

Research Assessment Academic
Medical Centre (AMC)
Site-visit 23-25 October 2017

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Report AMC Site-visit (final version 15 January 2018)

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1. Introduction

The Executive Board of the Academic Medical Center (AMC) invited an International Evaluation Committee to review its research performance, core facilities, graduate school and research governance. This review is part of the 6-year cycle of evaluation of research in all Dutch universities and University Medical Centers (UMC's). It is guided by the Standard Evaluation Protocol (SEP) of the Royal Academy of Sciences and Arts of the Netherlands.

The present evaluation takes place at a time when the AMC is in the process of setting up an alliance with the VU University Medical Center (VUmc) in Amsterdam. This started in 2012 and collaboration in the field of scientific research is a major element of the process. Harmonisation of research policies between the AMC and the VUmc is a critical part of the alliance planning. In January 2016, five alliance research institutes were founded, based upon existing AMC and VUmc research themes, and in January 2017 three additional alliance research institutes were formed (www.amsterdamresearch.org). Although the current 2017 evaluation focuses on the AMC research programme and formally not on VUmc research, the merger with VUmc obviously profoundly impacts the future and viability of AMC research.

Scope of the assessment

The Executive Board of the Academic Medical Center (AMC) has asked the International Evaluation Committee (IEC, further referred to as the 'Committee', see appendix 1) to perform an assessment of the quality of the research conducted at the AMC during the period of 2011-2017. According to the criteria of the SEP 2015-2021, also the societal relevance of the research and the extent to which the AMC (and its individual themes) is equipped as a whole to achieve its goals is included in the assessment. The SEP 2015–21 allows an institute to use its own objectives and strategy as guiding principles when preparing the self-evaluation report and the focus of the assessment process. The AMC has chosen to pursue a similar approach as in previous evaluations.

The Committee was asked to assess the Strengths, Weaknesses, Opportunities and Threats (SWOT) of the AMC from an international perspective; and in addition to assess the Strengths, Weaknesses, Opportunities and Threats of the individual themes, the core facilities, and the AMC Graduate School. The Committee was requested to take into account the following specific questions:

- What are the strengths in the AMC research governance that should be preserved in the planned merger with the VUmc? What are the opportunities that the planned merger with VUmc offers to further strengthen research governance?
- What are the recommendations to reinforce interdisciplinary research and the collaboration with other faculties of the University of Amsterdam?
- In which way should AMC reinforce its core facilities?
- How and at what organisational level (PI group, department, alliance research institute, division), should the relation between performance and budget be shaped in order to stimulate excellence?

The composition of the Committee, the documents provided to the Committee and the procedures followed by the Committee are described in more detail in Appendix 1. In chapter 2, the Committee assesses the AMC research as a whole. Chapter 3 is specifically concerned with each of the eight AMC research themes, the graduate school and the core facilities. The conclusions and recommendations of the Committee to the Executive Board of the AMC are summarized in chapter 4.

2. Assessment of the AMC research

The AMC is a university medical centre in which the Faculty of Medicine of the University of Amsterdam is fully integrated. It is a prominent research institution, as well as a university hospital, with around 1000 research staff including 302 Principal Investigators (PI's), 150 postdocs and more than 1500 PhD candidates. The AMC scientific mission is to promote excellent biomedical and medical research (see self-evaluation report). The self-evaluation report describes an established tradition of research, covering a broad spectrum from basic science, translational research and proof of concept studies to applied clinical studies, health services research and medical informatics. Many researchers combine their scientific work with day-to-day clinical responsibilities, teaching and training. The AMC has nine divisions, headed by a division chair, and encompasses 72 departments and sub-departments. Each (sub-)department head has integral responsibility for patient care, education and research, as well as for management and finances. The Executive Board consists of three members, and is advised by the Research Council (26 members) on major policy issues regarding scientific research. The Research Support Office supports development and execution of research policies, including strategic research planning, career development, internal budgeting, and core facilities (see 3.10). The Research Council and Research Support Office share a chair and secretary to align needs and developments.

2.1 Research quality

Overall, the basic, translational and clinical research in the AMC varies over a broad range from good to world leading. The Committee was impressed by the selected scientific highlights that were presented during the site-visit and reported in the self-evaluation document. Each of the themes presented such highlights during the site-visit, and some of these highlights reflect prominent international research lines.

The Committee acknowledges that the AMC's publication output is at a high level and has progressively increased. This increase parallels the rise in number of Principal Investigators. In the period under review, the AMC has made a number of landmark contributions to (bio)medical and translational research.

During the visit, the Committee also noted that several research themes showed a significant level of fragmentation, likely to have arisen from the lack of a 'top down' overarching research strategy. This is evidenced by a considerable number of PI's in relatively small teams, with widely different research interests. In some instances the Themes have been collated from researchers working from very different disciplines/departments without an agreed research strategy.

2.2 Relevance to society

The AMC has developed a Societal Impact (SI) score based on criteria such as contribution to clinical practice guidelines, health policy reports, books, patents etc. As shown in the self-evaluation report, the SI score is on average 3 (on a 5-point scale), showing a normal distribution. During the site-visit

excellent highlights of societal impact that the AMC has achieved in defined areas were presented to the Committee. The Committee was impressed by the societal impact of a diverse series of scientific achievements across several themes. Various achievements have societal or medical practice changing impact. Examples of these highlights are apparent in cardiovascular (e.g. the MrCLEAN trial), neurological/psychiatric (e.g. Deep Brain Stimulation), reproductive & women's health (e.g. the preconception carrier screening), public health (e.g. Research on Obesity and Diabetes among African Migrants), infection & immunity (e.g. meningitis), oncology (e.g. neuroblastoma bioinformatics), gastroenterology & metabolism (e.g. the AMC bioartificial liver) and movement & musculoskeletal (e.g. interdisciplinary translational research) programmes. The latter shortlist reflects a selection of illustrative examples but there are others than the ones mentioned here, indicating that the contribution of the AMC to society is profound.

2.3 Viability

In comparison to the previous evaluation, AMC finds itself at an important turning point because of the merger with the VUmc. To assess the viability, the Committee has focused on the strengths and weaknesses of the research governance of the AMC and considered this aspect from an international perspective. This is of particular relevance for the future alignment of AMC and VUmc research lines. Below the Committee presents its considerations for a number of research governance aspects and addresses the questions put forward to the Committee by the AMC Board.

1. Strategic research planning - priorities

The AMC's research policies focus on people (see 2.), funding (see 3.) and quality. According to the self-evaluation report, strategic decisions are made by the Executive Board, in particular regarding the appointment of professors, major research investments, and participation in national and international initiatives. Department heads are responsible for content issues, such as the definition of new and existing research lines and the nomination of candidates for PI appointments or professorships/associate professorships. The Research Council acts as an advisory body, but it has no executive power.

In order to stimulate interdisciplinary collaboration, the AMC has selected broad research themes in which it aspires to excel. These themes constitute the basis of the recent establishment of the alliance research institutes of the AMC and VUmc. The themes differ in their degree of development and organization. Some of these started in January 2016, whereas others were launched only very recently, i.e. in the current year 2017.

In the previous SEP evaluation (page 17 in the self-evaluation report), one of the recommendations was to set up strategic planning at a thematic level and support joint projects with strong research institutes in the region. The subsequent actions that have been taken in this regard have been stimulated greatly by the alliance with the VUmc, and the actual establishment of the new alliance research institutes.

Considerations: governance of research directions, profile and focus

Until now, the AMC has benefitted from its delegated governance processes: researchers are generally positive about the opportunities in the AMC and the productivity of research has been very good in the last 6 years. The Committee feels that in a comprehensive process as the merger with the VUmc, more central governance and steering is desirable in order to effectively align theme development and research priority decisions. In addition, the Committee advises that management

of the strategic overview, cross-cutting issues (such as core facilities and interdisciplinary research), and deliberate priority choices should be forcefully addressed centrally. The Research Council could play a role in this process and optimally support and enhance the organization of central governance tasks.

