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Betreft: ERC rapport CAPHRI

Geacht College,

Hierbij bieden wij u aan het definitieve rapport van de External Review Committee (ERC) for the 2010-2016 evaluation of CAPHRI Care and Public Health Research Institute. De External Review van CAPHRI heeft plaatsgevonden van 28 november tot 1 december 2017.

Het rapport van de ERC bevat een aantal aanbevelingen, die in de komende tijd ter hand genomen zullen worden.

Met vriendelijke groet,


prof. dr. A.J.J.A. Scherpbier,
decaan FHML

Bijlage: 18.0357/II (ERC rapport CAPHRI)

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Graduate School CAPHRI

- Care and Public Health Research Institute -

Assessment report

**EXTERNAL PEER REVIEW
2010 - 2016**

December 2017

Preface

This report summarises the findings of the External Peer Review of the CAPHRI Graduate School at the University of Maastricht, which was carried out between 28 November and 1 December 2017. In addition to discussions with colleagues from the university, the review process benefitted greatly from the extensive preparation undertaken by CAPHRI and from the provision of detailed statistics and other information in a standardised and digestible format.

The Review Committee appreciates the professional assistance provided by the whole CAPHRI Team. We also thank Maastricht University and CAPHRI administration, staff and PhD candidates for their contributions in making the review an interesting, informative and rewarding process.

December, 2017

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1 Introduction

This report presents the results of the assessment of the research and educational programs of the Care and Public Health Research Institute (further to be mentioned CAPHRI) over the period 2010-2016, conducted in December 2017 by an external Review Committee. CAPHRI is one of six research schools of the Faculty of Health, Medicine and Life Sciences (FHML) embedded in the Maastricht University Medical Centre+ (MUMC+).

1.1 *The External Review Committee*

To assess the research and education (both at the Master's and PhD level) conducted at CAPHRI, an international External Review Committee was appointed by the Executive Board of Maastricht University on May 31st. The Review Committee consisted of the following members:

- Prof. Henriëtte Eveline van der Horst (chair), Department of General Practice and Elderly Care Medicine VU University medical centre, The Netherlands
- Prof. Andrew Joseph Webster, Department of Sociology, University of York, United Kingdom
- Prof. Michael Joseph Campbell, School of Health and Related Research (SchARR), The University of Sheffield, United Kingdom
- Prof. Klaas Sijtsma, Department of Methodology and Statistics, Tilburg School of Social and Behavioral Sciences, Tilburg University, The Netherlands
- Dr. Nicholas Goodwin, International Foundation for Integrated Care, Wolfson College, Oxford, United Kingdom
- Dr. Roelinka Broekhuizen, secretary, The Netherlands

Due to family circumstances, Dr Nicholas Goodwin was unable to travel to Maastricht and did not participate in the review.

All members of the Review Committee signed a statement of impartiality and confidentiality. Additional information on the Review Committee members and their brief curriculum vitae can be found in Annex 1.

1.2 *Scope of the assessment and documentation*

The Review Committee used the methods described in the Standard Evaluation Protocol 2015-2021 (SEP). This protocol aims to ensure a transparent and independent assessment process (see Annex 2: Criteria and scores of national protocol SEP).

The Dean asked the Review Committee to

- 1) Assess the quality, relevance to society, strategic targets of the School CAPHRI as well as the six research lines (RLs).
 - a) Judge the performance of both CAPHRI and its RLs on the three SEP assessment criteria below, taking into account current international trends and developments in science and society:
 - i) Research quality
 - ii) Relevance to society
 - iii) Viability
 - b) Provide a written assessment on each of the three criteria and assign CAPHRI and its six RLs to a particular category (1,2,3 or 4*) in each case, in accordance with the SEP guidelines. (* 1 = World leading/excellent, 2 = Very good, 3 = Good and 4 = Unsatisfactory.)
 - c) Provide recommendations for improvement.
- 2) In addition, the Review Committee was asked to provide a qualitative assessment of CAPHRI and its RLs as a whole in relation to its strategic targets and to the governance and leadership skills of its management.

- 3) In accordance with the SEP, the following aspects were assessed in addition:
- a) PhD programmes
 - b) Research integrity
 - c) Diversity

1.3 Working procedure of the Review Committee

The assessment was based on and supported by three main components of evidence:

- self-evaluation reports detailing the operation, management, research activities, outputs, and SWOT analysis of the graduate school and its RLs; these self-evaluation reports were written in the format prescribed in the national standard evaluation protocol;
- internet-references of the selected papers and dissertations from each RL to allow the Review Committee to examine in detail examples of published work;
- discussions with boards, managers, RL leaders, Heads of Department, PhD council, postdocs and academic staff about the information provided.

The site visit was undertaken during the period 28 Nov – 1 Dec, 2017 and consisted of a number of components, which can be summarised as follows (full programme in Annex 3):

- A plenary introduction to Maastricht UMC+ by the Vice-dean of the Faculty of Health Medicine and Life Sciences Prof N. de Vries and to CAPHRI graduate school the Scientific Director of CAPHRI Prof M. Zeegers
- Sessions with all RLs (leaders and key staff);
- Introduction of Living labs
- PhD poster session
- A meeting with the Quality Assurance Committee
- A tour through rehabilitation centre Adelante
- A presentation on the Brightlands Innovation Programme and Global collaboration
- A meeting with the CAPHRI PhD council
- A meeting with the Board of Maastricht UMC+
- A meeting with the Heads of the departments

During the assessment program, the Review Committee decided to ask (and was provided with) additional details:

1. on financial structure
2. CAPHRI strategic Choices 2018-2022
3. a text about the gender and nationality diversity

In view of the extensive information provided in the Self-evaluation Report and during the program, the Review Committee *did not see compelling reasons to make use of the possibility to have extra interviews with a selection of the research staff.*

The visit was concluded with an oral feedback session of the findings and preliminary conclusions of the Review Committee, attended by CAPHRI staff, the Dean and the scientific director of CAPHRI.

The final report with the conclusions and recommendations was formulated according to the templates that have been provided to the Review Committee. The three criteria and especially the four-point scoring system, according to the latest version of the SEP, differ from those in prior SEPs and the scores from this review are therefore not directly comparable with the score of earlier reviews.

The draft report was presented to the dean of the Faculty of Health, Medicine and Life Sciences to redress any (factual) errors.

2 Brief description of the School CAPHRI

The School CAPHRI was formed after a 2003 merger of the School 'ExTra' that focussed on primary care and extramural care research and the School HEALTH that had a focus on public health research. Over 300 employees and almost 400 PhD candidates are based at 11 Core Departments (with the majority of the staff being funded by CAPHRI) and at 5 non-core Departments. In 2016, CAPHRI changed its name from 'School for Public Health and Primary Care' to 'Care and Public Health Research Institute' to better reflect its evolution towards research along the entire Care Chain.

Between 2010 and 2015 CAPHRI's research was organised in 18 research programmes. The programmes were relatively small, transparent and flexible. Although the programme structure allowed researchers to cooperate in a well-defined area of research, some programmes were too small and a managerial structure with 18 programmes did not seem viable any more.

Therefore, in 2014, the CAPHRI interim management decided to restructure the School with a view to increase viability. Since 2015, CAPHRI has implemented a new organisational structure based around six thematic oriented RLs in which researchers from different departments cooperate in multidisciplinary teams. Each RL consists on average of 36 (14 fte) senior research employees and 64 PhD candidates. The RLs have been given a high level of autonomy to make strategic choices regarding staff and investments and have subsequently developed their own vision, mission and strategic plans.

Research lines:

- Inequity, Participation and Globalisation (IPG)
- Promoting Health and Personalised Care (PHPC)
- Optimising Patient Care (OPC)
- Creating Value-based Health Care (VHC)
- Functioning and Rehabilitation (FR)
- Ageing and Long-Term Care (ALTC)

3 Assessment of the School CAPHRI

3.1 Self Evaluation Report

The self-evaluation report provided a useful introduction to the past, present and desired future of CAPHRI. The mid-term assessment took place in September 2015, and at that time CAPHRI had just condensed its 18 research programmes into 6 RLs. The characteristics of the RLs vary but they are working toward coherence, although the current review is too soon after the reorganisation for all RLs to have achieved a clear identity. The Review Committee also felt that, at 43 pages, the document was somewhat long, and that a shorter report with annexes might have been clearer. The future programme is ambitious and will need strong leadership. The SWOT analysis was honest, but the weaknesses were not addressed in the strategic plan (for example, the hourglass-shape distribution of staff seniority – is this really a threat and what can be done, if anything, about it?).

Section 1

The Review Committee felt the Objectives were more like Aims – they all started with ‘Moving towards’, and that perhaps a few SMART (specific, measurable, achievable, results-focused, and time- bound) objectives would have been useful.

The report contained the ten recommendations of last-midterm review. Each of these was given a detailed response in the self-assessment report, but it became clear during the review period that not all RL leaders felt that all recommendations had been fully implemented.

Recommendation 1: Provide RL leaders with a clear job specification sketching the outlines of their tasks and responsibilities.

