Erasmus MC
Universitair Medisch Centrum Rotterdam

# Research Assessment

## Theme Health Sciences 2013-2018


**Report on the research review according to the Standard Evaluation Protocol 2015-2021**

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## Contents

# Preface

The committee really enjoyed this interesting and inspiring digital visit. We would have liked to be shown around in the Erasmus MC buildings and enjoy the fantastic view of Rotterdam that the Dean showed us in his presentation. Unfortunately, this was not possible due to the COVID-19 pandemic. Of course, we also would have liked the experience of staying in the fascinating city of Rotterdam.

We are impressed by the quality as well as the relevance of the research that all four departments have carried out in the past six years, are carrying out at the moment or plan to carry out. The committee was impressed.

We also strongly appreciate all the efforts of the departments. Not only to disseminate their knowledge but also make sure that, by interacting with various stakeholders, they try to address the knowledge gaps that hamper our understanding of health and health promotion, of diseases and effective treatment, of prevention, in order to provide better health care. We specifically appreciate the efforts of reducing inequalities in health and life expectancy that exist between people with higher versus a lower socio-economic status.

Although direct funding decreased over the period of the evaluation, the committee found no deficiencies in the quality and relevance of the work. We do have some opportunities and points of attention to continue the excellent research.

**Professor Henriëtte van der Horst**
Committee chair, Theme Health Sciences
Amsterdam, December 2020

# I. Introduction

## Assignment to the committee

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

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

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

For the purposes of this assessment, the Executive Board of Erasmus MC appointed a separate committee of international experts for each of its nine themes, consisting of international experts in the fields of the underlying Departments. Each committee conducted its own assessment, amounting to a total of nine assessments. The respective digital site visits to Erasmus MC took place in the period June 2020 to April 2021. The Health Sciences site visit took place on 26-28 October 2020.

Originally, the members of each committee were intended to meet with one another and with Institute, Theme and Department representatives during onsite meetings. These were scheduled to take place in the spring of 2020. However, due to the global Covid-19 pandemic, the site visits to Rotterdam were first postponed and later replaced by remote meetings via a digital platform. In order to partially compensate for the loss of interpersonal interaction during physical meetings, it was decided to schedule additional online meetings between committee members and use interactive working methods.

This report describes the findings, conclusions and recommendations of the committee that assessed the four departments that are part of Theme Health Sciences. Each department is assessed in relation to research programs and institutes worldwide in similar disciplines and on similar topics.

## Assessment criteria

The assessment of the Theme Health Sciences was guided by the Standard Evaluation Protocol 2015-2021 (SEP) of the Royal Academy of Sciences and Arts of the Netherlands (KNAW), the Netherlands Organization for Scientific Research (NWO) and the Dutch Association of Universities (VSNU). The three assessment criteria specified in SEP – (1) research quality, (2) relevance to society and (3) viability – formed the starting point for the assessment. In its report, the committee both qualitatively and quantitatively assesses these criteria, scoring them on a four-point scale, ranging from world leading/excellent (1) to unsatisfactory (4). The meaning of the scores is explained in appendix 2.

In accordance with SEP, the assessment also includes a qualitative appraisal of Erasmus MC's PhD program, and its research integrity and diversity policies and practices. In addition to the SEP criteria, the committee took three specific research-related targets into consideration. These are part of Erasmus MC's current strategy (Strategy 23), which designates 'Technology & Dedication' as its guiding principles. In the Terms of Reference (ToR) for the research assessment the Executive Board of Erasmus MC describes the three research-related targets as follows:

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

## Committee composition

Members of the committee that assessed the departments of Theme Health Sciences are:

- Prof. Henriëtte E. van der Horst (chair), Amsterdam University Medical Centres;
- Prof. Ann Zauber, Memorial Sloan Kettering Cancer Centre, USA;
- Prof. Jane Froelund Thomsen, Bispebjerg Hospital, University of Copenhagen, Denkmark;
- Prof. Stefania Boccia, Università Cattolica del Sacro Cuore, Italy;
- Prof. George Hripcsak, Columbia University Irving Medical Center, USA;
- Prof. Bruce M Psaty, University of Washington, USA.

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

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

## Documentation

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

- Standard Evaluation Protocol 2015-2021;
- Terms of reference for conducting the site visit;
- A Beginner's Guide to Dutch Academia (The Young Academy, 2018);
- Some departments provided an addendum on the self-evaluation report due to the delay of the visit.

## Working method

In an online kick-off meeting, approximately six weeks prior to the site visit, the committee was introduced to the Standard Evaluation Protocol (SEP), specifics about the Dutch academic landscape and the committee discussed and agreed upon procedural matters. The committee members were asked to read the documentation and formulate preliminary assessments and questions for the interviews. In a second online meeting, approximately four weeks prior to the site visit, the committee discussed its preliminary findings and formulated questions on relevant topics. These questions were afterwards sent to the Department Heads and Erasmus MC in order to assist in their preparations for the site visit. In the week prior to the site visit, the theme and departments provided the committee with a document that included answers to most of the committee's questions. On the day before the start of the digital site visit, the committee held a third online meeting to prepare the interviews.