At the thematic level, the Committee was impressed by various positive examples of joint AMC and VUmc collaboration. Research lines usually seem to develop through a bottom up process by combining existing AMC and VUmc research lines. This is a positive development but in addition an overarching defined research strategy coupled to an explicitly structured governance may be useful, particularly at this time of upcoming significant changes in the organization of the AMC. An increased focus on the most promising research lines would contribute to the future positioning and profiling of the AMC research endeavour. This would enhance the visibility and (inter)national impact of the AMC and its capacity to attract external talent. The need for enhancing and focusing the research orientation should be supported by financial incentives to strengthen the further direction and optimal development of themes.

It seems appropriate that the Research Council and Research Support take up an active role in supporting this process of focusing on the most promising research lines. The Committee advises the AMC Board to charge the Research Council with a leading role in offering advice regarding the framing and restructuring of the research policy and of governance. In this context sufficient funds should be made available for implementing high priority changes. This is especially crucial in view of the upcoming merger/alliance between AMC and VUmc. This process should obviously be tuned with the AMC-VUmc alliance process.

2. People/Careers

Through its research policy, the AMC aims to stimulate excellence by putting the professional in the lead. Based upon publication output, funding acquisition and supervisor activities, the Principal Investigator (PI) system awards researchers and provides them with the opportunity to create their own group, take on leadership and gain visibility. Department heads can nominate researchers for a PI appointment, which is a prerequisite for promotion to associate professor. Further talent policy includes the annual AMC-fellowship (one per year) for mid-career laureates of prestigious individual grants. Since these laureates are considered future leaders, they are supported with an extra PhD candidate position. One of the aims of the PI system is to keep talent in the AMC by offering them the option to develop into an independent researcher.

Currently 302 PI's have been appointed, whereas in the original plan around 200-220 PI's were foreseen. The average PI score has increased from 3.0 (2011) to 3.4 (2017) out of a maximum score of 5. Performance based budgeting further supports the PI system.

Considerations: PI system

The Committee appreciates the value of performance based research budgeting. Clearly, the launch of the PI system has worked as a valuable tool to stimulate talent, although many researchers expressed concerns about the fairness and lack of transparency of the system. The number of PI's indicates that there are many good researchers at the AMC. However, while the average PI score is now 3.4, the Committee also observes a long tail of lower scores. In combination with the increased number of PI's, and the performance-based budget of €10,000 per PI-point that may induce division-

level incentives to nominate PI's, the Committee considers that in the future this system in its current form will not be sustainable and serve as the best model to stimulate high quality research. It is also understood from discussions with individual researchers, that the criteria of the PI score system have remained subject of an ongoing broader discussion. The Committee learned that part of the PI's feel that the variability of the position, career phase, and science field of PI's affect their scores, e.g. between clinicians and non-clinicians. The PI score is not uncommonly perceived to encourage researchers to focus on the quantity of publications rather than on the quality. Moreover, the PI score seems to enhance competition between PhD candidates and PI's on authorship, when the PI may unfairly claim senior authorship over more junior non-PI staff. This, as the Committee noted, is a potential cause of inappropriate incentive and resentment, and can adversely influence career progression.

Overall, from a general perspective of research careers, the Committee noticed limited attention for career guidance for postdocs, and limited planning for midcareer researchers. In terms of viability it is also essential to be able to attract external talent, which on occasions seemed difficult.

Thus, the Committee endorses the policy of supporting talented researchers, but it suggests that the current format of the PI score as an incentive system should be revised and transformed. The Committee recommends that the funding should be reallocated competitively. If individuals are selected on the basis of merit, budgetary allocation should directly benefit them. Decisions to this end should move away from divisions and departments, but instead align with strategic research priorities of the institutes. The policies to implement alignment and funding of excellence should be applied at the central corporate level. In addition to this, the Committee suggests to recognize and reward excellence for distinct career levels (for instance, PhD's, postdocs, and junior faculty) as well. This could be organized at the central level, and executed at the institute level.

3. Funding/ research budget

The AMC incoming research budget consists of direct government funding (Rijksbijdrage and Academische Component) which totals ~100M€ (in 2016); and acquisition of external funds (2nd, 3rd and 4th money stream), which totals ~112M€ (turnover in 2016). The turnover of the externally acquired funding (including NWO grants, EC funding and charity funding) has progressively increased each year from 2011 when it was 76M€. The yearly acquisition shows some variation, showing a high success rate in 2012 compared to later years. The funding of research from government funds is largely integrated in the budgets of divisions, which is granted as an annual lump sum to the divisions, and it is not earmarked according to core tasks (education, clinical care and research). Only part of the budget is allocated specifically to research and is connected to output. The total direct funding for research is 28.8M€ and is used for PI's, PhD's, Research Support and Core facilities, as well as a budget of 2M€ for the Alliance Institutes (0.25M€ per theme). This model, where budget allocation is largely independent of priorities and excellence is typical for most Dutch UMC's.

Considerations

The Committee notes that the consequence of the aforementioned type of budgeting is that a direct link is lacking between funding and scientific leadership, research excellence or research strategy. There are currently limited opportunities for direct steering. However, within these limitations, choices can be made that relate to investment in general or thematic strategic priorities, including

core facilities and e.g. interdisciplinary research. One of the aspects that regularly emerged as problematic during the site-visit is the lack of protected research time of clinicians. This has many implications including stress and potential bias against researchers with young children who have limited time outside working hours. The Neuroscience theme (see 3.4) has developed a strategy to this end that could serve as an attractive prototype example to be considered for broader application in the AMC.

4. The future

The Committee congratulates the AMC and VUmc with the achievement of the merger, appreciating that it is a challenging process and requires a proactive attitude along the way. The merger due to the enhanced “critical mass” and the potential for synergy will create numerous opportunities for strengthening the research portfolio and performance. The Committee was charged only with the unilateral AMC assessment in the current procedure. While the emerging bilateral relationship between AMC and VUmc presented itself as an obvious and recurrent item in the current AMC research evaluation process, the Committee was unable nor requested to systematically analyze the effects of the upcoming alliance as it was only provided with documentation about the AMC-related research in the 2011-2016 period. The Committee, however, considers the merger as a unique opportunity and a necessity to develop a common and focused research strategy in the AMC. Revising a newly updated and focused overarching research mission and strategy will be timely in the context of the AMC-VUmc merger.

In order to reach the goals of the merger, it will also be crucial to mitigate the risks and potential negative side effects. That is why the Committee is recommending in particular more direct central research governance in the AMC. The merger process represents a hugely demanding effort that ultimately involves the majority of the scientific staff for multiple years. It will withdraw time and attention of researchers from their core activities. This needs to be managed deliberately in order to prevent a decline in research performance during the years of implementation of the merger.

3. AMC themes, Graduate school and Core facilities

In this chapter, the Committee describes and assesses the Strengths, Weaknesses, Opportunities and Threats of the AMC themes from an international perspective.

3.1 Cardiovascular diseases

The AMC Cardiovascular theme has since 2016 been part of the Amsterdam Cardiovascular Sciences (ACS). This AMC/VUmc merger institute focuses on five themes: Heart failure and arrhythmia; pulmonary hypertension and thrombosis; atherosclerosis and ischemic syndromes; diabetes and metabolism; and a microcirculation research cluster. Its mission is to design knowledge-based treatment strategies to prevent and cure cardiovascular disease.

The AMC cardiovascular research theme is substantial in size, covering many departments. The cardiovascular research is mainly translational in nature with a strong clinical focus (two thirds of the PI's are MD's and one third is non-MD). The Committee recognizes areas of strengths in arrhythmia, heart failure, lipidology and coagulation, vascular medicine and congenital heart diseases. The investigators have participated in various influential clinical trials. Research on genetics of arrhythmias has placed the AMC into one of the leading centers worldwide and its phenotypic-genotypic approach to unravel the genetic background of rare but also more common arrhythmias has been adopted by other centers. Some of the results of these trials have had an apparent impact on clinical practice. As an example, the MrCLEAN trial which was highlighted during the site-visit, has impacted the perception of standard quality care world-wide. The Committee notes that the same work is reported as one of the key achievements in Neuroscience as well. The clinical research builds upon international leading genetics research, registries, biobanks and research facilities in induced pluripotent stem cells (iPS). Publication output is substantial. The groups have attracted considerable levels of external funding, both from private and public sources. A large part of the acquired public funding is characterized by grants attracted by individual researchers at different levels of seniority such as grants from the Dutch NWO (Veni/Vidi/Vici) and ERC granting system. Impressive is the leading role of the arrhythmia theme in four highly esteemed Transatlantic Leducq Partnerships, each lasting for a five-year period, assembling prominent researchers in cardio-vascular medicine.