The Review Committee felt that there was still some ambiguity about the relative responsibilities of the RL leaders and the Department Heads. The switch to managing resources in euros instead of ftes is a case in point which will be discussed under Section 3.3. A problem may arise because other schools in MUMC+ still work in ftes and Department Heads may have different ideas about replacement of staff who leave than the RLs, and it was unclear how these differences could be resolved (except by discussion).

Recommendation 2: Consider non-financial incentives for programme leaders, and especially for members of the CAPHRI Board

This was addressed in the self-evaluation. It wasn't discussed with the RLs but didn't appear to be an issue with the RL chairs.

Recommendation 3: As a research organisation, strive for the preservation and continuation of the CAPHRI cohorts

Surprisingly little time during the review was devoted to the CAPHRI cohorts, which are clearly a valuable asset. The Review Committee reacted with concern over the comment on page 41 of the self-evaluation report under research infrastructure of ‘monetisation of existing datasets’. This would appear to contradict the ethos of reproducible research, where datasets should be freely available. However, discussion with the Board suggested that this had been misunderstood, and access to the datasets would be free. What they meant by monetisation was that they would be seeking to exploit the potential value of the cohorts to bring in more PhD students and research grants. The Review Committee would like to have had some reassurance that there was a clear strategy to preserve the cohorts.

Recommendation 4: Organise more extensive support concerning clinical trials research, starting at the planning phase of the clinical trial

The Review Committee appreciates that clinical trials are not a major part of CAPHRI's work, but noted with concern that only 45k euro per year were allowed for methodology and statistics. It is the Review Committee's view, considering both the volume of work undertaken by CAPHRI, and the complexity of

modern statistical analysis and data sets, that this is a very limited resource for what is needed and that simply training researchers by offering courses in statistical methodology is an inadequate response to the shortfall.

Recommendation 5: Map, track and mobilise existing linkages to different societal groups within and between programmes

CAPHRI clearly has extensive local and international links, although tables (as annexes), would have helped since many of the markers on the provided maps were overlapping. It was unclear whether collaboration was driven by strategy or was largely serendipitous.

Recommendation 6: Institutionalise within CAPHRI processes a consideration of the expected economic and societal impact of research beforehand, and involve stakeholders from the appropriate societal group(s) and/or the technology transfer office from the onset.

This has been adequately addressed

Recommendation 7: Enhance transparency and improve accountability, and plan careful follow-up

The Managing director and scientific director explained how this was being achieved, but it is still work in progress. It was still hard for the Review Committee to get a grip on the financial organizational structure.

Recommendation 8: Develop a comprehensive acquisition policy

This has been adequately achieved

Recommendation 9: Provide more support to CAPHRI postdocs

Our concerns with the response to this recommendation link with that of the response to recommendation 1, how much real autonomy do the RLs have to support and promote post docs?

Recommendation 10: Keep the number of PhD graduations at a constant high level without compromising on quality

The Review Committee expressed some concern about the high numbers of external PhD candidates. The reason is that candidates who are not on campus and have other daily professional activities are difficult to supervise, often do not have the time and opportunity to follow courses and take part in the School's activities, and so on. Is the quality of the dissertations comparable to the quality of the dissertations the internal candidates produce? Would the fact that part of the School's income is related to the number of dissertations produced reflect upon the quality of the work?

Section 2

Some of the information presented was unclear. For example in Figure 2, stacked bar-charts are not ideal to display fte and cost structure, since, for example, it appears that professorial costs have increased significantly from 2010-2016, but this may be because of a reduction in costs in other grades. To an outsider, unfamiliar with the matrix structure in MUMC+, the organisational structure given in Figure 4 was also very unclear. It would have been helpful to know, for example, what proportion of each RL was in which Core Department. Some idea of the organisational structure below Chairs of the RLs would also have been helpful. For example where do the assistant and associate professors reside, and how many PhD students does each member of core staff supervise?

It was also unclear whether the Managing and Scientific Directors had deputies who could step into their shoes should the need arise.

The meeting of the Review Committee with the Advisory Board was cancelled and we wondered about the Advisory Board's function and how it overlapped our own. We were surprised that it did not have formal meetings and minutes and so were unable to decide if it performed a useful function.

It would have been helpful to have had the draft strategy 2018-2020 prior to the visit, although the Review Committee appreciated that it is a long process to get agreement from all the stakeholders.

Sections 3-9 of the self-assessment are covered in the following **sections 3.2-3.11**

3.2 Organizational aspects and governance

In addition, the Review Committee was asked to provide a qualitative assessment of CAPHRI and its RLs as a whole in relation to its strategic targets and to the governance and leadership skills of its management.

Over the past 3 years the Institute has reconfigured its RLs from 18 down to a more manageable 6 RLs. This has fostered a clearer and more strategic set of aims, with most of the RLs allowing genuine cross-disciplinary and wider thematic collaboration. More details on this are provided in the separate sections dealing with each of the RLs, but it is clear that the 'big picture' issues, such as the personalisation of care, new data needs, and innovative methodologies could not be properly addressed without the new research structure. A sense of this collaboration was captured by one RL leader who described CAPHRI as a 'community of researchers'. This realignment has also strengthened the already strong societal impact the Institute has, for example in the various Brightlands projects that were secured through cross-RL activity. Projects work at micro, meso and macro levels in exploring different dimensions of the care and public health system, though there could be more value-added if these three were even more strongly integrated, though the Review Committee recognised this is not always possible (for practical and/or funding reasons).

The possibilities for adding value via the new RLs is dependent on the successful functioning of the matrix system, which operates throughout the Faculty. In this regard the matrix generates new collaborative opportunities. At the same time it also creates complexity in regard to governance and responsibility in managing the RLs within a context of Faculty-wide and Department-specific priorities and authority structures. Within this setting much depends on the culture of negotiation and co-operation which is strong in CAPHRI, and equally so between it and its institutional components at Department and Faculty levels. This structural complexity requires as much informal as it does formal collaboration, and in part is dependent on the good leadership skills of RL leaders and their colleagues elsewhere in striking the right balance here. The Scientific Director and Managing Director play a major role in helping maintain the balance between formal and informal practice, not least by the high level of transparency and advice they provide to RL leads and others.

Despite this, the Review Committee felt some concern that, despite the creation of formal job descriptions for all RLs, as recommended in the 2015 interim review, further clarification of the managerial authority they have over what are in some cases large RL groups would be helpful, considering that Departmental Heads may have similar authority. This would, for example, be valuable in relation to more formal provisions in regard to replacing staff associated with an RL and how that recruitment process would work for the best.

The Review Committee sees CAPHRI as still in transition, bedding down its relatively new RLs and their associated management. There is a strong sense of cooperation and coherence among members, and especially importantly, a range of exceptionally important care and public health interventions that have regional, national and international impact.

3.3 Financial position

Until recently, CAPHRI built up a financial deficit, which was the result of hiring personnel based on fulltime equivalents (fte's) rather than available finances. Because of too little governmental oversight, the average personnel costs grew too high, and additional budget cuts worsened the situation, causing a deficit. To increase awareness of finances, CAPHRI introduced a financial policy in which budgeting is in euros instead of fte's. At present, none of the six RLs has a deficit but at the School's level, there is only limited room for manoeuvre.

The Review Committee was pleased to learn that CAPHRI no longer suffers from financial deficits and is in control of the School's financial management, bringing the School into surplus. Obviously, a healthy financial

position is a necessary albeit not a sufficient condition for the organization's continuation. In addition, the Review Committee noticed the following four issues.

First, it proved extremely difficult for the Review Committee to get a grip on the financial distribution model, which the Faculty of Health, Medicine and Life Sciences employs to finance its six Schools. It also proved difficult to get insight in the way in which CAPHRI finances its six RLs. To continue stimulating transparency and a responsible financial governance at all levels in the organization, the Review Committee advises both the FHML and CAPHRI to provide maximal openness about the financial distribution models they employ.

Second, to increase financial awareness for all, CAPHRI employs budgeting in euros, whereas budgeting of other Schools of FHML is in fte's. The Review Committee wondered whether such differences within the same organization could cause imbalances between Schools, and between departments (fte's) and the School (euros), and potentially produce conflicts.

Third, CAPHRI expressed a desire to transform the present staff structure, having too many full professors at the expense of associate and assistant professors, to a pyramidal structure, with relatively few full professors, and larger categories of associate and assistant professors. This will provide CAPHRI with more personnel, and probably lower work pressure. However, in 2010-2016 the number of full professors has grown consistently while the numbers of personnel in the other categories have decreased. In a few years, a large number of full professors will retire, and to prevent losing important networks, the Executive Board and several RLs are considering replacing retiring full professors with people with high potential of the same rank. Because opposing desiderata—striving for a pyramidal structure and replacing full professors with full professors—may readily produce new financial problems, the Review Committee advises CAPHRI to make clear and well-informed choices, and communicate these to the RL leaders in due time.

Fourth, the matrix structure of CAPHRI, with 11 core departments and 5 non-core departments and 6 RLs, and an Executive Board leading the 6 RLs, seems to invite discussion about who's in charge when hiring personnel and may provoke new financial problems. The Review Committee advises putting a clear decision structure in place.