Each member, including the chair of the committee, was primarily responsible for the assessment of one specific department. Because of their size, two departments had two first assessors, who took the lead in preparing for the assessment of this department, chaired the sessions with its staff and eventually drafted an assessment based on the SEP criteria. For reasons of continuity, one or two 'second assessor(s)' were appointed to each department. Contrary to the first assessor, the second assessor was not necessarily an expert in the field of the department.

The virtual site visit of Theme Health Sciences took place on 26-28 October 2020. During the site visit, the committee met with the Executive Board of Erasmus MC, as well as with representatives of the departments. Each department was given a time slot, which it filled with presentations and interviews. During speed dates, the committee also spoke with PhD students of the departments. During its final meeting, the committee jointly scored all of the departments. To conclude the visit, the committee presented the main preliminary conclusions to the Executive Board of Erasmus MC and the Heads of the departments of the Health Sciences Theme. The schedule for the site visit is included in appendix 2.

After the site visit, the secretary drafted a first version of the committee report, based on the assessments drawn up by the first assessors. This draft report was circulated to the committee for all members to comment on. Subsequently, the draft report was presented to Erasmus MC for factual

corrections and comments. In close consultation with the chair and other committee members, the secretary used these comments to finalize the report. The final report was presented to the Executive Board of Erasmus MC.

# II. Theme Health Sciences

## Introduction

The nine themes at Erasmus MC are organizational units only. As such they are not responsible for developing research strategies or distributing funds. Together the Department Heads of the underlying departments and Theme Director form the Theme Board, which bears collective responsibility for drawing up and realizing the theme's long term strategic plan and annual plan. The Theme Board is accountable to the Executive Board of Erasmus MC. One of the Department Heads acts as chairperson of the Theme Board. The Erasmus MC Health Sciences Theme is recognized as a leading innovator in healthcare and public health, committed to achieving a healthy population through research and teaching. The current strategic plan focuses on the two guiding principles of 'Technology and Dedication' and in all the core tasks a clear focus is on the social impact and valorization of ideas.

The committee did not compare the four departments in the theme, but assessed each department at its own merits and in its own discipline. It did want to use consistent quantitative data when assessing the departments. The committee agreed upon using the following data:

| 2018 | | Epidemiology | Public Health | Medical Informatics | General Practice |
|---|---|---|---|---|---|
| **Scientific staff** | **FTE** | 45 | 107 | 27 | 19 |
| **Funding** | **M EUR** | 3.8 | 11.3 | 3.2 | 2.2 |
| **Direct Funding** | FTE | 15.4 | 8,3 | 5,2 | 8,3 |
| **Total funding compared to 2013** | **%** | 78 | 90 | 66 | 106 |
| **publications (2013-2018)** | **Total #** | 2758 | 2620 | 585 | 594 |
| **PhDs (2013-2018)** | **Total #** | 84 | 106 | 24 | 31 |
| **MNCS (2013-2016/17)** | | 2.45 | 2.90 | 1.31 | 1.75 |

The committee primarily focused on the evaluation of the four underlying departments of the Health Sciences Theme. In these evaluations a number of common topics were identified, which will be described in this chapter. In particular, the committee sees a great deal of overlap in the challenges and issues for the future that apply to all four departments. Therefore, the committee has decided to combine its recommendations for all the departments in this theme.

**Career development**

At Erasmus MC level there are a number of career development programs that provide coaching and support for talented researchers to shape their academic careers. The program for female career development is impressive and longstanding. The committee met some of the mid-career researchers who are participating in these programs, which shows that the departments make use of the services offered by Erasmus MC. The institute does not yet have a formal tenure-track program. The result of this is that obtaining a permanent position cannot be guaranteed even if one meets the requirements. A point of attention is the way in which the management of a department decides on participation in these career development programs. Transparency of decision-making and the setting and communication of clear criteria are important for a good career policy. In some departments it was not clear to researchers (who participated in the review) why and how the decision was made to have them participate in a program or to promote a researcher. It is important that this is properly organized at departmental level, but the committee believes that this is also a point for attention at thematic level and at Erasmus MC level.

## Work pressure

In many interviews the committee discussed work pressure, in particular for mid-career academics who are not always in a tenured position. Overall, there is agreement that workload is high, but doable. Many tasks have to be balanced and expectations are high. At the same time, most staff members feel that they can discuss the workload and prioritization with the department Head or their supervisor. What contributes to keeping the workload manageable is the freedom they experience to organize their own work and set priorities. A promising development that the committee sees in a number of departments is the preference for quality over quantity. There is more recognition for fewer but higher quality publications that are published in excellent journals. The committee is very positive about this development and encourages the departments to take further steps in this respect, also with regard to PhD students.

## Collaboration within the theme

Within the Health Sciences Theme the four departments collaborate in projects, for example by joint PhD students. The Health Sciences Theme is well organized and there appears to be much overlap among departments in areas like causal inference and observational research. The self-evaluations show that the departments realize that it is necessary to further develop collaboration within the theme. The committee fully agrees with this, the departments and the theme will gain in strength when further and more intensive collaboration takes place. As an example, the committee recommends the development of a 'virtual' cross-department 'core' of quantitative methods, in which the Epidemiology, Public Health and Medical Informatics departments all participate and contribute to the development of methodology.