While all these scientific activities have shown positive developments, it is at the same time clear to the Committee that ACS may benefit from a greater focus of the overall strategy of the entire research program. The AMC and VUmc themes in the ACS are aligned to include almost all existing lines. The Committee would encourage to further focus research efforts during the transition period, and additionally in particular pinpoint an overarching profile and strategy. The Committee recognizes that the retirement of some of the established senior leaders is imminent which will pose a challenge for the future, especially in view of the transition and overall strategy. It may be challenging to maintain the legacy of these senior researchers.

The Committee acknowledges the fact that the sustainability of the cardiovascular research lines significantly depends on core facilities and research infrastructure at large, which need further attention (see core facilities). In the merger, the VUmc cardiology will move to the AMC, bringing cardiovascular research and clinical care together in one building and strengthening the critical mass of basic, translational and clinical research even further. AMC researchers are generally positive about the benefits of the merger for research. While the imaging facilities remain at the VUmc

location, some AMC researchers express the need for a Clinical Research Unit (CRU) to conduct, for instance, in-house phase 1 and 2 investigator initiated clinical studies. In addition, research infrastructure for big data, data management and coupling of electronic patient data, to biobank material and clinical research requires continuous support and staff. According to the Committee, the planning of the organisation of these developments should preferably be part of an overall strategy for the core facilities and a more focused cardiovascular profile and promising research priorities.

In the discussion with the representatives of the cardiovascular theme, the Committee specifically addressed the topic of career development. A strong career development policy will be critical for the future. With regard to career development, the current system does not (yet) provide sufficient tools to attract talents from abroad. The PI system doesn't offer extra budgets for individuals, and the mid-career options (post-doc, junior faculty) within the AMC could be improved, with extra incentives for non-MD PI's. At the same time, PI's find it difficult to protect their research time from other demanding tasks including clinical duties. The individualized system offers grants for collaborative projects to support synergy, but in general the steering of research budgets does not follow the most successful research priorities and opportunities. The Committee suggests that PI's start working together on cross-cutting topics around shared infrastructure, combining basic and clinical science in order to go for good science

3.2 Gastrointestinal Diseases and Metabolic Disorders

The Amsterdam Institute for Gastroenterology & Metabolic Health (AG&M) unites the research of 65 PIs at the AMC and 28 PIs at the VUmc positioned at the intersection of nutrition, microbiology, digestion, endocrinology and metabolism. The mission of the AG&M research institute is to perform research on healthy nutrition and metabolism, prevent or cure gastrointestinal and inherited and acquired metabolic disease and improve the wellbeing of patients. AG&M is organized in 4 different research program: 1) Regeneration and cancer of the digestive system, 2) digestive immunity, 3) endocrinology, metabolism and nutrition, and 4) inborn errors of metabolism. AG&M shares multiple commonalities and ongoing collaborations with the other research themes, in particular cardiovascular sciences, oncology, infection and immunity, and reproduction and development.

AG&M covers the complete research & development track, from fundamental to clinical research. AG&M includes several excellent PIs and research centers (e.g. the work at the Tytgat center, which was selected for presentation during the site-visit). The Committee recognizes the AG&M publication quantity, although the Committee also felt that papers with higher scientific or clinical impact could have been selected for the self-evaluation report. The scientific highlights that were presented at the site-visit were quite of interest, but the presentations also suggested particular strategy weaknesses in the institute and in the AMC as a whole. One observation is that there is comparatively little focus and coherence marking the specific research profile of the institute. The research activities cover a truly wide range of collected heterogeneous activities. In order to meet the characteristics of a true institute rather than a network, the institute would need to take an active lead in defining a clear strategy and focus. For this the institute will need clear insights into the budget to be provided by the AMC Board.

Within AG&M, facilities are available for whole genome sequencing, tandem mass spectrometry and metabolomics. Even though they generate high-quality data, it is questionable whether in their current positioning they can perform at a competitive state-of-the-art level and be able to sustain an internationally prominent technological infrastructure. The Committee suggests to focus on the most promising research lines and associated infrastructure, which should then become eligible for central funding support to be able to grow into an internationally leading facility. The Committee also noticed that the logistic and expertise support of investigator-initiated trials is inadequate, which as a matter of fact appears a broader issue also in other themes in the AMC, which is comprehensively and more specifically addressed in 3.10. Strength of AG&M is that they invest in talented researchers by funding programs for going abroad and for postdocs.

The fundamental researchers and clinical experts closely collaborate in multiple projects, which result in research lines with societal impact. For instance, the colorectal cancer surveillance program (which is a national programme) is highly relevant for society. The PhD student individual plan seems quite effective, as is the concept of selecting a buddy for young researchers in order to mentor them during grant applications.

Although AG&M has been active in stimulating AMC and VUmc alignment (Annual retreat, PhD retreat, joint lectures and symposia), the merger of AMC with VUmc will have profound consequences for gastroenterology and metabolism research. It will be a major challenge to define a joint research strategy, to obtain sufficient coherence and to set a focus for particular research lines, mainly because of the large level of fragmentation within the institute. Another concern of the Committee is that the gastroenterology part will move to VUmc and the metabolism part will stay in the AMC.

It is important to reiterate that the Committee recognized the value of individual researchers and their groups and the consistency of performance of some of the AG&M groups over the last decade. The Committee, however, would also like to commend the open attitude of the leadership in the discussions about the current position and future of the institute. At the onset of the meeting with senior group leaders, the Committee asked the question: "Does this Theme make compelling intellectual sense or do you feel that it is more of an administrative exercise to lump together quite heterogeneous scientific groups?" To the credit of the AMC colleagues who were very frank in their response during the meeting, there was an overwhelming vote in favor of the second suggestion in spite of the still early stage of development of this institute that only started in 2017.

Independent of scientific quality of the AG&M theme, the expertise could be reallocated and reorganized in view of the geographical conditions that will physically separate components of the theme. Such a reconsideration may also be in the interest of a cohesive strategy between the various parts, and the appealing opportunities to merge with other strong AMC themes in the interest of the research strategy.

Actually, the Committee recommends the AMC leadership to reconsider whether the AG & M theme in its current form should be continued or rather be repositioned. A better positioning of the existing groups needs to be explored in discussion with Department Heads and the other theme leaders. For example, the Gastroenterology oncology could be integrated into Oncology (CCA), the groups focusing on mucosal immunity and the inflammatory bowel disease research line could find a home in AI&I; diabetes research could be embedded in the cardiovascular sciences institute and the inborn

errors of metabolism research to the Reproduction & Development theme. However, in the event that it is decided to keep AG&M as a research institute, it will be essential for its viability that they take up more active decisive power and authority to align AMC and VUmc researchers, outline a clear research strategy & focus and manage a dedicated research budget in accordance with and in support of the outlined scientific AG&M strategy.

3.3 Infection and Immunity

The research of the infection and immunity theme of the AMC and the VUmc formally merged since January 2017 and comprises one of the largest alliance institutes: the Amsterdam Infection & Immunity (AI&I) Institute. Three programs were defined, namely Inflammatory diseases, Infectious diseases and Cancer Immunology. The mission of the Amsterdam Infection & Immunity Institute is to develop knowledge and expertise for deciphering microbiological and immunological principles and design innovative therapies to prevent or treat infectious diseases, inflammatory diseases and cancer. In order to achieve this, AI&I aims to perform high-level multidisciplinary fundamental, preclinical and clinical research, thereby covering the complete research & development track. Since the institute is not based on a particular disease, but rather on shared underlying principles, AI&I has multiple interactions within their themes and links with other institutes, in particular the Gastroenterology & Metabolism and the Oncology theme.