3.4 Infrastructure

As noted above (paragraph 3.2) the matrix structure within the Faculty applies to all Schools, though in practice the Review Committee was advised that how this operates varies, according to some legacy effects and disciplinary characteristics (some schools are more mono-cultural in this regard than CAPHRI). This heterogeneity was reflected in the Review Committee being advised by senior staff that there is no one optimal school model that might be applied across the Faculty as a whole. Even so, the three infrastructural components central to the functioning of CAPHRI – its intellectual structure and foci, its financial structure and management, and its administrative structure and oversight – are sometimes in tension with each other within CAPHRI and between the Institute and Faculty.

Administrative support for RL leaders, for example, is provided only through Departments, despite CAPHRI being keen to establish a 1 to 3 ratio of support to research staff within each RL. Given the scale of the RLs, the Review Committee sees this as an important matter, supports this goal, and recommends further CAPHRI/Faculty collaboration to make this possible.

The Review Committee noted two important steps being taken in regard to quality assurance. First, the Faculty is building new standardising procedures in regard to staff evaluation and performance appraisal: this will be an important element in establishing clear assessment procedures and so helping build this aspect of the staffing infrastructure across the whole Faculty.

Secondly, the Review Committee welcomed the creation of a Quality Assurance and research integrity Working Group. This has made some excellent progress in determining how both are to be defined and practised among CAPHRI staff.

3.5 CAPHRI Research Quality

The Review Committee deems the quality of the research carried out in all six RLs of CAPHRI to be of high quality.

The research carried out in the past five years has yielded an impressive number of publications; 30% of the papers have been published in the top 10% of journals in the respective fields. The Review Committee is especially impressed by the productivity and the high quality of the contribution of the PhD students.

The Review Committee also notes that the content of the RLs is rather broad, which probably reflects the transition from 18 RLs to six RLs. This broad orientation poses a challenge to keep the necessary focus in order to reach scientific excellence. However, the Review Committee also takes into account that CAPHRI conducts research in a field where mainly generalist disciplines are involved, covering a broad array of (public) health issues and thus a broad range of research questions and topics that are relevant for the field. Narrowing down the focus too much may lead to less relevant research focusing on details and contributing too little to relevant health issues.

In most RLs methodological issues or new methodology developments are part of the content of the research programme, but the number of staff committed to methodology research is rather small per RL. The Review Committee wonders if a RL dedicated to methodology issues pertinent to the (public) health issues CAPHRI is dealing with, would not yield more results and add to the overall quality of the research carried out in CAPHRI.

As to the academic reputation of the group, although the H-indexes of the senior staff are up to expectations, the Review Committee also notes that the senior staff have virtually no personal grants, which apart from the quality of the scientific output also reflects academic stature. However, the Review Committee also notes that in the past few years a number of young researchers have gained personal grants, which holds a promise for the future. The Review Committee acknowledges there might be a tension between focusing on multidisciplinary teamwork, which is an important prerequisite for the research conducted by CAPHRI and acquiring personal grants.

Based on these considerations the Review Committee thinks there is definitely room for some improvement and thus judges the quality of CAPHRI to be very good. (Score 2)

3.6 CAPHRI Relevance to society

CAPHRI conducts research that is highly relevant to society, addressing important (public) health issues in the Netherlands (with an emphasis on the Limburg region) as well as in other countries. The research of CAPHRI concentrates on a number of emerging important themes, such as 'promoting health and personalised care', 'inequity, participation and globalisation' and 'ageing and long-term care'. The researchers of CAPHRI work in close collaboration with health care professionals and health care organisation, in the Living Labs, which further both the relevance of the conducted research and the implementation of the results of the research.

The Review Committee visited one of the Living Labs and spoke with several people participating in one of the living Labs. The Review Committee was impressed by the opportunities the Living Labs offer, by the commitment of the partners participating in the Living Labs (offering staff and finance for research projects) and by the results of research carried out in the Living Labs.

The Review Committee noticed that CAPHRI hosts a substantial number of international PhD students from all over the world, who in a number of projects focussed on health problems in their own country, thus contributing to society at large, which is admirable.

The Review Committee established that researchers participating in all six RLs have contributed to a substantial number of books mainly written for professionals, but also to some papers and books for lay people. Members of virtually every RL have contributed to a large number of clinical guidelines for various professionals. Staff of each RL is also participating in a number of national advisory boards. Implementation is an important issue in the Living Labs, which ensures that results from the research are used to optimize health care.

Both the content of the research carried out by CAPHRI researchers and the above-mentioned contributions show that CAPHRI has a solid focus on carrying out research that bears societal relevance.

Based on these considerations the Review Committee thinks CAPHRI delivers an outstanding contribution to society and judges the societal relevance to be excellent. (Score 1)

3.7 CAPHRI Viability

Recently, CAPHRI went through a difficult time of financial deficits and possessed an organization structure, which was difficult to manage due to fragmentation of the research effort across 18 programs. Some of the programs were very small and not viable in the longer run. To solve these financial and organizational problems, in 2014 CAPHRI decided to change the budgeting from fte's to euros (see section on Finances 3.3) and to reorganize the 18 programs in six RLs. The RLs have approximately equal size in terms of fte. A position paper written in 2014 formed the basis of the new organization structure. A proposal dated March 2015, explained the definitive plan. An external midterm assessment committee judged CAPHRI's viability based on the new organization structure with six RLs "very good". The Midterm Assessment Committee made ten recommendations, to which CAPHRI's reactions can be found in Part A, the self-evaluation 2010-2016. Most of these recommendations directly concern CAPHRI's viability.

The Review Committee assessed a couple of topics. The assessment of CAPHRI's reactions to the recommendations the Midterm Assessment Committee is often implicit in the Review Committee's recommendations with respect to viability.

CAPHRI is in the middle of the transition going from 18 research programs to six RLs. The Review Committee acknowledges the innovative spirit that this enterprise reflects and recognizes the difficulty organizations in general have to commit to change and realize the plans. CAPHRI has made remarkable steps and should be complimented with their initiative and effort.

Leadership, innovative strength, strategic choices and decisions

The Review Committee noticed the complexity of the matrix structure of core and non-core departments, and the complex governance structure CAPHRI has set in place. Even though Part A of the Self-assessment documents clearly describes the responsibilities of the different governance bodies and the desire to realize shared decision-making, the Review Committee also picked up evidence of the difficulties several individuals experience defining their role and responsibilities in this complex system. There seems to be a gap between the official governance map and reality, in which negotiation and "polderen" seem to be dominant. The Review Committee has the impression that the gap may easily stand in the way of effectively implementing innovation by slowing it down and making decision-making complex and opaque.

The complex organizational and governance structures complicate CAPHRI's leadership mission. The transition from 18 programs to six RLs has made a good start, but the transition runs the risk of slowing down and losing momentum. The Review Committee has noticed remarkable differences between the different RLs in this respect. Some RLs actively try to integrate the old research programs into one coherent RL, while others still lean heavily on the old research programs. To speed up the change

process, the Management Board has to get a strategy in place that provides guidance to reach the desired goals before a particular date. The strategy needs the support of the various parties that are relevant to CAPHRI and of the Faculty's Executive Board.

Scientific visibility and recognition, research vision and strength of the RLs

CAPHRI's research is of high international quality and contributes hugely to societal concerns in the areas of care and public health. CAPHRI receives recognition from multiple sources and in several capacities. Evidence comes the value of the Living Labs for society, the wealth of popular publications and presentations, and from a large number of memberships of societal organizations, such as the Dutch Health Council, and grant evaluation committees of NWO and ZonMw. The RLs show remarkable differences with respect to the degree to which they have been able to implement the transition from separate research programs to integrated RLs. Not being able to make the transition could be a threat to the research viability, because of a lack of focus and innovation strength.

Acquisition capacity

CAPHRI is very well capable to acquire research grants from several sources, and has a rich history that it seems capable to continue. The Review Committee recommends that senior researchers focus on acquiring prestigious personal grants from NWO and ERC.

Other

- The Review Committee noticed the rather modest (in size, not quality) methodological and statistical support CAPHRI receives. This is remarkable given CAPHRI's size, but also given the growing complexity of statistical models and the growing complexity of research data in a mostly exploratory research context. The Review Committee recommends making budgetary reservations to increase methodological and statistical support.
- The Review Committee noticed concern in the RLs about the retirement of full professors having large networks in 2020+. The Review Committee recommends developing a plan for replacing these chairs that is consistent with the various ambitions CAPHRI entertains.
- Finally, work pressure is a recurring concern in the documents the Review Committee had at its disposal, and an imbalance between educational and research tasks is regularly mentioned. The Review Committee recommends Management to monitor workload and consider possibilities to reduce workload to an acceptable level.