## Infrastructure

The research of all four departments in the Health Sciences Theme requires infrastructure to deal with large databases, data storage and analysis. According to the departments the current infrastructure is inadequate despite the initiative at Erasmus MC level of the Research Suite, a platform specifically developed for data storage and data sharing. Some of the research is done in collaborations with clinical departments and the Research Suite – in general – fits the requirements for storing and sharing these clinical data. However, the departments in the Health Sciences Theme have many non-clinical collaborations as well as external collaborations that are non-hospital based. For example, major Randomized Controlled Trials (RCTs) in, for example, primary care, require a different type of data-storage and data-linkage to external organizations.

## External versus internal funding

The direct funding of all four departments has declined in the period of this evaluation. The committee understands that the funding from government to the Erasmus MC is fixed and has also gradually reduced over time. However, the historical basis for distributing this budget - despite limited performance-based funding - is detrimental to the non-clinical departments in this theme. The committee is of the opinion that these departments are not only valuable for the Erasmus MC, but also - to a high degree, for society.

The committee points out that in 2016 the Netherlands Health Council published a report in which it is recommended that the funding of Health Sciences Departments should increase. The Ministry of Health, Welfare and Sports has clearly communicated that it expects contributions towards Public Health being included in the funding of research. These four departments are very successful in attracting research grants and contract research. However, structural costs, like those for infrastructure to do research outside the hospital, cannot easily be covered by grants. The societal impact will undoubtedly result from the external collaborations in the research, but collaborations require structural funding. Although part of the direct funding is said to be performance-based, it is unclear to the committee if the performances of the departments are sufficiently valued.

## PhD training

Supervision

Half of the international committee that evaluates the Health Sciences Theme and departments is particularly familiar with the American system of training for PhD students which deviates strongly from the Dutch system. The committee was impressed with the students who were engaging and excited about the research they do. The PhD students are overall very content and pleased with the supervision they receive and consider that they have good contact with their daily supervisor. The frequency of meeting with the entire supervision team is less frequent and some students have such team meetings even less than once every three months. The committee is of the opinion that the frequency and intensity of contact with the daily supervisor is adequate, but considers that the meetings with the entire team should be more frequent (at least once every six weeks). It is important that the supervision and progress of the PhD student is considered a team effort with structural involvement of the promotor. All in all, the committee believes that the supervision of PhD students is well done. However, what might be useful is an (external) mentor with whom PhD students have a discussion once or twice a year about more general aspects of a PhD trajectory. This mentor can also play a role in the annual progress discussions and in the preparation for a career after the PhD.

*Challenges*
For a number of PhD students the pandemic resulted in issues in data collection, but also posed challenges in the domains of data access and analysis. This issue is related to the comments of the committee concerning infrastructure. For PhD students with often a short-term contract the limited access to data can be very stressful. Another drawback of having to work from home during the pandemic is the loss of a collaborative atmosphere and interaction with colleagues, especially for the younger PhD students who just started. The committee heard about digital initiatives to overcome some of this and believes that this is a good development. Another point of attention is the pressure many of the PhD students feel to publish many papers, even more than required. Supervisors are aware of this and try to downsize the mostly self-imposed high expectations. The committee is of the opinion that PhD students should be included in the quality over quantity shift that is currently taking place.

*Success rates*
The duration of PhD projects was not centrally monitored in the period of the review. This makes it difficult for the committee to assess this aspect, as the numbers provided by the departments give a general picture, but are not comparable with each other. The committee does recommend to Erasmus MC to monitor duration and delays of all PhD students, as well as the number (and reasons) of drop-outs.

*Local Graduate School*
Erasmus MC has recently started an institution-wide Graduate School. The committee believes that this development is necessary in order to improve the structure and clarity of the training for PhD students. For many PhD students, it is a search for the requirements and rights with regard to a PhD trajectory. There are various documents available, but the PhD students have to collect them themselves. It is advisable to offer an information package to new PhD students. Although the committee has no doubts about the supervision of the PhD students, a Graduate School can also offer quality assurance in this area.

*Conclusion*
Overall, the committee observed that the departments try to provide their PhD students with the necessary courses, supervision and training in order to become good researchers. Although the graduate school has just started, the committee has seen many examples of offering the necessary courses and training, often in the form of the NIHES-master to their PhD. Career prospects are discussed with the PhD students during the project, in some instances rather systematically during the annual appraisals, in other instances more haphazardly.

## Integrity policy

The committee found that all departments encouraged an open and transparent culture in a variety of settings, including journal clubs, meetings and seminars. All PhD students attend the compulsory course on scientific integrity at the beginning of their career, but more important is that issues in the domain of scientific integrity are regularly discussed during supervision and meetings. Nice examples are seen in the Epidemiology Department where a quality assurance committee selects random papers twice a year for a thorough evaluation, this encourages ongoing evaluation and serves as a reminder and deterrent. Another example is the quality assurance of the Public Health Department that is performing ten internal audits to ensure reproducibility of results. PhD students work with at least two supervisors. The standard in all departments is, appropriately, open science and open source. The Medical Informatics Department takes an open science approach to integrity, where processes are transparent and software is open source, and where exceptions can be made only with explanations. Departmental research products like the IPCI database are strictly controlled to protect patients and ensure the integrity of the database. In the Epidemiology Department an open and transparent culture is encouraged in a variety of settings, including journal clubs, meetings and seminars. All researchers in the General Practice Department that collect clinical data have an up-to-date BROK certificate. The department also has a quality handbook that includes issues relating to research Integrity.