The Committee was pleased to see an enthusiastic group of ambitious researchers and several research groups with a good critical mass in both infectious diseases and immunology. Based on the self-evaluation report and the presented scientific highlights of the work on stem cell transplantation, cancer immunotherapy, HIV vaccine development and HIV transmission elimination, the opinion of the Committee is that infection and immunology research represents a well-developed research area in the AMC. The joint Experimental Immunology group with Sanquin is an example of the productive collaborations that are ongoing in AMC infection and immunology research. The research themes within AI&I are generally of translational and transdisciplinary nature. In order to become an even stronger research institute, fragmentation should be reduced and transversal themes further developed, including those dealing with neurological and psychiatric disorders. For that purpose, a central research strategy should be defined, which requires an effective steering instrument and more directive power within the research institute. This should also deal with earmarked research budgets and dedicated research time for clinical experts. In addition this may lead to a greater visibility of the major research lines to the outside world. Although there is sufficient awareness of the importance of talent development, the available budget to truly support talent in the development of their research line is limited. The same holds true for attracting talented PhD students and Postdocs from elsewhere in the Netherlands and abroad.

The Committee recognizes the strong impact of the Infection and Immunity theme on national and international guidelines for infectious diseases, inflammatory diseases and cancer. Within the theme, there is an evident link to biotechnology. Furthermore, multiple collaborations with industry, patient organizations and other stakeholders are ongoing, which contributes to societal impact. As regards the recent merger, the AMC and VUmc AI&I are already well aligned as a result of efforts such as a kick-off meeting and a PhD retreat, but also common talent development and grant programs. The latter might be more targeted towards joint initiatives of AMC and VUmc in the future. In addition, AI&I already developed common research themes. An opportunity for AMC is to

profit from the tumor immunology group of the VUmc. In order to stimulate more collaboration between AMC and VUmc researchers, the Committee recommends developing incentives for the start of joint research initiatives. Core facilities such as clinical trial support and the animal facility require greater specific attention and earmarked budgets, because they are essential for the development and maintenance of excellent research lines.

3.4 Neurosciences

The AMC Neuroscience theme merged with the VUmc Neuroscience in 2016 to form the Amsterdam Neurosciences Institute (ANI). In this institute, research is organized in a matrix combining five disease-orientated programmes (neurodegeneration; neuroinfection and neuroinflammation; neurovascular disorders; compulsivity, impulsivity and attention; mood, anxiety and psychosis) with four mechanistic and technology programmes (brain mechanisms, complex trait genetics; neurotechnology; brain imaging). The AMC theme aims to conduct internationally recognised research in parallel with compassionate and innovative patient care of the highest quality. Many PhD students within the institute follow a combined track of a PhD and medical specialist training. The medical specialist training allows 1 year of research time. PhD candidates attend graduate school courses, organise and attend regular events or seminars, but neurology and psychiatry are mostly not together.

The Committee was impressed to see the already advanced development of the structure of the merged institute and the role it could serve as a paradigm for other emerging AMC/VUmc institutes. The strategic thinking was in place already at two years prior to the merger, and this has resulted in a thoughtful approach that is backed up by up-to-date data on staff, budget and output across the matrix. Thematic topics are based upon strong areas of research. The governance is in place, with alignment of the budget and positions. Clearly, the institute leaders share a vision about where they are going. Part of the AMC programs is world leading and it shows that deliberate coordinated planning pays off, as for instance is evident from a large number of joint publications and from clinical care advances at the same time. The Committee noted that clinicians have protected research time: 60% is required for clinical practice and the remaining part is negotiable, but often results in 30% research time. These experiences may serve as a prototype example for other departments throughout AMC.

While the clinical cohorts and randomised clinical trials with a strong translational link to basic science are a major asset, the inadequacy of some core facilities constitutes a serious problem also for this theme. In particular, there have been problems with the animal housing facility, e.g. in relation to research with rodent models. As a result of the closing down of the animal core facility (ARIA), experimental research has been critically hampered. With regard to the matrix structure, the current strategy might be further developed to include big data approaches, especially those around behavioural and multimodal data, bioinformatics and machine/deep learning. The Committee believes that there are promising opportunities within this area that deserve to be exploited, but this would require partnership with other groups.

By making explicit research choices rather than trying to cover everything, a focused, high-impact approach has been created. The Committee strongly endorses the Neurosciences Institute to proceed with implementing their stipulated roadmap. Their approach should continue to leave

flexibility and space for new directions. The Committee supports the Amsterdam Neurosciences Institute strategy towards more integration with the local expertise in other institutes in the Amsterdam area near AMC. In particular, the ANI aims to further organise collaboration by integrating with the Netherlands Institute for Neuroscience (KNAW-NIN), Spinoza Centre for Neuroimaging, and the UvA's Amsterdam Brain & Cognition (ABC). The Committee encourages these initiatives.

3.5 Oncology

In January 2016, the oncology research of the AMC and VUmc merged to form the Cancer Center Amsterdam (CCA), which has been organized in 3 programs: Cancer biology & Immunology, Imaging & Biomarkers and Treatment & Quality of Life. The CCA mission is to improve treatment, life expectancy and quality of life for patients with cancer and to reduce the impact of cancer on health care and society. Within the institute, multidisciplinary research is being performed, ranging from fundamental to translational and clinical research. For several cancer types, the CCA is covering the complete research and development track. Moreover, AMC oncological research is connected to other themes of the AMC, in particular to the Immunology, Gastroenterology and Public health themes.

The Committee valued the scientific highlights that were presented during the site-visit and in the self-evaluation report. During the site-visit, productive research lines were presented on colorectal cancer and lymphoma, while the Committee in addition greatly appreciated the oncogenomics platform. However, during the site-visit the Committee also observed a high level of fragmentation, indicated by the fact that the oncology research within the AMC is a collective effort of no less than 62 PIs from 27 departments. In order to stimulate the excellence of oncology research, the Committee feels that the CCA should strategically define the most excellent research lines and cross-cutting themes, which should result in the focus on a limited number of research topics/ programs by building critical mass and reallocation of budgets. However, in the current situation, CCA lacks the authority to be able to define and implement a clear strategy and to reallocate budgets. An opportunity offered by the merger is to take advantage of the strong immunology group of the VUmc, together with the excellent immunology ongoing within the infection and immunology theme of the AMC itself. With the exception of LYMMCARE, in the Oncology Theme surprisingly little mention was made of cellular or antibody-based immunotherapy at this time of break-through innovation in cancer immunology therapeutics.

The Committee was pleased to see that researchers of the oncology theme are successful in obtaining external funding, including several personal grants from the European Research Council, the NWO Vernieuwingsimpuls and the Dutch Cancer Society, but also multiple (inter)national collaborative projects have received funding. The Committee recognizes the strong societal relevance of the oncology research within the theme, which is indicated by its focus on translational research, but also by a high number of public-private partnerships. LYMMCARE is an example of a multidisciplinary research group that actively collaborates with stakeholders like clinic, industry and patient organizations to facilitate rapid implementation of their findings, resulting in high societal relevance.

Although the Alliance institute CCA formally started in January 2016, the research institute has already made significant efforts to align the institutes, for example by the organization of a common kick-off meeting for almost 400 researchers from AMC and VUmc. The impression of the Committee is that planning and organizing the merger demand substantial efforts and time investments of many people, which should not reduce scientific performance and output. In the future, all oncology research and clinical care will transfer to the VUmc location. However, before the actual transfer, collaboration between researchers from AMC and VUmc location should be stimulated to overcome the physical distance. Currently, funds are being raised to unite all preclinical CCA researchers from AMC and VUmc in one building. The Committee recommends to maximally reducing the physical distance between preclinical researchers and clinical experts in order to stimulate translational research. To overcome the potential barrier to the development of cross-cutting themes and multidisciplinary research because of different locations of research institutes, the collaboration within and between research institutes should be actively promoted via incentives for joint grants. The PhD students of the oncology theme are generally pleased with the level of supervision by their supervisor, although there is variability, as it seems that this very much depends on the individual supervisor. In the opinion of PhD students, the graduate school could improve their visibility. Regarding the merger, the PhD students feel that the communication regarding joint events could be more effective.