Based on these considerations the Review Committee thinks the viability of CAPHRI is very good. (Score 2)

3.8 PhD programmes (graduate school)

The PhD programme is very impressive, and the students receive much more support than they would in, say, the UK. There are about 400 PhD students, which given the size of CAPHRI, is many more per fte senior staff than in comparable UK institutions. Of these 100 are internal, with a standard four year employment contract, there are about 50 within MUMC+, 20 with a scholarship, and about 220 who provide their own funding in the Netherlands or abroad. Each student has at least two supervisors and there is a dedicated PhD co-ordinator, and two confidential advisors. There are also a number of committees to advice on PhD related topics, including the Faculty PhD committee, the early career committee and a PhD panel. The latter acts also as a sounding board for the CAPHRI board and contact persons for PhDs.

CAPHRI has uses innovative software, PhD TRACK, which registers the PhD students and supervisors, and monitors research, teaching and training. It also monitors the progress of the students and their satisfaction, and produces management information. This software has been subsequently adopted by other Schools and Institutes in Maastricht.

The drop-out rate has been estimated at 14% (which is comparable to that of SchARR at the University of Sheffield). This was considered high, and as with other institutions, it was felt that one solution was early

screening. To this end an e-assessment tool VCN (Virtual Competence Manager) was utilised to try and recruit more internal PhD students and to provide better selection of students. In addition, a decision point after 10 months was introduced to try and reduce drop-out in later years, which is clearly not good for the supervisors or students.

The rating of the performance of supervisors by the students showed high average scores, although it was not clear whether supervisors with consistently poor scores were mentored and trained.

The students the Review Committee spoke to were happy with the system, and this included the student representative. The students were happy with networking and the software platform is working. The Review Committee felt that the supervisory load on staff was potentially quite great, and it would have been helpful to have information on PhD numbers per individual staff member. Supervisors with high numbers of students either cannot devote enough time to each one, or perhaps do not contribute so much to teaching and research.

3.9 Research integrity

The area of Research Integrity (RI) is adequately addressed in the documentation that was provided to the Review Committee. This shows how CAPHRI, as part of the University of Maastricht, has adopted and deployed a range of provisions and practices that reflect institution-wide and national provisions on and procedures that help underpin RI. These have been adopted within the research practices of the Institute, at both staff and PhD levels. The Review Committee was impressed by the level of implementation of these procedures, which was evident in the very detailed documentation that was provided relating to the specific PhD platform the Review Committee received, not least in the 'contract' between supervisor and student.

The RI issue has been kept in the forefront through CAPHRI's research away day meetings and through the ongoing work of the recently established Quality Assurance working group.

The discussions the Review Committee had with staff and senior management demonstrated very strong professional commitment to ensuring RI throughout the work that is undertaken.

3.10 Diversity

The documentation provides a clear indication that CAPHRI takes the matter of diversity seriously, with a strong commitment especially in regard to ensuring gender balance in the Institute among staff and PhD students.

Although this issue is properly addressed, some further clarification in regard to what is described as 'a differentiated HR policy' should have been provided in the documentation as well as information on matters relating to ethnicity and disability. These may be incorporated within the HR approach CAPHRI has adopted, though clarification on this would have been helpful. Subsequently, the Review Committee received additional documentation from the Scientific Director which provided further quantitative information on the current gender balance and ethnicity of staff, though the latter was defined in terms of members recruited internationally, rather than Dutch ethnic minorities per se. In regard to gender, CAPHRI has taken steps in the past five years to appoint and promote female staff, noting that 'During the last 5 years almost 50% of the new appointed professors were female, which exceeds the Maastricht University recommended minimum of 20%.'

3.11 Recommendations for improvement

The Review Committee has a number of general recommendations based on the review of the abovementioned aspects and taking into account current and future national and international developments. Furthermore, the Review Committee has provided some specific recommendations for each RL, which are placed in the section discussing each RL.

The Review Committee has three recommendations with regard to the quality.

1. Although the transition from 18 to 6 RLs has brought more focus in the research activities of CAPHRI, the Review Committee noticed that the themes of various RLs are still very broad. Try to get more focus in the content of the programmes by formulating the criteria for embarking on a specific research proposal. Identify the 'unique selling points' of the research carried out by CAPHRI and use them;
2. The Review Committee notes that CAPHRI has projects that address issues on several levels, but within a project mostly only one level is addressed. Focus, where relevant, in public health research on the micro, meso and macro level at the same time and on the interaction between these three levels, which will enhance both the scientific quality and the societal relevance;
3. The Review Committee concluded that expertise on methodology and statistics is quite dispersed over the RLs and that relatively few ftes are allotted for methodology and statistics. Explore the possibility of establishing a RL dedicated to methodology in order to facilitate new methodology suited to address important health issues in the fields CAPHRI covers.

The Review Committee has one recommendation with regard to societal relevance.

4. The Review Committee noticed that the collaboration with groups from other parts of the world is quite dispersed. It might be more profitable both for CAPHRI and for the international partners to focus on a limited number of international partners, based on joint interests, and intensify the collaboration with those partners in a more strategic way.

The Review Committee has three recommendations with regard to the viability.

5. The cohorts of CAPHRI are a strong asset. CAPHRI should develop a clear strategy to ensure the prolongation of their cohorts on the long term
6. The organizational and financial structure of CAPHRI is still very complicated. There is a definite tension between Departments counting in ftes and CAPHRI counting in euros. CAPHRI should strive to clear this tension. To continue stimulating transparency and a responsible financial governance at all levels in the organization, the Review Committee advises both the FHML and CAPHRI to provide maximal openness about the financial distribution models they employ. CAPHRI should also be very clear about the responsibilities of department heads on the one side and RL leaders on the other side, and there should be no doubt about who decides on which issues.
7. The Review Committee advises to reconsider the composition and role of CAPHRI's Advisory Board. At the moment it seems rather peripheral to the Institute's activities. Creating a stronger and more mixed Board, reflecting a more diverse range of stakeholders from the Limburg and national levels would be a sensible step to take, especially as the RLs consolidate over the few years ahead.

4 Assessment of the Research Lines

4.1 *Inequity, Participation and Globalisation (IPG)*

4.1.1 General remarks

The RL is the amalgamation of four research programs. Starting in 2015, the RL has developed several initiatives to realize its mission and aims. The RL has identified four “IPG assets” at the interfaces of the four original research programs and in collaboration with national and international scientific and societal partners, they consider vital for creating a coherent RL. The IPG assets clearly go beyond applying for grants and other initiatives that are useful but add to the original research programs and aim to integrate them into one RL. The Review Committee recognizes a serious effort to produce a new RL that replaces the old research programs rather than accommodates them. The RL leadership explicitly wants “to make sure that the whole would be more than just the sum of its individual parts” (Part B, page 9, bottom).

4.1.2 Research Quality

The excellent research quality is reflected by many articles in top journals, important scientific rewards, research grants acquired (among them several personal NWO grants), invited lectures, memberships of scientific committees, and memberships of editorial boards and editorships of scientific journals. (Score: 2)

4.1.3 Relevance to society

The excellent relevance to society is witnessed by extensive media exposure, many lectures and workshops organized for health care professionals, the general public, and patient groups, several important publications having addressed topics important for organizations and issues outside academia and having societal impact, several advisory reports for policy makers and clinical guidelines. In addition, members of the RL hold memberships of civil society advisory boards. (Score: 1)

4.1.4 Viability

The viability of the RL is very good. The strategy is to set many initiatives in motion that go beyond, for example, members from two former research groups applying for grants. The IPG assets have benefit and contribute to integration into one RL. The RL leadership notices that the RL encompasses a large variety of research fields (Part B, page 9), based on the four old research programs. The Review Committee wonders whether this heterogeneity will get in the way of the integration of the programs into one RL. (Score: 2)

4.1.5 Recommendations for improvement

The Review Committee appreciates the strategic plans mentioned in Part B, page 23, but recommends making the strategy for developing the four former research programs into one RL more explicit, and ensuring commitment from all staff. In addition, the leadership may define deadlines for reaching certain goals, and the staff should be committed to these deadlines, for example, by targeting direct funding to such activities.

From the SWOT analysis, the Review Committee derived some concern of the RL with the RL’s future. Most of the weaknesses and threats are not unique for the IPG RL, such as heavy workload, growing difficulty to obtain ethical clearance, and increased competition for funding. Others seem to reflect concern that calls for a different perspective. For example, given limited resources for all, within reason one should accept a limited senior staff in the absence of vacancies for opportunities for young talents, and an imbalance between permanent and temporary staff. The Review Committee recommends striving for an explicit pyramidal staff composition, with few full professors, et cetera. An acceptance of a particular degree of flow among the senior staff opens new opportunities for the RL rather than is a cause for concern.

4.2 Promoting Health and Personalised Care (PHPC)

4.2.1 General remarks

This RL was created in 2015 as a merger of four areas of research in CAPHRI. It is perhaps one that is of special interest in generic terms as the theme of personalised medicine and care can be seen to cut across many of the other RLs too, given its growing importance in the definition and management of health and care. A key focus is on how such care involves active involvement of patients and a wide range of stakeholders, and how policy and practice in the delivery of services needs to reflect shared-decision-making. The RL should be able to track and contribute towards the gradual emergence of different forms of personalised care.

It was clear that the RL recognises however that there is often considerable rhetoric and hype surrounding the personalised care narrative, and that within this context, it is important not to lose sight of socio-economic inequalities that personalisation of care itself cannot address.