## Diversity

Diversity is on the agenda of the Board of the Erasmus MC. Already mentioned above, the Erasmus MC has an impressive program for female career development. At the same time, the role of Department Heads is essential in achieving a

gender balance, especially in senior research positions. All departments in the Health Sciences Theme have a good gender balance among junior and mid-career researchers. The challenge is to redress the male-female misbalance at the top, which at the moment does not reflect the rate between male and female staff members. Other aspects of diversity, such as ethnicity and age, are more difficult to assess. A clear strategy on these aspects seems to be missing in the four departments although all departments manage to attract international staff from different cultural backgrounds.

# III. Epidemiology

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|---|---|
| Research quality | Excellent (1) |
| Relevance to society | Excellent (1) |
| Viability | Very Good (2) |

## Strategy and targets

The mission statement of the Department of Epidemiology is to 1) improve health across populations as well as optimize care for individual patients, 2) develop and apply novel methods for quantitative research, 3) deliver education of the highest academic standard, 4) provide an optimal environment for scientific and academic development with a strong focus on scientific integrity, 5) facilitate and maintain open communication within the academic and healthcare communities as well as with the public, and 6) build strong collaborations with partners at institutional, regional, national and international level. The research is divided into three main programs, with each having several research lines:

A) Quantitative Methods
B) Epidemiology of Diseases
C) Epidemiology of Determinants.

According to the committee the Department of Epidemiology's mission is appropriately broad, including not only populations and patients, but also research, education, integrity, communications, and collaboration. The department is well organized into relevant programs, each with its set of research lines. The management team represents the department's constituents. The recent efforts - to develop new research lines, to expand the research profile, and to provide opportunities to young research leaders - have been highly successful. In addition, the Department of Epidemiology runs the Centre for Quantitative Methods that consists of biostatisticians and methodologists (from different departments), who advise all researchers within Erasmus MC on research methods.

Between 2013 and 2018, funding for FTE from grants and contracts has remained largely stable (2018 is 85% of 2013), but direct funding for FTE from the institution has declined more precipitously (2018 is 67% of 2013). The material costs have declined from 3.39 million euros down to 0.56 million euros. The extensive advising roles on study design and analysis seem to lack support. The waning of the institutional support is a concern.

The department's culture, a major strength, has become especially supportive and collaborative, and departmental staff noted its continued improvement. The department is energetic, spirited, and productive. The leadership is readily available to faculty and students, encourages open and transparent discussion, and advocates quality of work over quantity of work. The faculty are dedicated to their PhD students, their training and their progress. Few students drop out. The plans for the next five years to expand outreach, to develop new data resources, and to develop young talent are appropriate, achievable, and important. The faculty are generous in providing advice on the design and analysis of studies to other departments at Erasmus MC. The opportunities to leverage the strengths of this outstanding department are legion.

Diversity is integral to the Epidemiology Department. Of the eleven PIs, six are women, and they represent five different cultural backgrounds. Graduated students have come from 35 nationalities, and physical disabilities are accommodated.

## Research quality

The research of the Department of Epidemiology is world-leading. The department pursues a program of research that includes both methods and content. The program on determinants complements the program on diseases, and the interest in molecular epidemiology complements the focus on nutrition. The targets such as cardiometabolic and neurologic diseases are major threats to the public health. Population imaging is especially novel. The department's contributions are legion, both in large-scale collaborative efforts and in local studies in Rotterdam and in the Netherlands. Examples include dynamic prediction from joint models, important publications on instrumental variables, interventions such as yoga, estimates of risk of cardiometabolic disorders that serve as references values for the Dutch population, the interaction between lifestyle and genetics in dementia, the association of protein intake with cardiometabolic health, and the importance of cerebral microbleeds as a new imaging marker of cerebral small vessel disease. The cardiovascular prediction model, for instance,

has been incorporated into the European Society of Cardiology (ESC) guidelines.

In the last decade, the department has helped to transform the conduct of epidemiologic research in Europe and the US. Cohort studies such as the Rotterdam Study used to be politely competitive. With the advent of genome wide association studies (GWAS), many cohort studies joined forces to improve study power with the result that collaborative efforts became essential to the conduct of high-quality research. The faculty and the students from the department have been leaders not only in establishing these large-scale collaborations but also in making them highly productive. In part as a result of their efforts, the standard in epidemiologic genetic studies now includes not only replication and omics analyses but often functional work as well. Indeed, the department members participate in a large number of consortia, including CHARGE, ENIGMA, COPDgene, SPIROMETA, ISGC, ACC, BBMRI, EUDRAGENE, PSY-CA, PGC, Combi-bio, Proof-ATHERO, ERFC, GIANT, MAGIC, ICGC, UNIVRSE, UNITED. Accordingly, the department's research networks are remarkably broad, as is shown in the self-evaluation report. This collaborative approach, which started in studies of genetic epidemiology, has spilled over as a cultural side effect into other genres of epidemiological studies.

In the last six years, the Department of Epidemiology, though not large, has published an astonishing number of 2758 papers and 84 PhD students graduated. The departments MNCS is high at 2.45 (2013-2016/17), and a quarter of its publications belong to the top 10% of the most cited articles in the field. The scientific impact of the department research is also documented from personal and collaborative grants obtained, invited lectures at large symposium and participation of the staff to scientific committees and editorial boards of prestigious academic journals. Department's alumni/ae occupy prestigious positions nationally and internationally.