3.6 Public Health and Epidemiology

The theme 'Public Health and Epidemiology' investigates the health and well-being of both the general and the working population, the quality and effectiveness of the organization of healthcare, the course of chronic physical and mental health problems in patients, and the results of interventions. Together with the VUmc, a project plan of the Amsterdam Public Health research institute has been established. The mission of this institute is to conduct high quality research to improve people's health, reduce health inequalities, transform healthcare and empower people. In the opinion of the Committee this project plan is clear and well defined. The Committee also values the management structure described in the project plan with the existence of a scientific quality Committee, a PhD Committee and two advisory boards (both internal and external).

After implementation of the close collaboration with VUmc, the research theme consists of eight research programs. According to the Committee this division into eight programmes makes sense, because of the size of the research group. The Committee was pleased to notice that the AMC and VUmc parts together have redefined research programs that are relevant and up to date. In the opinion of the Committee, the collaboration with VUmc creates critical mass in each research programme (the smallest programme consists of 100-120 researchers) to enable an important role in the public health field. Although the research strategy of the 'Public Health and Epidemiology theme' seems to provide a solid basis for successful implementation and collaboration, it has yet to fully saturate the entire body of researchers at all levels. For instance, during the site-visit, the Committee noted that the PhD students were almost unaware of the existence of the research theme. They much more identified themselves with the departments.

The Committee was impressed by the quality of the research as summarized in the self-evaluation report and valued the societal impact of the work that was presented during the site-visit. In its opinion, the theme is focusing on important general health issues with an active translation of

findings to policy. Part of the theme's research is based on several large longitudinal cohort studies. The Committee noticed that the maintenance of the infrastructure of these cohorts, which are also utilized for research projects by other departments and themes, is not secured, but largely depends on external funding, which places their continuance at risk. Because of the scientific value of these cohorts, also for other research AMC research themes, the Committee advises to create more sustainability through central funding.

Due to budget cuts in the last few years, many junior faculty on temporary funding left. This makes it difficult to mentor PhD students. The theme would benefit from having a stronger talent policy and good mentoring system. Another concern of the Committee is that the PI system does not seem to work very well for this group, due to the lower impact of leading journals in this theme.

3.7 Reproduction and Development

The research theme Reproduction & Development aims to improve health by performing ground breaking preclinical and clinical research. The overarching concept of the research of this theme is the circle of life.

The Committee noted that the theme benefits from strong leadership, organisation and commendable vision and that considerable progress had been made in creating a programme of work with the VUmc. The Committee values the collaboration with other themes for instance in the field of clinical genetics and public health. It was pleased to hear that the theme aims to be inclusive in defining the research strategy. However, in the opinion of the Committee it is important not to spread out too broadly and diversely. In the near future, the theme should consider to further work towards a detailed research strategy focusing on the existing strengths of the research programme, whilst recognizing links between the different research topics of the theme and cross thematic interconnections.

Connecting with the group in Metabolism studying the inborn errors of metabolism is recommended, with the possibility that the academic strategy and geographical location of that group might fit more appropriately into Reproduction and Development than in Gastroenterology and Metabolism. The alignment lies in the shared interest in genetics particularly in screening for genetic disorders.

The Committee was positively impressed by the quality of the research in this theme and the proven translational and societal capacity. Whilst links with Public Health are strong, consideration should be given to the best fit of PIs who might be better placed 100% in this theme. The committee considered that the research group is leading in obstetrics research in the Netherlands. The Committee values the internationally recognized successes of the trial facility of the Nederlandse Vereniging voor Obstetrie en Gynaecologie (NVOG) consortium, which is led by this group. However, without a central trial facility at the AMC providing oversight and infrastructural support for trials across the AMC, the NVOG consortium trial unit is isolated and potentially vulnerable to risk with regard to providing adequate support of management, trial design, statistical support and other aspects of trial planning and trial management. This oversight should be provided by a core Clinical Trials Unit facility as it is in most European universities.

The Committee agrees with the theme leaders that at present there is a lack of basic science in reproductive health and that more focus is needed. The laboratory based sciences presented showed considerable but isolated strengths, and capacity for expansion. The lack of core facilities in the AMC

(for general comments see further under 3.10) is an impediment for this theme as well. This also concerns the problems which have been incurred in relation to the animal facilities. Shared laboratory facilities with VUmc should be considered as they would bring together the existing basic science and strengthen the laboratory infrastructure. At which site these laboratories should be located should depend on the availability of core facilities to support the research. The Committee also suggests that more basic research be undertaken in association with the clinical trials unit, for instance in the development of biobanks for storage of human tissue specimens. Current level of funding within the NVOG model has insufficiently enabled this, leading to a major missed opportunity and reducing international competitiveness. New funding opportunities should be explored.

In the opinion of the Committee, societal relevance is excellent in this theme. The Committee was pleased to hear that translational impact of research results is an important topic of discussion. The Committee encourages the theme leaders to further expand the implementation of trial results and consider investment in implementation science.

Being small makes the theme vulnerable. The shared thematic development with VUmc is hampered by the lack of administrative support, which is important at this developmental stage. The unitedness with VUmc is already strengthening the theme's capacity to attract research scientists and external funding but this would be optimised with administrative help. During the site-visit, it struck the Committee that there was insufficient awareness amongst the theme leaders of the theme's financial situation, and the Committee was receptive to the stated need for financial transparency in the divisions, especially the allocation of funds for research staff. Researchers appeared to have no data on the research funding within their division. The Committee also recognized considerable dissatisfaction with the current PI incentive scheme. The Committee recommends to incorporate a funding plan in the research strategy. In the opinion of the Committee, a different and more transparent financial structure would help this vibrant theme.

3.8 Movement and Musculoskeletal disorders

The research theme 'Movement and musculoskeletal medicine' was founded in January 2017. Although the theme just started, it can build upon the existing VUmc research institute. AMC, VUmc and Free University (VU) together developed an institute plan 'Amsterdam Movement Sciences', in which the plans of the coming period are described. The aim of the institute is becoming world leading in the field of interdisciplinary translational research on human movement and physical performance, and to disseminate its results to end-users so that society benefits optimally from the research results.

The Committee has spoken to an enthusiastic group of researchers, who all considered the alliance with VUmc as an opportunity for the field of movement sciences. With the establishment of this theme, they feel that they can advance research in this topic and become more visible in the AMC and abroad.

In the self-evaluation report and during the site-visit, the Committee has seen some good examples of high quality research, which is also relevant for practical application. Some of the research has a long-standing background. The Committee was positively surprised to see how well the alliance of the research groups of AMC and VUmc has progressed. It noticed that recently gained funding is

mostly for joint projects. The Committee also values the number of collaborations with other partners, such as the TU Delft and TU Eindhoven.

Although the Committee is positive about the research plans, it also identified potential threats to the long-term sustainability of the theme. In the opinion of the Committee, the theme is vulnerable, because it is led by a small number of researchers. In addition, the PI system doesn't work well for this theme, because of the relatively young researchers with low publication impact and the relatively low publication impact of the field in comparison to mainstream areas. The theme is therefore largely dependent on external funding and will receive less via the present PI score system. The Committee recognizes that the theme could be pushed forward by a clinical research unit and shared movement lab facilities.

3.9 Graduate School

The mission of the AMC Graduate School is to organize the doctorate level academic training of AMC PhD candidates.

Activities of the Graduate School are:

- To register AMC PhD candidates and their supervisors;
- To inform current and future PhD candidates, supervisors and others about the AMC PhD programme;
- To provide a PhD course programme for registered PhD candidates;
- To monitor the PhD training of AMC PhD candidates;
- To support PhD candidates in case of questions and difficulties;
- To support PhD supervisors in their roles as active mentors and trainers of PhD candidates;
- To facilitate formal activities towards the thesis defense and ceremony.

The Graduate School has over 1600 active PhD candidates who are mainly Dutch (82%). Although the Committee understands that medical PhD students need to speak Dutch in order to communicate with patients, it encourages the AMC to make efforts to increase the percentage of international students.