4.2.2 Research Quality

There is a strong publications track-record and some significant and highly competitive grant awards (such as the 4 VENI grants). The reach of the RL in terms of the range of research projects and diverse forms of engagement it undertakes is impressive and complex. However, the Review Committee were clear that there are some core research USPs that mark out the territory of this RL, primarily examining behaviour and motivational perspectives; the relationship between micro, meso and macro levels; tailored health; methodological development (such as in the 'LIME' project) co-creation of personal care; and efficient data collection and management.

The RL has a relatively large staffing complement (35 and 8 postdocs) and a strong though a little uneven performance across the membership, which might be expected given the number involved, and there are some notable major contributors to the RL at the senior level. It is well led and the planned programme of research ahead was explained in full. The RL team provided a good trend analysis that indicated a clear grasp of future developments in this area. (Score 2)

4.2.3 Relevance to society

In terms of societal impact a range of timely and important interventions have been made within the NL and internationally (in regard to HIV; alcohol use during pregnancy; regional health authorities and their role; the use of CAPHRI's 'Bollen model' by Dutch GPs; a sexual health programme in Sudan planned for 2018). Most of these interventions have secured support and financial resources from a range of non-academic stakeholders indicating the perceived societal value of the work for Limburg and beyond at national government level. There is a good level of international activity, and in regards to income streams a strong contract research component (59%). It also has a large complement of PhDs (18 internal and 73 external).

For the future, this RL has mapped out its plans and identifies a number of challenges ahead associated with the integration of either prevention (in the sense of health promotion) or personalised medicine in the wider health and care system. This will for example create new demands relating to appropriate statistical measures, as well as the relation between these and the co-creation of measures as being fostered and understood in the LIME project. (Score 1)

4.2.4 Viability

This RL is producing excellent work and has strong leadership, intellectual strength in depth and makes significant contributions to society. Overall: this RL is producing high quality research, work that is having a consistent societal impact, and one that plays a strategic role within CAPHRI. (Score 1)

4.2.5 Recommendations for improvement

More work will need to be done on the use of e-health systems and on new projects focused on methodological development. There are some very good international links, and formal collaborations but a more strategic focus to strengthen and broaden these (with the advice of the recently established international Collaboration Committee) is to be encouraged.

4.3 Optimising Patient Care (OPC)

4.3.1 General remarks

This RL was originally composed of four former programmes: clinical epidemiology, nutritional and molecular epidemiology, asthma and COPD and diagnosis in primary care. Recently a new unit has been added, which has a focus on systematic reviews, research integrity and forensic epidemiology. It is one of the larger RLs with a total of 54 people attached to it, and an additional 50 external PhD students. In the SWOT analysis the RL state that their core business is methodology for clinical studies, and yet this was not really reflected in the presentations, except possibly the use of prediction models in obstetrics.

4.3.2 Research Quality

The research quality is high. This is evidenced by the five selected papers, one in NEJM, two in Lancet and 2 in BMJ, all top 10% general journal in the field. From the data in the report, the number of publications per fte was almost 11 in 2015 and 9 in 2016, (Report B pages 50 and 53)(although the presentation given during the review stated it was nearer 20). Whichever figure is high by international standards in this field. There appeared to be a huge amount of media exposure in 2105, with >100 interviews.

We heard some excellent talks on subjects such as point-of-care CR-P testing of bacterial infection to reduce antibiotic prescribing, the use of internet training to reduce antibiotic prescribing rates for acute respiratory tract infections, using prediction models to improve obstetric care and the problems of smoke inhalation in India. The Living Labs are an excellent example of outreach and research in the community. (Score 1)

4.3.3 Relevance to society

Almost by definition, the RLs are relevant to society and the Living Labs help anchor this. We heard that five general practices have joint appointments with CAPHRI which means that there is close collaboration with GPs who combine their GP work with research. One of their main aims is helping GPs make decisions, which is currently a very high impact area. Members of the RL have collaborated with the Dutch Ministry of Health, which is clear evidence of relevance. The increasing demand for personalised medicine also is very relevant, and this group can exploit this. (Score 1)

4.3.4 Viability

The original research programmes that formed this RL were quite disparate, although one can see that asthma and COPD are commonly treated in primary care, and nutrition could also be linked to primary care. However, the Review Committee did not have the age profile of the staff, but judging from the h-indexes, at least two of the staff are very senior and may well be retiring in the near future, and it would have been helpful to have had this discussed in the strategic plans. The proportion of funding by research grants is 15% which appears quite low but is comparable to other RLs. As with other RLs (and academics in general) the competition with teaching tasks and management demands was seen as a threat. One would have expected to see some strategic aims to try and deal with this. The CAPHRI cohorts are a major asset, and the first plan in the RL strategy is to exploit the existing cohorts, for grant applications and expanded collaboration. (Score 1)

4.3.5 Recommendations for improvement

The RL is doing well and so should continue in the way it operates. The Living Labs and the different research streams show that it is viable. The threats outlined in the SWOT analysis, namely an increasing workload, which includes teaching and management commitments should be addressed in the strategic plans, possibly with guidelines on numbers of articles. PhD students and grants that can be reasonably expected. The methodological research would appear to be concentrated on a few people and so, given the priority attributed to this in the research strategy, it would be sensible to try and employ some more people in this area in future.

4.4 Creating Value-based Health Care (VHC)

4.4.1 General remarks

This RL was formed as a combination of three former CAPHRI programmes 'Health Technology Assessment', redesigning health care' and Comparative Health. It is the largest of the six RLs with 33.6 fte's, but it is worth noting that over 50% of this comprises internal PhD candidates and the number of fte scientific staff is less than that of some other RLs. The RL appears to be earlier along the *journey of integration* than some of the other RLs. The objectives of the RL (which are more like aims) are essentially to assess and improve cost-effectiveness in health care organisations and systems, and to evaluate public health and health care policy and management from a Dutch and European perspective. It would have been helpful to have some more specific aims. During the visit the Review Committee had some lively talks from Prof. Silvia Evers and Dr. Peter Schröder-Back and heard about the Sustainable Care and Public Health living labs. The Sustainable care Living Lab contains 15 PhD projects on a range of issues on delivering cost-effective health care.

4.4.2 Research Quality

Some of the papers chosen as the most important were in high impact journals, but several were early in the assessment period, and so were part of the earlier research programme, making them difficult to assess in terms of the current RL. The RL produced an average of 4.4 and 5.3 refereed publications for 2015 and 2016 respectively, which is relatively low compared to the Optimising Health Care and too few to get a mean normalised citation score. The average impact factor score for 2015 was also lower than the CAPHRI average. Media exposure is light, but increasing with 2016 being the year with the highest level of interest. It was clear that some of the staff have high international profiles, particularly Dr. Katarzyna Czabanowska who is president of the Association of Schools of Public Health in Europe (ASPHER) 2017-19. We heard some excellent conceptual ideas about creating health and well-being at the micro, meso and macro level, i.e. at the individual, the organisational and the societal levels. The EQUIPT study in particular won the European Network for Smoking and Tobacco Prevention (ENSP) award for outstanding European Health Research. (Score 2)

4.4.3 Relevance to society

The assessment of patient payment policies (universal coverage) in Europe, specifically those in Central and Eastern Europe is clearly highly relevant as countries in these areas aspire to Western European levels of health care. Tobacco smoking is still the leading cause of preventable death in the world, since it is linked to both heart disease and lung disease, and although the situation is improving in Western Europe, in the rest of Europe and the world it is still the major cause. Thus, any research into reducing smoking habit is highly relevant to society. (Score 1)

4.4.4 Viability

The total number of actual people is almost 100, which can make creating a coherent group difficult. There is a relatively low number of permanent staff to the number of temporary staff. Under weaknesses in the SWOT analysis (Part B p 85 Table 4.16) the RL identifies the difficulty of recruiting well-qualified staff, since this field is attractive to the government and to pharmaceutical companies. There are few funds for theoretical and methodological development, and a high teaching load for many staff members. Cost-effectiveness is at the heart of sustainable health care; with an ageing population costs will rise and affordability will become a major issue. Thus there is no doubt that there will be much scope for research in this area. The staff that the Review Committee met were lively and enthusiastic, which bodes well for the future. (Score 2)

4.4.5 Recommendations for improvement

It is difficult to make specific recommendations from an external perspective. Clearly, there is still much work to do to achieve a coherent strategy. Contract research forms a higher proportion of the funding than for other RLs, which reflects the demand for health economics in particular in many research organisations. This can prove to distract from the main research strategy, so one suggestion would be to try and concentrate on applying for more research grants, to relieve the burden of short term commercial contracts to some extent.

4.5 Functioning and Rehabilitation (FR)

4.5.1 General remarks

Since 2015 this RL combines four former CAPHRI programmes: Rehabilitation Medicine, Occupational Epidemiology, Epidemiology of Musculoskeletal Disorders and Rheumatic Diseases. Thus the RL combines research conducted in three care settings: primary care, rehabilitation centre and hospital care. The focus lies on understanding and fostering functioning and participation of individuals in society throughout their lifespan. As in other RLs the focus of this RL is broad and the ambition is high.