With the departure of several senior investigators, the department is now relatively young, but energetic and dynamic as well. Two new research lines were activated (Nutrition and Lifestyle, and Causal Inference), and two more are under development. The goals are broad and appropriate. Members of the department have received a variety of prestigious awards, grants, and honors. Some of the major lines of research are longstanding strengths of the department, lines that are now led by the former students of the pioneers.

Perhaps not surprisingly, a recent "scientometric study showed that this department contributed the most in terms of samples provided to all GWA studies collectively" (quoted from the self-evaluation report). The faculty and students, often leaders for a number of phenotypes, have contributed far more than samples to these large-scale collaborative efforts, especially in the areas of its expertise such as neuroepidemiology, cardiometabolic epidemiology, and pulmonary epidemiology.

## Relevance to society

The effort to focus on sex-tailored cardiovascular prevention is a novel approach that has received recent awards and grants. Insights into the vascular contributions to dementia have been critical in directing prevention efforts. Control of risk factors, the department has shown, can modify the genetic risk of Alzheimer's. Improved cardiovascular risk prediction equations have appeared in major journals in the US and Europe including *JAMA* and the *Lancet*. They appear in the ESC guidelines, and similar work has influenced the WHO risk charts. The recent focus on studying a birth cohort for the earliest origins of Alzheimer's is novel and exciting. The role of protein intake in cardiometabolic health across the lifespan is an award-winning set of findings has helped change the European regulations for protein content in infant formulas. In terms of communication, the department has organized a number of outreach activities including blogs, lectures and debates for the general public and schools. Some members of the management team received markers of recognition from the civil society for their efforts towards improving the health of the public.

## Viability

The department's targets are comprehensive and appropriate. In the very fast changing scenario of the last decade, the research lines were adapted accordingly, to incorporate innovation in the methods. In some cases the research lines were "creators" of innovation, by addressing new research questions and using novel methodologies to address existing and open research questions. Two new research lines were recently activated

(Nutrition and Lifestyle, and Causal Inference). Collaborations with clinical departments and international consortia are a major strength. The integration of Biostatistics into Epidemiology is also a strength. Members of the department have received a large number of awards, prestigious EU grants, and honors. The Erasmus MC Research Development Office has been very helpful in grant development. The SWOT analysis seems to be appropriate. Internally, the department is vital, viable, and vibrant. However, the large number of unfunded institutional responsibilities and the limited financial resources from the institution are appropriately identified as threats.

## PhD training and supervision

The faculty from the Epidemiology Department coordinates 16 courses as well as the summer program for the NIHES graduate school. The availability of the Rotterdam Study and the Generation R Study to PhD students are major strengths. Every graduate student works across at least two (out of eleven) research lines to promote exchange of ideas and knowledge dissemination.

The attitude of the department is towards encouraging the PhD students to care more about the quality of paper and analysis than the number of publications. The faculty are dedicated to their graduate students, their training and their progress. Few students drop out.

## Conclusion

The department's culture, a major strength, has become especially supportive and collaborative, and everyone noted its continued improvement. The department is energetic, spirited, and productive. The leadership is readily available to faculty and students, encourages open and transparent discussion, and advocates quality of work over quantity of work. The faculty coordinate many courses and the summer program for the NIHES graduate school, and they are called upon by many groups to provide advice on the design and analysis of studies**.** The opportunities to leverage the strengths of this outstanding department are legion.

# IV. Public Health

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|---|---|
| Research quality | Excellent (1) |
| Relevance to society | Excellent (1) |
| Viability | Very Good (2) |

## Strategy and targets

The mission of the Public Health Department of Erasmus MC is to conduct eminent research and provide excellent education with a discernible impact on population health at local, national and international levels. This is achieved by interdisciplinary research on the effectiveness of prevention, screening, and health care to support evidence-based practice. According to the committee, this is convincingly fulfilled. The keyword is interdisciplinary research which the department shows many successful examples of. Researchers have backgrounds in health sciences, medicine, social sciences, psychology, econometrics and mathematics. The research of the department is organized in two main programs with nine specific research groups:

A) Determinants and primary prevention
   - Social epidemiology
   - Youth health care
   - Occupational health
   - Cancer surveillance

B) Secondary prevention and care
   - Evaluation of screening
   - Medical decision making
   - Infectious disease control
   - Health technology assessment and implementation
   - Medical care and decision making at the end of life.

The Medical Ethics, Philosophy and History of Medicine sub-department has an independent research program. Between 2013 and 2018, total funding has remained largely stable (2018 is 90% of 2013), but direct funding from the institution has declined strongly (2018 was 50% of 2013). This decline in direct funding was partially compensated by a strong increase in funding from contract research, but the waning of the institutional support is a concern.

The department's culture is described as open and focused on teamwork, as well as competitive and ambitious with high work pressure. Researchers state that the culture has been changing over the past decade from competition towards a stronger focus on collaboration. Being a multidisciplinary department, collaboration is essential, which will only become more important in the upcoming years. According to the committee, PhD students are implicitly taught to become team players by always working in projects with multiple researchers. This might interfere with the requirement of first authorships. Hence, the committee emphasizes the importance of clearly defining the role of each researcher in a project beforehand and agreeing on the authorship of publications.