According to the Committee, the Graduate School functions well, contributing to a very high completion rate. The Committee had the opportunity to speak with a selected number of PhD candidates who were satisfied with the operation of the Graduate School.

The Graduate School offers 49 courses classified into transferable skills, scientific methods and advanced science. Participation is free of charge to registered PhD students. The Committee was pleased with the variety of courses. The Committee was especially positively impressed by the AMC World of Science introductory course, in which also the topic of scientific integrity is included. In the opinion of the Committee, it would be best if also thematic training courses would be organized under the auspices of the Graduate School. This would offer a platform to the coordinators of these courses to communicate and facilitate the exchange of best practices.

A recommendation of the past assessment report was to develop a standardized monitoring procedure. Therefore, the Graduate School has introduced an individual Training and Supervision Agreement (iTSA), in which arrangements are made with regard to mode and frequency of supervision as well as the structure and contents of courses and training. The Committee was impressed by this monitoring procedure. It values the attention given to the individual PhD candidate

through the PhD candidate advisor, who is very accessible. The Graduate School monitors and evaluates PhD projects at three points of time, at the beginning, half way and after graduation. To strengthen the programme, the Committee would suggest to extend the midterm evaluation to yearly evaluations rather than only once (after 2 years).

It struck the Committee that taking courses and even registration in the Graduate School is not obligatory for AMC PhD candidates. Since most PhD candidates are registered in the Graduate School, fill out their iTSA and follow World of Science already, it seems a relatively small step to make this mandatory. The Graduate School also provides support to PhD supervisors through a number of instruments, including guidelines for good mentorship and workshops on supervision of PhD candidates. This newly developed training programme for supervisors is an important positive response of the Graduate School to expressed needs of PhD students considering the relatively high number of complaints about supervision. Unfortunately, the number of supervisors that follow the training programme is low. The Committee suggests that the Graduate School makes efforts to further stimulate, or better even, require newly appointed supervisors to follow this course. Based on interviews with PhD candidates, the Committee noted that the career guidance of PhD candidates is minimal. The Committee recommends a stronger career development programme for both PhD candidates with academic and non-academic ambitions. It also suggests including postdocs in this career development programme.

3.10 Core facilities

In the self-evaluation report the AMC presents 16 core facilities. The organisational and financial structures of the core facilities vary. Most core facilities are embedded in a department, whereas they are governed and variably financed through the Division of Laboratory Specialisms (Division G). In the 2011 evaluation and the subsequent 2014 midterm evaluation, recommendations were specifically directed at the core facilities. However, the Committee takes note that in the self evaluation report it is concluded that “a shared vision, and policies based on that vision, should be elaborated; and that investments are needed to reinforce core facilities with sufficient equipment and expert staff to reach acceptable turn-around times and reasonable user fees”, suggesting that the earlier recommendations have not sufficiently materialized. One of the questions that the AMC Board had formulated for the Committee was (again): In which way should AMC reinforce its core facilities?

The Committee was confronted with the insufficiently structured organisation of the core facilities and a clear definition of core facility was lacking. The Committee was left with the impression that the infrastructures identified as core facilities were a result of historically established facilities that have been developed from a bottom-up system. Whereas this may prove viability in the initial phases, for such a construct to develop and remain vital, guidance will be required in order to establish sufficient governance and satisfy emerging needs. Importantly, the organization of the core facilities needs to be part of an overarching strategy. In addition, the conversations with the staff who are directly involved in core facilities revealed that they (and their management) demonstrated little sense of the need to develop a business model where services are at least partially reimbursed on a ‘fee for service’ basis. Only in this way, can a sustained core facility maintain its quality and service. A separate concern expressed by individual members was that recent institute-wide budget cuts had disproportionately affected the core facilities.

In the interest of the AMC ambition to maintain (and strengthen) its position as a leading international research institute, the Committee advises that the leadership develops a sound strategy for a sustainable core facility infrastructure. The wording chosen here reflects the urgency of the needs, acknowledging that some people dedicated to the facilities have been poorly supported in the last 6 years. Given this situation, those involved in the core facilities dealing with the day-to-day challenges have done a great job. The Committee is impressed that under these conditions individual groups are doing so much good research.

With regard to the heterogeneous set of core facilities that are listed, the Committee would like to make a distinction between services, specialist facilities and facilities not listed.

Core services are fundamental needs for all researchers throughout the AMC, and need to be available at all times, having strong back up systems and built-in sustainability. The animal house, radionuclide lab, and medical-technology are such services. The animal housing problems have caused major setbacks in research. Several researchers across most of the AMC themes expressed their frustrations in the way problems have (not) been addressed.

High-tech specialist facilities usually develop within individual departments and are as such critical for some of the “local” high-quality research. Once they become available to the other departments and turn into ‘self-acclaimed’ core facilities they may suffer from abundance of requests, too little money, and diffuse management structure. Oncogenomics, the HIS mouse facility and cellular imaging are examples of such sophisticated core facilities that are directly related to research. In these facilities bioinformatics support is understaffed, which needs further attention. In order to maintain them, they are in need of structured management.

In the list of 16 core facilities, the Committee noted an important deficiency, namely a big data/clinical informatics (patient, cohorts and research data) infrastructure. The latter is crucial for modern biomedical research, and requires planning and strategy. Part of this research infrastructure is available as support for various aspects of clinical research. Yet, within several research themes clinical research support and coordination seem to have been developed with little coordinated overview, which leaves the Committee wondering what the role of the Clinical Research Unit (CRU) is. Moreover, regardless of their quality, the existence of multiple research theme specific clinical trial groups, e.g. in Reproduction and Cardiovascular themes, complicates overall quality assurance oversight of clinical trial management for the AMC board, with inherent risks. There is an immediate and unmet need for an overarching Clinical Trials Unit to oversee all aspects of clinical trial management and governance. Also the biobanking and medical imaging activities of the AMC should be considered as part of the big data/clinical informatics core facility activity.

In setting up a strategic development for the core facility portfolio, AMC should strive for common requirements and standards for each initiative considered as a core facility including a user Committee structure, a business plan, and a description of the activities that are intrinsic to the department or division hosting the core facility. The Committee recognizes that locating such facilities in departments which also have a research stake in the corresponding topic, requires a sustainable strategy for core facility services that distinguish between those aspects for purposes of budgeting and performance evaluation.

The Committee is of the firm opinion that sustainable business models for the core facilities must include user fees that are competitive but sufficient for the facilities' operations. The Committee has seen examples of facilities with very low or absent fees that are predictably overwhelmed with requests. The fact that many researchers outsource their work to core facilities external to the AMC facilities must imply that AMC investigators recognise that the use of facilities is not for free. The financial situation for the facilities is complicated by the fact that clinical divisions are budget holders and research themes are not in the lead, which is common in other Dutch UMC's. The upcoming merger with the VUmc provides an excellent opportunity to revise and reconsider the position of the facilities, the needs, the budget, and the management. This should take into account other Amsterdam based institutions, in order to create viable and sustainable facilities that match the needs of the AMC/VUmc institutes as well as outside user needs. In such a joined effort, there is more room to manoeuvre. The plan should align with the overall research strategy, and should at least include a separate budget that is clearly visible within the divisions, including division G.

4. Conclusions and Recommendations

According to the Standard Evaluation Protocol (SEP), qualitative assessments are supplemented by assigning a discrete score (1-4, 1 being highest) to the research unit (in this case, the AMC) for each of the following evaluation criteria.