The Review Committee visited Adalante, one of the living labs of CAPHRI, and heard some interesting pitches from young researchers on their projects. Although the RL has formulated a vision, mission and objectives, it is clear from the description of the various units, the former research programmes, that the variety of topics still primarily reflects the original research programme. The focus on functioning and participation is not present in all four units. Both the first unit, 'Epidemiology of musculoskeletal diseases' and the fourth unit, 'Diagnosis as and interventions in rheumatic diseases', don't mention functioning and participation in their current strategy. Thus the integration of the four units seems to need some work, but the RL leaders noted that the units are working together more and more. The research leaders mentioned that an important step has been the development of a 'common language' between the four units.

4.5.2 Research Quality

The scientific output of the RL is more or less comparable to the output of the other RLs, taking the number of staff into account. The average impact factor of the publications over 2015 was 4.12 compared to the CAPHRI average of 3.59 in that year, which suggest a good research quality. Half of the senior staff members have a H-index of above 30 (range 17-53). On the crown indicator the RL scores also fairly well: the MNCS is 1.22.

Compared to some other RLs, the RL has a rather large staff: 28 (9,20 fte) senior staff, 10 postdocs (6,70 fte) who have to supervise 14 internal PhD students and 65 (!) external PhD candidates. Epidemiology of musculoskeletal disorders has almost half of senior staff and postdocs, which suggests that the distribution between units might cause some tension. (Score 2)

4.5.3 Relevance to society

Researchers participating in the RL have contributed to a number of books, mainly written for professionals. In the last five years members of the RL have contributed to 12 guidelines for various professionals. Members of this RL have produced the only three patents of CAPHRI in the last five years. Staff are also participating on a number of national advisory boards. Both the content of the research and the above-mentioned contributions show that the RL has a solid focus on carrying out research that bears societal relevance. (Score 1)

4.5.4 Viability

One third of the funding of the RL comes from the faculty/university; two-thirds of the funding comes from research grants and contract research. In the report there is no mentioning of personal or other prestigious grants, which might indicate a weakness. Although the RL leaders notice a growing collaboration between the units, there are still gaps to fill. In the strategic plans there is mention of improving several things, such as infrastructure, methodological expertise, coherence and improving financial situation. However, it is not very clear how these things are going to be achieved. (Score 2)

4.5.5 Recommendations for improvement

The Review Committee recommends to try to get more alignment between the goals of the RL as a whole and the goals of the, as yet, separate units. In addition, it would be wise to make more explicit how the RL can benefit from the existing cohorts and the Living Lab.

4.6 Ageing and Long-Term Care (ALTC)

4.6.1 General remarks

The RL ALTC has combined (parts of) three CAPHRI programmes: Innovations in Health Care for the Elderly (4,3 fte), Implementation of Evidence (partly, 0.20 fte) and Design and Analysis (partly, 0.75 fte). The RL has a strong connection with the Living Lab Ageing and Long-Term Care, which is a structural collaboration, together with Zuyd University of applied sciences, with many organisations engaged in care for the elderly and long-term care. The Living Lab provides a good opportunity to retrieve relevant research questions and to conduct research in relevant settings.

The objectives of the RL are quite broad: from disentangling the role of medical, environmental and psychosocial factors in trajectories of disablement in older person, via investigating determinants and consequences of all kinds of health problems in elderly people, to developing and evaluating innovative health care arrangements.

4.6.2 Research Quality

The scientific output of the RL is more or less comparable to the output of the other RLs, taking the number of staff into account. The average impact factor of the publications over 2015 was 2.84 compared to the CAPHRI average of 3.59 in that year, which suggests a fairly good research quality. However, the lower IF average could be related to the fact that elderly care medicine is a relatively young specialty. Two thirds of the senior staff members have an H-index of 30 or higher (range 27-44). For the calculation of the MNCS, the crown indicator, the RL has not yet published enough papers (roughly 100 papers which is not enough for a reliable MNCS-score). The RL has some solid publications, including a paper in the BMJ for example. Compared to some other RLs, the RL has a rather small staff: 16 (6.0 fte) senior staff, 6 postdocs (2,40 fte) who have to supervise 10 internal PhD students and 25 external PhD candidates. (score 2)

4.6.3 Relevance to society

Researchers participating in the RL have contributed to a number of books, mainly written for professionals. In the last five years members of the RL have contributed to 9 clinical guidelines and advisory reports. Staff members of the RL are also participating in a number of national advisory boards. The content of the research, the above-mentioned contributions and the close collaboration with the Living Lab show that the RL has a solid focus on carrying out research that bears societal relevance. (score 1)

4.6.4 Viability

One third of the funding of the RL comes from the faculty/university; two-thirds of the funding comes from research grants and contract research. In the report there is only mention of two personal grants (from two Dutch foundations) and no mention of other prestigious grants, which might indicate a weakness. Recently, the Ministry of Health has promised to provide a substantial amount for the next five years and even beyond that term for the research infrastructure and projects of intramural care for the elderly. The strong connection between the RL and the Living Lab and the strong engagement of various care organisations contributes to the viability of the RL. (score 1)

4.6.5 Recommendations for improvement

Although the focus on projects relevant for daily practice and on implementation is a strong asset of the RL, it might also prove to be a relative weakness when aiming for scientific quality (as might be reflected in the rather low average IF score of the publications). This RL should try to maintain the balance between implementation focussed projects and projects that generate new knowledge.

4.7 Overall quantitative assessment of the school and divisions

	Quality	Relevance to society	Viability
School of CAPHRI	2	1	2
IPG	2	1	2
PHPC	2	1	1
OPC	1	1	1
VHC	2	1	2
FR	2	1	2
ALTC	2	1	1

5 Annexes

5.1 Annex 1: External Review Committee

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5.1.1 Prof. dr. Henriette E. van der Horst

Prof. dr. H.E. (Henriëtte) van der Horst is professor of general practice and head of the Department of General Practice and Elderly Care Medicine at VU University medical centre since 2007. As head of the Department, she is responsible for the vocational training of general practitioners and the vocational training of specialists elderly care medicine, for research and teaching in the field of both disciplines, for the academic networks of the department and for the university general practice (UHP). From 2012 till 2015 she was one of the co-directors of the EMGO+ research institute of VUmc. Since 2015, she also chairs one of the six Divisions of VU University medical centre.

Since 2013, she is a member of the scientific board of the College voor Zorgverzekeringen/ZIN (Netherlands Care and Quality institute). Henriëtte is also a member of the ZonMw-committee Topsubsidies and the ZonMw committee Goed Gebruik Geneesmiddelen. She is on the editorial board of the NTVG, the Dutch Journal of Medicine.

Her research activities cover the domain of medically unexplained symptoms, mental health and elderly care medicine with a focus on diagnostic and prognostic research. She works as a GP one or two mornings per week.

5.1.2 Prof. Andrew Webster

Andrew Webster is Professor in the Sociology of Science and Technology in the Department of Sociology at the University of York which he joined in 1999. Between 1988 and 2017 he was Director of SATSU, an international research centre working in the field of STS, specifically in the areas of health, biomedical technology, digital systems and the history of science. He was Head of the Department of Sociology 2005-9 and Dean of Social Sciences, 2009-13 at York and is Co-Chair and founder of the Association for Studies in Innovation, Science and Technology-UK. He was elected a Fellow of the Academy of Social Sciences in 2006. He directed the £5m ESRC/MRC Innovative Health Technologies Programme (1999-2004) and the ESRC's £3.5m Stem Cells Initiative (2005-9). He is PI on a £1.5m ESRC-funded project on regenerative medicine, 'REGenableMED', work which has informed NHS policy and moves towards new centres for advanced therapy and Co-I on a recently started ESRC project exploring gene therapy, and collaborating with colleagues at the University of Montreal on research relating to 'responsible health innovation'. He co-edits (with Sally Wyatt who is based at Maastricht) the Health Technology and Society Series (Palgrave Macmillan), soon to publish its twentieth book. He is especially interested in understanding the emergence and implications of new biomedical systems and how these redefine the meaning of disease, diagnosis and clinical practice and shape health care systems at national levels.

5.1.3 Prof. Michael Joseph Campbell

Mike Campbell is Emeritus Professor in the Scholl of Health and Related Research (SchARR) at the University of Sheffield, He joined in 1997, having previous been at the University of Southampton UK and the MRC Pneumoconiosis Unit, Cardiff. He was Director of Postgraduate Research in SchARR 2012-15, and Director of Health Services Research 2009-2012. He is a currently co-applicant on grants worth £4.1M and was PI of a study to develop the Summary Hospital Mortality Index for the NHS. He gave the inaugural Allan Donner Lecture at the University of Western Ontario in 2015. He was the Programme Chair for the Royal Statistical Society 2014 Conference in Sheffield and 2013-15 Chair of Medical Section of Royal Statistical Society. From 1997-2002 he was Chair of the Royal Statistical Society Examinations Board having previously served as examiner and senior examiner. He was a member of an Appraisal Committee for the National Institute for Health and Clinical Excellence for 10 years. He was a member of the Health Services Research Board for the National Institute for Health Research (NIHR) 2010-2015 He was on the UK Research Assessment Exercise Panel 12 (Professions Allied to Medicine) in 2008 and from 2002-2007 he was a joint editor of *Statistics in Medicine*. He has also served on numerous other committees such as the MRC Fellowship Committee, the NIHR programme grants committee and the Bristol Royal Infirmary Inquiry. He was authored or co-authored seven books, including *Statistics at Square One* and *Statistics at Square Two*.

