74	83%
Research grants	1.72	18%	0.92	11%	0.67	8%	-	0%	-	0%	-	0%
Contract research	1.53	16%	1.13	14%	0.91	11%	1.00	13%	1.01	20%	1.0	17%
Other	-	0%	0.72	9%	0.47	6%	0.49	6%	-	0%	-	0
<b>Total funding</b>	<b>9.66</b>		<b>8.05</b>		<b>7.97</b>		<b>7.74</b>		<b>5.14</b>		<b>5.74</b>	

#### Emergency Medicine Department

##### Composition of the department

	2013		2014		2015		2016		2017		2018	
	#	FTE	#	FTE	#	FTE	#	FTE	#	FTE	#	FTE
Staff	-	-	1.0	0.33	2.0	0.84	1.0	0.30	2.0	0.28	3.0	0.46
Support staff	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total staff</b>	<b>-</b>	<b>-</b>	<b>1.0</b>	<b>0.33</b>	<b>2.0</b>	<b>0.84</b>	<b>1.0</b>	<b>0.30</b>	<b>2.0</b>	<b>0.28</b>	<b>3.0</b>	<b>0.46</b>

##### Financing of the department

	2013		2014		2015		2016		2017		2018	
	FTE	%	FTE	%	FTE	%	FTE	%	FTE	%	FTE	%
Direct funding	-		0.33	100%	0.84	100%	0.30	100%	0.28	100%	0.46	100%
Research grants	-		-	0%	-	0%	-	0%	-	0%	-	0%
Contract research	-		-	0%	-	0%	-	0%	-	0%	-	0%
Other	-		-	0%	-	0%	-	0%	-	0%	-	0%
<b>Total funding</b>	<b>-</b>		<b>0,33</b>		<b>0.84</b>		<b>0.30</b>		<b>0.28</b>		<b>0.46</b>	

#### Intensive Care Department

##### Composition of the department

	2013		2014		2015		2016		2017		2018	
	#	FTE	#	FTE	#	FTE	#	FTE	#	FTE	#	FTE
Staff	8.0	3.34	9.0	3.06	6.0	2.49	6.0	2.23	11.0	4.57	11.0	4.41
Support staff	3.0	1.63	2.0	1.13	4.0	1.93	2.0	1.13	3.0	2.0	3.0	1.59
<b>Total staff</b>	<b>11.0</b>	<b>4.96</b>	<b>11.0</b>	<b>4.18</b>	<b>10.0</b>	<b>4.42</b>	<b>8.0</b>	<b>3.35</b>	<b>14.0</b>	<b>6.57</b>	<b>14.0</b>	<b>5.99</b>

##### Financing of the department

	2013		2014		2015		2016		2017		2018	
	FTE	%	FTE	%	FTE	%	FTE	%	FTE	%	FTE	%
Direct funding	3.59	72%	3.18	76%	3.39	77%	3.35	100%	5.66	86%	4.89	82%
Research grants	1.00	20%	1.00	24%	0.25	6%	-	0%	-	0%	0.10	2%
Contract research	0.37	7%	-	0%	0.78	18%	-	0%	0.90	14%	1.00	17%
Other	-	0%	-	0%	-	0%	-	0%		0%		0%
<b>Total funding</b>	<b>4.96</b>		<b>4.18</b>		<b>4.42</b>		<b>3.35</b>		<b>6.57</b>		<b>5.99</b>	

#### Appendix 4. SEP Assessment Scale

	<b>Meaning</b>	<b>Research quality</b>	<b>Relevance to society</b>	<b>Viability</b>
<b>1</b>	World leading/ excellent	The relevant research unit has been shown to be one of the few most influential research groups in the world in its particular field.	The relevant research unit is recognised for making an outstanding contribution to society.	The relevant research unit is excellently equipped for the future.
<b>2</b>	Very good	The relevant research unit conducts very good, internationally recognised research.	The relevant research unit is recognised for making a very good contribution to society.	The relevant research unit is very well equipped for the future.
<b>3</b>	Good	The relevant research unit conducts good research.	The relevant research unit is recognised for making a good contribution to society.	The relevant research unit makes responsible strategic decisions and is therefore well equipped for the future.
<b>4</b>	Unsatisfactory	The relevant research unit does not achieve satisfactory results in its field.	The relevant research unit does not make a satisfactory contribution to society.	The relevant research unit is not adequately equipped for the future.