- **Research quality:** As outlined in paragraph 2.1, the basic, translational and clinical research in the AMC varies over a broad range from good to world leading. The Committee was impressed by the selected scientific highlights that were presented during the site-visit and reported in the self-evaluation document. Each of the themes presented such highlights during the site-visit, and some of these highlights reflect prominent international research lines. Score #2 (The unit conducts very good, internationally recognized research)
- **Relevance to society:** As described in paragraph 2.2, the Committee was impressed by the societal impact of a diverse series of scientific achievements across several themes. Various achievements have societal or medical practice changing impact. Score #1 (The unit makes an outstanding contribution to society)
- **Viability:** As stated in 3.3, the AMC finds itself at an important turning point because of the merger with the VUmc. This is both a challenge and an opportunity. The Committee assessed the viability against this background and ranked it as Good (Score #3 - The unit is equipped for the future). The Committee wishes to emphasize that its conclusion is not based on any misgiving about the AMC. Aspects of viability such as the financial basis and acquisition power reflect the very good research quality. And the leadership is well aware of the future needs and potential hiccups in the merger process. In particular because of the merger with the VUMc but also in view of the need to align with international best practices, the Committee wishes to signal that AMC should reinforce its central research governance in terms of thematic prioritization, talent policy, and core facilities. This is of direct relevance as well for the future alignment of AMC and VUmc research lines. Accordingly, a number of firm strategic decisions must be taken now, the effect of which is yet unknown. At this precise relatively early point in time, the Committee lacks sufficient insight that everything will unfold under a best-case scenario. While the conclusion is that AMC has worked hard and positively on the soundness of the future plans concerning research in the merger with VUmc, there is still an enormous task ahead that requires the full potential of AMC's leadership.

From the general and theme descriptions, and from the qualitative and quantitative assessment, several conclusions and recommendations emerge:

1. Strategy, leadership and governance

- The Committee advises the board of AMC to continue its approach of stimulating the research agenda with the same level of ambition but to consider additional measures to strengthen highly promising research lines and reconsider critical governance mechanisms (detailed below).
- The Committee advises the Executive Board of the AMC to (re)define an overarching research strategy and the governance needed to implement it in view of competing priorities in the institutions. This should involve an explicit long-term vision, transparent procedures of strategic research planning and choices of research priorities associated with transparent allocation of funds.
- The AMC Board should consider charging the Research Council with a leading role in restructuring the overall research policy and governance.

- The Research Council, supported by the Executive Board, could monitor and offer support to reduce the current disparity among the themes and enable preparation for the merger in terms of leadership, governance models, focus, and coherence. Some themes are already advanced and may serve as role models in this regard.
- There is a need for strengthening the orientation and financial incentives that support the further development of research strategy and research themes. The Research Council may need an allocated budget to implement change.
- One of the incentives to support excellence, e.g. in clinical research, is to organize protected research time to talented individuals. In addition, the PI system should be reconsidered and a decision made to reallocate funding in a different model. The emphasis should be on personal excellence, but moving away from distribution through divisions and departments. Instead these activities should align with strategic research priorities of the institutes.
- Interdisciplinary research can be further stimulated by the Executive Board, following re-framing of their corporate research vision, plans and incentives to deliberately focus on cross-cutting and transversal research themes, alignment of interdisciplinary priorities and strategic cooperation with external partners and outreach to other faculties of the University of Amsterdam, e.g. the Science and Social Science faculty.

2. Research priorities within themes

- The research themes need to be encouraged to actively focus on the most promising research lines. This requires prioritization of selected areas of scientific excellence and promise in which the AMC can continue to compete internationally on a high level. This is not only important for continuing to attract competitive external funding, but it will also further enhance the visibility of these activities and increase the impact of the AMC in the outside world as well as its ability to attract external talent.
- In order to achieve these objectives, the Committee recommends constructing a managerial model that puts authority and executive and advisory decision making into the hands of the leadership of the Alliance Institutes. A critical step to achieve this is to equip the leadership with financial insight and responsibility, and the ability to make strategic appointments. At the very least, this should permit the leadership to influence the appointment of new Professors and to have an important role in choosing new PI's. The advisory role of the Research Council for fostering coherence and development of cross-cutting themes and assignment of priorities should be enhanced.
Ideally, this would permit allocation of funds by the leadership to support capital expenditure, finance staff and provide a career development pathway for promising young researchers.
- The Committee recommends to reconsider the position of the Gastrointestinal Diseases and Metabolic Disorders theme (as part of the Amsterdam Institute for Gastroenterology & Metabolic Health (AG&M)). This institute appears insufficiently founded on a common coherent research theme. It seems to cover a wide range of heterogeneous scientific disciplines; there is limited cohesive strategy and relatively little interactive value across the entire theme.

3. Career and talent development

- The Committee feels that the current PI system deserves to be reconsidered in view of the merger with the VUmc and suggests developing it into a revised or even new system. In a new PI system, the crucial element of personal merit should be maintained, and at the same time taking

seniority level into account to avoid a bias away from supporting mid-career scientists (post-docs and junior faculty). This new system should further be blended with decision making by the institutes.

- The Committee recommends developing a policy and providing appropriate support for career and talent development that is focused on excellence and that is specific for each career phase (PhD candidates, postdoc/PI, junior faculty), and to assign funding competitively. This should benefit “high-potential” individuals, across divisions. Decisions should move away from divisions and departments, but instead align with corporate strategic research priorities.
- Especially further attention is needed for mid-career options and extra incentives for non-MD PI’s.

With regard to the Graduate School

- The Committee recommends to make registration and taking courses in the Graduate School mandatory for AMC PhD candidates; this would align with most European PhD training programmes.
- The AMC Board should make efforts to require newly appointed supervisors to attend a course for supervisors and further encourage current supervisors to do so as well.
- The Committee advises to develop a proper career development programme for both PhD candidates with academic and non-academic ambitions. More systematic approaches are needed to expose this group to non-academic career options. Include postdocs in this career development programme.
- The Graduate School is advised to further develop its mentoring system, making it also effective with respect to mental wellbeing. A mentoring system is extra useful for non-MD PhD’s who experience more uncertainty about their career perspectives.

4. Core facilities

- As state of the art infrastructure of equipment and core facilities is crucial, the Committee recommends that the Executive Board of the AMC develops a comprehensive plan for the core facilities. In the past years the performance of many core facilities has been suboptimal because of lack of central management and associated lack of appropriate budget.
- A core facility strategy should start with general and appropriate definitions and criteria for core facilities that cover all relevant facilities and infrastructures.
- The choice and size of core facilities should be reconsidered according to the research strategy. While core facilities need a user driven governance, this needs to be translated into a business plan and allocated budget to make them sustainable. The core facilities plan needs to be supported by the central management, in line with the research strategy.
- Core facilities need earmarked central funding and should be accessible across the entire AMC institution. Competitive additional funding may be required as well.
- The AMC core facility strategy obviously will need to be aligned with the VUmc core facility planning, as well as with other relevant institutions in Amsterdam, to create maximum synergy. In the transition period funding may be needed to bridge this gap.
- The Committee perceives a need for strengthening a state-of-the-art clinical trials unit that supports Good Clinical Practice (GCP) and methodology, governance, data management, legal sponsorship, Standard Operating Procedures (SOP), and registry that is in line with European regulation. The quality of such a core facility is critical to launching clinical trials, as is indicated by

the fact that all themes currently seem to develop their own clinical trials unit of variable magnitude. However, this does not mean that everything has to be accommodated in one geographically located unit. A hub and spoke model may work adequately.

- Regarding other research infrastructure, further attention is necessary for maintenance of cohorts, research data sharing practices and coupling to clinical data.

Appendix 1 The International Evaluation Committee and the review procedures

The International Evaluation Committee members were:

- Prof. dr. Bob Löwenberg, chairman of the Committee
Professor of Hematology at Erasmus University Medical Center Rotterdam, The Netherlands.
- Prof. em. dr. Günter Breithardt
Department of Cardiovascular Medicine, Hospital of the University of Münster, Germany.
- Prof. dr. Marc Bonten
Department of Medical Microbiology and Julius Center of Health Sciences and Primary Care at the University Medical Center Utrecht (UMCU), the Netherlands.
- Prof. dr. John Creemers
Center for Human Genetics, KU Leuven, Belgium.
- Prof. dr. David Kerr
Professor of Cancer Medicine, University of Oxford, United Kingdom.
- Prof. dr. Gitte Moos Knudsen
Department of Neurology and Neurobiology Research Unit, Copenhagen University Hospital, Rigshospitalet, Denmark.
- Prof. em. dr. Kees Melief
Professor of Immunology at Leiden University Medical Center (LUMC), The Netherlands.
- Prof. dr. Andreas Meyer-Lindenberg
Director of the Zentralinstitut für Seelische Gesundheit, Mannheim, Germany.
- Prof. dr. Lucilla Poston
Head of the Department of Women and Children's Health, Kings' College, London, United Kingdom.
- Prof. dr. Janet Rich-Edwards
Director of Developmental Epidemiology at Brigham and Women's Hospital, Harvard Medical School Boston, United States.