Collaborations are impressive, with leading roles especially in projects with Erasmus MC's clinical (and non-clinical) departments, leading to ground-breaking results on – for example – screening. The department also has powerful international platforms, both in the fields of screening and neglected tropical diseases. The department participates in several international networks, like the International NTD Modelling Consortium, and International Cancer Screening Network (ICSN) and in two European collaborative projects. The department developed and leads the EU-TOPIA project with recent extensions beyond the EU, and the group in the Screening section are leaders in the Cancer Intervention and Surveillance Modeling Network (CISNET) that uses microsimulation modeling to assess what are the optimal screening and surveillance strategies of the six most common cancers.

The relatively limited collaboration between research groups in the Public Health department was given as a weakness in the SWOT. The committee encourages the department not only to increase these intradepartmental collaborations, but also include interdepartmental collaborations. The outward look is excellent and there are also multiple and excellent collaborations with various clinical departments at Erasmus MC. The committee encourages the department, as indicated in the self-evaluation report, to strengthen the structural collaboration with other departments in the theme.

The Public Health Department chair has been at the helm for nearly four years. He is aware of the need of more female full professors and is planning such new appointments very soon.

## Research quality

The Department of Public Health at Erasmus MC is recognized internationally for its ground-breaking research that also has societal impact for public health. The department combines highly skilled methodological knowledge (modelling, economical calculations) and collaboration with clinical knowledge (screening CRC, lung tumors). Also, the use of this combined knowledge to fight neglected tropical diseases has high impact. Three excellent researchers highlighted their work during the virtual site visit. Their topics were Evaluation of Screening, Modeling of (Tropical) Infectious Diseases, and the Centre for Effective Public Health in the larger Rotterdam area.

The department is succeeding in accomplishing its mission to conduct eminent research and provide excellent education with a discernable impact on population health on the effectiveness of prevention, screening and health to support evidenced-based practice. The research stretches across multiple domains of public health from improving conditions for the homeless to preventing cancers with screening. A visionary research strategy is demonstrated as well as an interdisciplinary approach e.g. in the colorectal screening program preceded by RCTs on compliance and yield, resulting in high and well documented effect. In several areas the department is an internationally leading research institution, e.g. in evaluation of screening, analyzing trends in inequality, medical decision making, strategies for the treatment of neglected tropical diseases. Locally, the department has an extensive collaboration with the Rotterdam city council.

The number of publications in the period 2013-2018 is impressive with a total of 2620 and 106 successful PhD defences. The high quality of the research is reflected in high-ranking publications and high citation scores. As a benchmark for quality the MNCS score of 2.9 is excellent and has been increasing over the last years confirming the determination to focus on quality over quantity. Nevertheless, there has also been a steady increase of published papers with a high percentage (24%) belong to the top (10%) of the most cited articles in the field . They have had publications in top journals such as JAMA, Annals of Internal Medicine, and Journal of the National Cancer Institute.in recent years. The students and faculty have received numerous awards for their work (science awards, personal research grants, invitations as lecturers in prestigious congresses, memberships in editorial boards, guest professorships etc.). The committee would like to specifically remark the focus on research integrity in this department: the quality manual, a quality committee that is performing ten internal audits to ensure reproducibility of results and a confidential mediator are inspiring features.

## Relevance to society

The research in this department is directed towards areas of considerable relevance, such as screening, clinical decision-making, evaluation of treatment, reducing inequality and focus on neglected tropical diseases. The screening modeling group has provided decision analysis to inform recommendations and guidelines for cancer screening. The department has impressive collaborations, often with leading roles. Especially within the Erasmus MC's clinical departments this is leading to groundbreaking results on e.g. medical decision making and screening. The department has built a powerful platform internationally both in the fields of screening and medical decision-making but also in their effort to improve treatments for neglected tropical diseases. International impact is obtained in the treatment of e.g. thrombectomy in stroke.

The interdisciplinary approach is clear, a combination of highly skilled methodological knowledge (modelling, economical calculations) and collaboration with clinical knowledge (screening colorectal cancer, lung tumors) is used. Also, the use of this combined knowledge to fight neglected tropical diseases has extremely high impact.

The local collaboration with the Rotterdam municipality has resulted in, among other things, a 50% reduction in suicides and homicides among homeless people through evidence-based interventions. A new project mentioned is the food-environment and the effects of additional food-outlets in the area.

## Viability

The Public Health Department is vibrant and viable with excellent research on highly relevant research topics. The department has established strong collaborations internationally, at European level, within the Netherlands and in Rotterdam. They

have been successful in obtaining external funding. The department also has had high success with recruiting PhD students and postdocs. The extensive collaboration with excellent partners nationally and internationally signals very good opportunities for both young and senior researchers attracting talents.

The culture of the department has changed over the years from being competitive to collaborative. This is an active prioritization from the head of the department. This is evident in several research lines but is also emphasized by the department as an area that should be enforced. The junior investigators are included in the activities of the department. The department has introduced a *Talent Review* for junior researchers, postdocs and assistant professors that leads to a classification of talents and "potentials". The committee fully agrees that the requirements with respect to career opportunities and nurturing of talents need to be transparent. At the same time, there is a risk that this talent review will have the undesirable side effect of increasing competition between researchers. The committee understands that the validity of the recently set up system is still untested and urges the department not to lose sight of the possible dangers when further developing it.