5.1.4 Prof. Klaas Sijtsma

Klaas Sijtsma (1955) obtained his master's degree in psychology and statistics and measurement theory at the University of Groningen, The Netherlands (1982). He was affiliated as a methodologist with the University of Groningen (1981-1983), the Vrije Universiteit Amsterdam (1983-1993), and Utrecht University (1993-1997). Since 1997, he is a full professor of methods and techniques of psychological research at Tilburg University.

He published more than 200 articles and chapters on methodological and statistical topics, mainly in the area of psychometrics. Together with Pieter Drenth, he published the textbook "Test theory" (1990, 2006; Springer), and with Ivo Molenaar, he published a monograph on nonparametric item response theory (2002, Sage). With Andries van der Ark, he prepares a monograph on statistical models for the measurement of individual differences (planned for 2019, Chapman & Hall).

Sijtsma was chair of the Dutch Committee on Tests and Testing (COTAN, 2005-2010; COTAN works under auspices of the Netherlands Association for Psychologists, NIP), President of the Psychometric Society (2010-2011), and Dean of Tilburg School of Social and Behavioral Sciences (2011-2017). He is a member of the Supervisory Board of CITO Institute of Educational Measurement, Arnhem, The Netherlands (1998-2003; 2009-present).

5.1.5 Dr. Roelinka Broekhuizen

Roelinka did her PhD in Maastricht at the school NUTRIM. After working for Numico Research for two years, she started working as an independent consultant, now working for the Dutch Society of Nutritional Sciences, SMBWO, Wageningen UR and Louis Bolk Institute. She has been hired as an independent Secretary of the Review Committees of Nutrim/VLAG in 2015 and now for CAPHRI.

5.2 Annex 2: Criteria and scores of national protocol SEP

Criterion 1: Research quality

The committee assesses the quality of the chair group's research and the contribution that research makes to the body of scientific knowledge. The committee also assesses the scale of the chair group's research results (scientific publications, instruments and infrastructure developed by the group, and other contributions to science). The following elements are to be considered in assessing this criterion:

- scientific quality
- productivity to the scientific community (in relation to the volume of the tenured scientific staff)
- the academic reputation of the group
- the strategy to provide the output at the highest relevant level possible

Criterion 2: Relevance to society

The committee assesses the quality, scale and relevance of contributions targeting specific economic, social, or cultural target groups, of advisory reports for policy, of contributions to public debates, and so on. The point is to assess contributions in areas that the chair group has itself designated as target areas. The following elements are to be considered in assessing this criterion:

- a narrative in which the group demonstrates its relevance for society
- research products for societal target groups such as
 - professional publications and outreach to the general public
 - other research output to society
- use of research products by societal groups such as
 - patents, licences, training courses
 - projects in cooperation with societal partners (European Union, Top-sectors, international funds)
 - contract research (including consultancies), also co-publications and use of facilities
 - present jobs of alumni
- demonstrable marks of recognition by societal groups such as demonstrated by
 - advisory reports for the government
 - media exposure as presentations on radio / TV, invited opinion articles etc.
 - membership societal advisory boards

Criterion 3: Viability

The committee assesses the strategy that the chair group intends to pursue in the years ahead and the extent to which it is capable of meeting its targets in research and society during this period. It also considers the governance and leadership skills of the chair group's management. The following elements are to be considered in assessing this criterion:

- leadership of the chair
- (scientific) visibility and recognition
- research vision and strength of the RLs
- innovative strength
- strategic choices and decisions
- composition of the group (expertise, people)
- acquisition capacity

The meaning of the scores for the three main assessment criteria:

Score	Meaning	Research quality	Relevance to society	Viability
1	Excellent / world leading	One of the few most influential research groups in the world in its particular field	An outstanding contribution to society	Excellently equipped for the future
2	Very good	Very good, internationally recognized research	A very good contribution to society	Very well equipped for the future
3	Good	Good research	Makes a good contribution to society	Makes responsible strategic decisions and is therefore well equipped for the future
4	Unsatisfactory	Does not achieve satisfactory results in its field	Does not make a satisfactory contribution to society	Not adequately equipped for the future

5.3 Annex 3: Programme CAPHRI Review 2017

28-11-17	Arrival members External Review Committee in Maastricht
16.00 – 18.00	Closed session of the External Review Committee Location NH Hotel
18.15 – 18.30	Taxi tot Restaurant “Harry’s” Address: Wycker Brugstraat 2, 6221 EC Maastricht Telephone nr: +31 (0)43 3281366
18.30 – 20.30	Welcome Dinner at restaurant “Harry’s” Installation External Review Committee by Prof. N. de Vries, vice-dean of the Faculty of Health, Medicine and Life Sciences (FHML)
20.45	Taxi to hotel
29-11-17	
08.45 – 09.00	Welcome with coffee and tea Health Campus, Academic Hospital, Flendrigzaal (4th floor P. Debyelaan 25, Maastricht)
09.00	Opening Session (Chair: Prof. H. van der Horst)
09.00 – 09.05	Welcome (Prof. M. Zeegers, Scientific Director CAPHRI)
09.05 – 09.20	Introduction to Maastricht UMC+ and the Dutch Research landscape (Prof. N. de Vries, Vice-Dean Faculty of Health, Medicine and Life Sciences)
09.20 – 09.40	Introduction to CAPHRI (Prof. M. Zeegers)
09.40 – 09.50	Questions and Discussion
Research Line – Promoting Health and Personalised Care	
09.50 – 10.15	Presentations (Prof. H. de Vries, Dr. R. Crutzen)
10.15 – 10.35	Questions and discussion
10.35 – 10.50	Coffee and tea break
Research Line – Optimising Patient Care	
10.50 – 11.15	Presentations (Dr. L. Smits, Prof. J. Muris)
11.15 – 11.35	Questions and discussion
Living Labs	
11.35 – 11.40	Introduction Living Labs (Prof. M. Zeegers)
11.40 – 11.50	Living Lab – Public Health (Prof. M. Jansen)
11.50 – 12.00	Living Lab – Sustainable Care (Prof. D. Ruwaard)
12.00 – 12.10	Living Lab – General Practice (Prof. J. Metsemakers)
12.10 – 12.30	Questions and discussion
12.45 – 13.45	Walking Lunch and PhD poster session at “The Terras” Location: The Terras, 4th floor, Academic Hospital, P. Debyelaan 25, 6229 HX Maastricht During lunch there will be an opportunity to look at posters from CAPHRI PhD candidates.
Research Line – Creating Value Based Health Care	
14.00 – 14.25	Presentation (Prof. S. Evers) Pitches (R. Hrzič M.D., Dr. D. Westra & Dr. B. Wijnen)
14.25 – 14.45	Questions and discussion
Quality Assurance Committee	
14.45 – 14.55	Presentation (Dr. M. Spigt)
14.55 – 15.05	Questions and discussion
15.25 – 16.00	Taxi to Adelante
16.00 – 16.15	Welcome with coffee and tea at Adelante (Prof. J. Verbunt)
16.15 – 17.10	Tour Adelante
Research Line – Functioning and Rehabilitation	
17.15 – 17.40	Presentations (Prof. A. Boonen, Dr. T. Welting & Dr. P. Emans)
17.40 – 18.00	Questions and discussion
18.30 – 19.00	Taxi to Kasteel Hoensbroek
19.00 – 21.30	Informal dinner at: “De Blauwe Dame” in Kasteel Hoensbroek
21.45	Taxi back to the hotel

30-11-17

08.45 – 09.00 Welcome with coffee and tea
Health Campus, University, Universiteitssingel 40, room 6.538

Research Line – Ageing and Long Term Care / Living Lab – Elderly Care

09.00 – 09.25 Presentations (*Prof. R. Kempen, Prof. J. Hamers*)

09.25 – 09.45 Questions and discussion

Brightlands Innovation programme

09.45 – 09.55 Introduction

09.55 – 10.05 The Healthy Primary School of the Future (*Dr. M. Willeboordse*)

10.05 – 10.15 Limburg Measures (*Prof. S. Beurskens*)

10.15 – 10.25 4Limburg (*Prof. IJ. Kant*)

10.25 – 10.45 Questions and discussion

10.45 – 11.00 Coffee and tea break

Research Line – Inequity, Participation and Globalisation

11.00 – 11.25 Presentations (*Prof. K. Horstman, Dr. J. Penders*)

11.25 – 11.45 Questions and discussion

Global collaboration

11.45 – 11.55 International collaboration committee (*Dr. P. Schröder*)

11.55 – 12.05 ASPHER (*Dr. K. Czabanowska*)