Secretaries to the Committee were:

- Dr. Ingeborg Meijer, PhD, Ingeborg Meijer Advies
- Dr. Joyce Putters, PhD, VUmc, Amsterdam
- Dr. Annemarie Venemans, PhD, De Onderzoekerij

Information provided to the Committee

The Committee has received the self-evaluation report 2011-2016 of the AMC as core documentation, including the information required by the Standard Evaluation Protocol (SEP).

The Committee also received the following documents:

- The Terms of Reference, including the specific questions
- The SEP protocol 2015-2021
- The AMC evaluation report 2011

- Alliantie AMC-VUmc; Op weg naar excellentie. Ambities, locaties en plannen; May 2014 (strategic document concerning merger, in Dutch)
- Financial reports Academic Medical Research (AMR) of the AMC, years 2011-2016
- Specific reports of the AMC-VUmc institutes

Procedures followed by the Committee

Prior to the first Committee meeting, all Committee members received the Terms of Reference for the evaluation together with the self-assessment report of the AMC. The final assessments are based on these two documents, the documentation provided by the AMC-VUmc institutes, and the interviews with the board, research council, and representatives of AMC themes, core facilities and Graduate School. The site-visit of the Committee took place on 23, 24 and 25 October 2017 at the AMC in Amsterdam. The full agenda of the site-visit review is attached (appendix 2), and it had been prepared by the AMC itself. At occasions, the Committee has requested to deviate from the preplanned agenda in order to be able to discuss and address particular topics in greater depth. The evaluation of an institution of the size of AMC in two days required that the Committee members split in parallel subgroups to meet with representatives from the various themes. The logistical process further required intermittent feedback and harmonisation sessions of the Committee and opportunities for sharing, discussing and aligning findings and impressions. Appendix 3 shows which individual Committee members visited the individual AMC themes, graduate school and core facilities.

Prior to the theme sessions, the Committee prepared and discussed the information in the self-evaluation report, exchanged first impressions, and formulated questions for the AMC theme representatives during the parallel sessions. After the sessions, the plenary Committee discussed about their observations, comments and recommendations for the report. Before the written draft report was finalized, a prefinal version was presented to AMC for factual corrections and comments. The report is submitted to the University of Amsterdam, which is the formal recipient of the report.

Appendix 2 Programme site-visit

Programme site visit International Evaluation



Programme site visit International Evaluation Committee

AMC research evaluation, 23, 24 & 25 October 2017

Monday 23 October

| | |
|--|---|
| 12.30-13.00 hrs <i>E2-148</i> | Arrival and Coffee |
| 13.00-13.30 hrs <i>Lecture Hall 1</i> | Opening and overview of AMC research Presentation: Hans Romijn, Chair AMC Executive Board & Mat Daemen, Chair Research Council |
| 13.30-14.00 hrs <i>E2-148</i> | Lunch |
| 14.00-15.00 hrs <i>E2-148</i> | Internal IEC meeting Impressions, approach, focus points |
| 15.00-18.00 hrs <i>F4-119</i> | AMC Theme Oncology IEC members: Bob Löwenberg, David Kerr & Kees Melief Participants: Jan Paul Medema (theme leader), PIs, PhD candidates & postdocs |
| 15.00-18.00 hrs <i>G4-123</i> | AMC Core Facilities IEC members: Janet Rich-Edwards, Andreas Meyer-Lindenberg, Gitte Moos Knudsen & Marc Bonten Participants: Esther Lutgens (chair internal evaluation core facilities) and other PIs |
| 15.00-16.30 hrs <i>H4-284</i> | AMC Graduate School IEC members: John Creemers, Lucilla Poston & Günter Breithardt Participants: Marlies Stouthard (director), Graduate School Board & PhD candidates |
| 16.30-18.00 hrs <i>H4-284</i> | AMC Theme Movement and Musculoskeletal Medicine IEC members: John Creemers, Lucilla Poston & Günter Breithardt Participants: Frans Nollet (theme leader), PIs & PhD candidates |
| 18.00-18.45 hrs <i>E2-148</i> | Internal IEC meeting Impressions, approach, focus points |
| 19.30 hrs | Diner with Executive Board of the AMC and the Executive Board of the Research Council at Restaurant Lastage (Center Amsterdam) |

Tuesday 24 October

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| 08.00-08.45 hrs <i>E2-140</i> | Internal IEC meeting Impressions, approach, focus points |
| 8.45-9.15 hrs <i>E2-140</i> | AMC research policies Discussion with the Executive Board of the Research Council |
| 9.15-9.30 hrs <i>E2-140</i> | Coffee |
| 9.30-12.30 hrs <i>H4-284</i> | AMC Theme Reproduction and Development IEC members: Lucilla Poston, Janet Rich-Edwards & David Kerr Participants: Sjoerd Repping (theme leader), PIs & PhD candidates |
| 9.30-12.30 hrs <i>F4-119</i> | AMC Theme Infection and Immunity IEC members: John Creemers, Kees Melief, Andreas Meyer-Lindenberg & Marc Bonten Participants: Theo Geijtenbeek (theme leader) and other PIs |
| 9.30-12.30 hrs <i>G4-123</i> | AMC Theme Cardiovascular Science IEC members: Günter Breithardt, Gitte Moos Knudsen & Bob Löwenberg Participants: prof. Mat Daemen (theme leader) PIs & PhD candidates |
| 12.30-13.30 hrs <i>AMC Restaurant</i> | Lunch at AMC restaurant The Box |
| 13.30-16.30 hrs <i>PA3.102</i> | AMC Theme Neuroscience IEC members: Günter Breithardt, Andreas Meyer-Lindenberg & Gitte Moos Knudsen Participants: Diederik van de Beek (theme leader), PIs and PhD candidates |
| 13.30-16.30 hrs <i>G4-123</i> | AMC Theme Gastroenterology and Metabolism IEC members: John Creemers, Lucilla Poston & David Kerr Participants: Stan van de Graaf (theme leader), PIs & PhD candidates |
| 13.30-16.30 hrs <i>C2-114</i> | AMC Theme Public Health and Epidemiology IEC members: Kees Melief, Janet Rich-Edwards & Marc Bonten Participants: Judith Sluiter (theme leader), PIs, PhD candidates & postdocs |
| 16.30-18.00 hrs <i>E2-148</i> | Internal IEC meeting Impressions, draft narratives, preliminary scores |
| 18.00 hrs` | Free evening |

Wednesday 25 October

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| 8.30-11.30 hrs <i>E2-148</i> | Internal IEC meeting Writing concept report |
| 11.30-12.00 hrs <i>Lecture Hall 1</i> | Chair IEC presents main findings in presence of AMC Executive Board and all interested researchers |

Appendix 3 Parallel sessions

Distribution of Committee members over panels

| Theme | 1 | 2 | 3 | 4 |
|--------------------|---------------------|---------------------|---------------|---------------------|
| Oncology | C. Melief | D. Kerr | B. Löwenberg | |
| Core facilities | M. Bonten | G. Moos Knudsen | L. Poston | A. Meyer-Lindenberg |
| Graduate school | J. Creemers | J. Rich-Edwards | G. Breithardt | |
| Musculoskeletal | J. Creemers | J. Rich-Edwards | G. Breithardt | |
| Cardiovascular | G. Breithardt | G. Moos Knudsen | B. Löwenberg | |
| Infection&Immunity | C. Melief | A. Meyer-Lindenberg | J. Creemers | M. Bonten |
| Reproduction | L. Poston | J. Rich-Edwards | D. Kerr | |
| Neurosciences | A. Meyer-Lindenberg | G. Moos Knudsen | G. Breithardt | |
| Gastroenterology | D. Kerr | L. Poston | J. Creemers | |
| Public Health | J. Rich-Edwards | M. Bonten | C. Melief | B. Löwenberg |