The department displays coherent and visionary plans for future research areas with further development of methods and analytical strategies in complex interventions, big data, causal inference (esp. cancer care, personalized intervention, health inequality), conscious about the importance of expanding collaboration within the department and the theme. In the SWOT analysis the department adequately points out weaknesses and threats, like a structured link with societal stakeholders, opportunities in big data and short grant periods. According to the committee the major concern is not from internal conditions but the fact that the Department to a very high and increasing degree is dependent on external funding. This leaves little room for exploring new areas and for e.g. expanding the societal impact through collaboration with local and regional networks and partners.

## PhD training and supervision

The Department of Public Health has a large number of PhD students with an average of nearly 18 graduates per year. Approximately 25% of the PhD students are external (*buitenpromovendi*), another 20% of the PhD students are international. For these PhD students there is a buddy system to help them get acquainted with the local situation. Consensus for supervision in the department is (bi)weekly meetings with the daily supervisor and a meeting with the promotor every 4-6 weeks. The department Is responsible for the public health epidemiology track In the NIHES master's program.

## Conclusion

The Department of Public Health is vibrant and viable with excellent research on highly relevant research topics. The department has established strong collaborations internationally, at European level, within the Netherlands and in Rotterdam. It has achieved impressive results with high societal impact and is internationally leading in several areas. The department exposes high research integrity and ethics requiring high research standards. The research quality is considered excellent. The department has been working with the culture of the department, successfully changing it from primarily competitive to collaborative. The committee recommends that the department carries on working with the culture and the work pressure of the staff, reflecting on the potential problems with the talent recruiting procedure, and increasing the collaboration with other departments within the theme.

# V. Medical Informatics

| | |
|---|---|
| Research quality | Excellent (1) |
| Relevance to society | Excellent (1) |
| Viability | Very Good (2) |

## Strategy and targets

The mission of the Medical Informatics Department is to generate reliable evidence from health data to enable better health decisions and better care. This is done by developing and applying novel quantitative and computational methods in close collaboration with academic partners, physicians, regulators and industry, and with a strong commitment to open science. According to the committee the mission is very well focused, which helps insiders align themselves with the rest of the department and helps outsiders understand what to expect.

In addition to a line dedicated to teaching, the department has three research lines:

1. Health Data Science
2. Observational Data Analysis
3. Biomedical Imaging

The organizational structure seems appropriate to the mission, with one group building on infrastructure and informatics perspectives and the other group being involved in actually using this infrastructure. The two groups inform and strengthen each other.

Between 2013 and 2018, total funding has somewhat declined (2018 is 66% of 2013), but this can be explained by the Imaging Centre moving to a clinical department. Direct funding has remained stable at 15%, but is the lowest in percentages for all four departments in this theme. Although the department is very successful in acquiring external grants and contract research, this low amount of direct funding shows that the dependence on grants and contract funding entails risks and vulnerabilities.

The department is collaborating with other departments in the theme, with the Epidemiology and General Practice Departments there are joint PhD students, which seems an excellent way to boost collaborations. Also, there are collaborations with other Erasmus MC departments, including Radiology and Pediatrics. There are also multidisciplinary collaborations on topics such as pharmacology and therapeutics, allergic diseases, quantitative imaging etc. Regional collaborations include the universities in Delft and Leiden in biomedical imaging and observational research. National collaboration is strong on drug safety. International collaborations are very strong through projects like EU-ADR, EMIF, OHDSI, EHDEN and EU2P. The department has been unusually effective in initiating and leading important informatics-related initiatives.

The culture in the department was described as open and collaborative, with a lot of complementarity between the research lines. Also in grant application collaborations are considered effective. The input of the central Erasmus MC research development office is valued with respect to grant opportunities and collaborative applications. The committee is of the opinion that this smaller department consists of a cohesive group of researchers.

A third of the Medical Informatics Department's senior research staff are female. The department has a strong international representation.

## Research quality

This is a world-famous Medical Informatics Department with a history of contributions in areas like signal processing and with recent extremely important contributions in observational research and biomedical imaging. The research mission and objectives are well focused in this small and highly cohesive department with a strong influence around the world. Its current core competencies lie in observational data, interoperability, and analytic pipelines. Its philosophy is to take on leadership roles in a limited number of very highly influential projects, with its EMA (European Medicines Agency) role and EHDEN (European Health Data Evidence Network) being two current examples.

The work in observational research is at the forefront of large-scale causal inference and stands to influence medical research in general. Patient-level prediction is being carried out at larger scale with extensive verification. All this is being done as open science with open-source code. The clinical publications based on observational research are highly valued and the department's work in biomedical imaging is well known around the world. The number of publications has remained stable at about 100 per year and approximately

four PhD theses per year, and the MNCS, which ranges from 1.31 to 1.48, is well above average and commensurate with its strong methodology focus.

The department has a reputation of producing demonstrable products with signal processing tools in the past, Jerboa for pharmacoepidemiology, and most recently open-source products via the OHDSI network and EHDEN initiative and EHDEN Academy. Its concrete observational data analysis results are highly cited and recognized by the EMA, with successes in diabetes, arrythmias, vaccines, COPD, and asthma. Its work in biomedical imaging is also highly cited and recognized around the world, with work in imaging biomarkers, imaging genetics, ultrasound tracking, and machine learning for imaging.