12.05 – 12.15 Pollution and Health (*Prof. O. Schayck*)

12.15 – 12.25 Capacity building (*Prof. B. vd Borne*)

12.25 – 12.35 Questions and discussion

Lunch with Research Line management

Location: Health Campus, University, Universiteitssingel 40, room 6.538

PhD Programme & Career opportunities

14.00 – 14.15 Introduction PhD Programme (*Dr. Hannerieke van der Boom*)

14.15 – 14.25 Netherlands School of Primary Care Research - CARE (*t.b.a.*)

14.25 – 15.00 Closed session - CAPHRI PhD Programme, Talent Management and Career Perspectives
(*A. Mengelers Msc., C. van Beijsterveld Msc., Dr. F. Schneider, E. de Bont MD, A. Stevens Msc., K. Oduro-Appiah Msc., R. Ashim Msc., Dr. R. Crutzen*)

15.00 – 15.30 Closed session with part of the Management Team, i.e. Research Line leaders

15.30 – 15.45 Coffee and tea break

15.45 – 16.15 Closed session with Board Maastricht UMC+ (*Prof. N. de Vries*)

16.20 – 16:50 Closed session with CAPHRI Advisory Board

16.55 – 17.25 Closed session with Heads of Departments

(*Prof. J. Muris, Dr R. Meertens, Prof. D. Ruwaard, Prof. M. Weijnenberg*)

Closing sessions

17.30 – 18.00 Wrap-up presentation (*Prof. M. Zeegers*)

18.00 – 18.30 Closed session of External Review Committee.

19.00 – 20.30 Dinner at NH Hotel Members of the committee

1-12-17

09.00 – 12.00 Closed session of External Review Committee Location: Health Campus
Discussion and formulation of preliminary conclusions.

12.00 – 13.00 Lunch (*Co-Greepzaal*)

13.00 – 13.30 Closed session of External Review Committee

Preparation for presentation

13.30 – 15.00 Public presentation of preliminary conclusions of External Review Committee (*Prof. H. van der Horst*)

15.00 Informal get-together (*Co-Greepzaal*)

5.4 Annex 4: CAPHRI composition and financing

5.4.1 Composition

By 31 December 2016, CAPHRI was responsible for a total of 344 employees, equalling 186,1 ftes (full time equivalents) (Table 1) consisting of 55,9 fte scientific staff (university and hospital staff), 29,5 fte postdocs, 71,4 fte (internal) PhD candidates and 29,3 fte support staff. In addition, CAPHRI has 279 external PhD candidates (registered as CAPHRI PhD candidates but not officially employed by CAPHRI/UM), and hosts on average 3 new visiting professors/researchers every year. After 2011, there has been a 30% decrease of the total research staff at the School level, which is basically due to cuts in the direct governmental funding. In 2013 the scientific staff of MUMC+ increased significantly, but this is merely an administrative increase. Over the years the MUMC+ staff has been merely the same.

Table 1: Research staff at School level

	2010		2011		2012		2013		2014		2015		2016	
	n	fte												
CAPHRI														
Scientific staff FHML (1)	130	47,8	134	50,7	130	48,5	115	44,7	110	43,5	127	45,9	136	47,8
Scientific staff MUMC+	18	3,3	14	2,6	12	2,5	11	2,0	30	9,8	33	8,9	30	8,1
Postdocs (2)	98	53,2	91	54,8	85	51,7	72	48,0	66	39,3	50	32,3	49	29,5
Internal PhD candidates (3)	113	102,1	114	102,8	111	103,8	108	97,1	92	83,6	92	82,6	80	71,4
Total research staff	359	203,8	353	210,3	338	206,5	303	191,8	298	176,3	302	189,7	295	156,8
Support staff (research) (4)	65	36,8	65	42,6	59	36,3	59	35,7	51	27,2	45	25,7	41	23,1
Support staff (managerial) (5)	9	7,2	13	9,9	14	11,1	9	7,8	7	6,2	8	6,2	8	6,2
Total staff incl. MUMC+	433	250,4	431	262,8	411	269,7	371	235,3	356	209,7	355	221,6	344	186,1
Total staff excl. MUMC+	315	247,1	317	220,3	309	231,3	303	233,8	296	178,9	302	192,7	314	178,0
External PhD candidates (6)	n/a		123		210		233		223		266		279	
Visiting fellows/professors (7)	2		4		4		3		1		1		2	

#: Number of persons active on the School research activities on 31-dec of any year

##: Number includes professors without research labelling within UM or MUMC+

fte: Sum of actual fte-factors (in fulltime equivalents) labelled on the School research activities on 31-dec on any year

Note 1: Comparable with WOPI-categories HGL, UHD and UD; tenured and non-tenured staff appointed at the FHML.

Note 2: Comparable with WOPI-category 'Researcher [Onderzoeker]' (1, 2, 3, 4), with completed PhD, not belonging to scientific staff (with WOPI-categories HGL, UHD and UD)

Note 3: Standard PhD (employed)

Note 4: All support staff working on research (research assistants, lab technicians, and other support staff not working at the management office)

Note 5: Support staff working at the School's management office including the scientific director

Note 6: External PhD (externally or internally funded but not employed)

Note 7: Visiting fellows are researchers/professors who visit the School for a period of typically one week up to three months to work with Schools staff members.

5.4.2 Financing

Table 2 presents information concerning funding and expenditures of the School. The funding has been described both as the number of ftes and in percentages. The School depends financially on (1) direct governmental funding as well as on the acquisition of (2) research grants (obtained in national and international scientific competitions), (3) contract research (EU framework, INTERREG, industry etc.) and (4) other funds from sources such as sponsorships, revenues from course fees, workshops, training programmes and other industry-related revenues.

Table 2: Funding at School level

	2010		2011		2012		2013		2014		2015		2016	
	fte	%	fte	%	fte	%	fte	%	fte	%	fte	%	fte	%
Funding:														
Direct funding (1)	77,8	39,3	73,4	35,2%	67,8	33,2%	47,9	25,2%	41,5	24,9%	41,1	25,6%	41,5	27,3%
Research grants (2)	44,3	21,8	51,1	24,5%	57,7	28,3%	52,6	27,7%	39,1	23,5%	31,8	19,8%	25,1	16,9%
Contract research (3)	74,4	36,6	78,4	37,6%	70,7	34,7%	78,4	41,3%	81,0	48,6%	80,3	49,9%	76,4	51,4%
Other (4)	6,7	3,3	5,5	2,6%	7,7	3,8%	11,0	5,8%	5,0	3,0%	7,6	4,7%	5,7	3,8%
Total funding (5)	208,1		208,4		204,6		189,8		268,5		190,8		198,7	
Expenditure:														
Personnel costs	14.065	77%	15.595	77%	15.117	78%	14.588	77%	13.821	80%	12.878	79%	12.662	78%
Other costs	4.108	23%	4.624	23%	4.286	22%	4.447	23%	3.364	20%	3.397	21%	3.509	22%
Total expenditure	18.173		20.219		19.403		19.035		17.185		16.275		16.171	

Note 1: Direct funding by FHML/ Maastricht University ('basis financiering' / lump sum budget).

Note 2: Research grants obtained in national scientific competition (e.g. grants from NWO, ZonMw and KNAW)

Note 3: Research contracts for specific research projects obtained from external organisations, such as industry, governmental ministries, European organisations, including ERC, and charity organisations

Note 4: Funds that do not fit the other categories.

Note 5: The funding in fte includes the total research staff but excludes the MUMC+ staff

The funding of the School is expressed in ftes of scientific staff excluding the MUMC+ staff. The overall expenditures have decreased from an average of 19m€ in the years 2010 – 2013 to 16m€ in the years 2015 – 2016. The decrease in funding is mainly due to the governmental budget cuts for research, which is shown in both the direct (governmental) funding and the indirect governmental funding through research grants. The funding by contract research has been steady over the years with a slight increase in 2014 and 2015. An alternative to the funded research projects are the projects with external PhD candidates. Since 2011 the number of these projects has more than doubled and this reflects a big increase of in kind investments of individuals and organisations.

Table 3: Attracted funding at School level

CAPHRI- new funding in k€	2010	2011	2012	2013	2014	2015	2016	Average in period
Research grants	4.759	5.210	4.070	2.635	2.555	999	3.338	3.367
Contract research	5.811	2.916	4.063	5.663	2.958	5.718	8.426	5.079
Other	1.584	1.536	1.192	699	78	1.450	2.259	1.300
Total	12.453	9.664	9.324	8.997	5.590	8.168	14.023	9.746

As is shown in table 3, there was a significant reduction in attracting new funds in 2014 (table 3). This was mainly due to the impact of budget cuts in 2013 and due to the fact that relatively many projects ended in this period. Both issues had an effect on the time available for preparing new proposals. Also, funding in the fields of healthcare and public health were decreasing and new funding opportunities needed to be identified. New funding has been found through new collaborations of Maastricht University, such as Kennis-As (3 projects) and Chemelot InSciTe (2 projects). In 2016 CAPHRI managed to increase grants beyond the 2010 level, albeit with fewer staff available for acquisition.