## Relevance to society

The department's work is highly relevant to society, both methodologically by advancing the field, and practically by supplying concrete biomedical results (e.g., observational data analyses) and PASS studies for the EMA. As patient-level prediction matures, more direct benefit to patients may be realized.

The department conducts post-authorization drug safety studies in coordination and collaboration with the EMA, now in Amsterdam, producing very high societal relevance. The department is coordinating the European effort to create a federated network that uses the common data model (EHDEN). These drug safety studies are important to establish the risk-benefit profile of drugs.

Collaborations within Erasmus MC include the Radiology, Pediatrics, Epidemiology, and General Practice Departments, as well as multidisciplinary collaborations such as pharmacology and therapeutics, allergic diseases, quantitative imaging, etc. Regional collaborations include the universities in Delft and Leiden in biomedical imaging and observational research, nationally in drug safety. International collaborations are very strong through projects like EU-ADR, EMIF, OHDSI, EHDEN, and EU2P. The department has been unusually effective in initiating and leading important informatics-related initiatives.

These initiatives and collaborations have led to concrete products. The EU-ADR project lived on as an Alliance with extensive use by the EMA. The OHDSI patient-level prediction library is used by OHDSI researchers. The IPCI is well-used in research. The Quantib spinoff of the biomedical imaging group provides a well-used platform and won a 2017 prize for data science startups.

The department serves society well, in contributions to outside informatics researchers, contributions to clinical researchers, and contributions to care providers.

## Viability

This long-standing and well-known Medical Informatics Department appears very much viable. The department has done unusually well initiating and leading international efforts and earning large grants to fund the activities, which provide robustness in the coming years, but this may be offset by reductions in medical center core funding.

The challenges to viability relate to the departure of the imaging group to another department, which reduced the size of the department, and the difficulty re-expanding in new areas due to fierce competition in the area of informatics and data science for junior faculty and postdocs who might become faculty members. This latter issue is not unique to this department, but a world-wide challenge in the discipline. The committee recommends the department to develop a strategy to become more attractive for talented researchers and consider incentives other than high salaries that can be used to compete with industry.

The questions of challenges to viability due to internal competition in data science and due to privacy issues related to the clinical databases were addressed during the sessions. The investigators have adapted cleverly to the GDPR restrictions, which nonetheless seem onerous for university-based research. Collaboration seems strong, and it was reported that the GDPR concerns may have a solution as databases like IPCI may be considered a common good.

## PhD training and supervision

The Medical Informatics Department has a strong PhD program with about four PhD graduates per year. The quality of PhD research is facilitated by having two senior supervisors for each PhD student

and by having an agreed upon PhD training and supervision plan that is regularly updated. The Department also teaches medical students at Erasmus MC, with a focus on interpreting the literature to current practice. It teaches in various venues including on informatics and data science with Delft and Leiden, the new virtual EHDEN Academy related to OHDSI and OMOP, and pharmacovigilance with industry.

## Conclusion

The Medical Informatics Department's well-focused research agenda has served it well. Its influence extends beyond Erasmus MC to Europe and the world, and it generates important evidence that is put to real-world use. It has been very strategic in selecting high-impact projects. The research staff and students report express great satisfaction in the department, which is open and collaborative. The departure of the imaging group led to a shrinkage of the department, but the remainder is financially strong with outside funding. The department's single biggest challenge is finding qualified research staff, but this is a problem common to informatics departments around the world. The department collaborates with other departments inside the theme and around the medical center, but the committee still wonders if the medical center is optimally exploiting the department's strengths in areas like data, interoperability, and analytics.

# VI. General Practice

| | |
|---|---|
| Research quality | Excellent (1) |
| Relevance to society | Excellent (1) |
| Viability | Very Good (2) |

## Strategy and targets

The mission of the General Practice Department is to improve patient care in general practice and intellectual disability medicine by conducting high quality scientific research. This (inter)national successful and innovative research group obtains and disseminates clinically-relevant knowledge on a number of themes.

The department works dedicatedly on its mission with regard to research: to improve patient care in general practice and intellectual disability medicine by conducting high quality scientific research on musculoskeletal disorders in general practice, diseases in children in general practice, and physical and mental health in people with intellectual disabilities. In doing this, the department is not only focusing on research, but also addressing dissemination and ensuring the societal relevance of its research.

Research in the department is organized around two themes:

A. The General Practice theme includes two main research lines, Musculoskeletal Disorders and Diseases in Children.
B. The Intellectual Disability theme includes four research lines, Physical Activity and Fitness, Cardiovascular, Heathy Ageing and Comorbidity.

The governance structure is clear: the Department Head is responsible for both research and education, including the vocational training of GPs. Both research themes have a head, supported by a management team responsible for research strategy, focus and project quality. The committee has seen and heard many signs of an open, supportive culture in the department.

Between 2013 and 2018, funding for FTE from grants and contracts has remained largely stable (2018 is 105% of 2013), but direct funding for FTE from the institution has declined more precipitously (2018 is 85% of 2013). The balance in funding of research grants and contract research is good and stable over the period of evaluation.

In addition to collaborations with all departments within the Health Sciences Theme, there are multiple collaborations with other Erasmus MC Departments, like Orthopedics, Internal Medicine, Radiology, Anesthesiology- Pain Medicine, Neurosurgery. A number of intensive collaborations are observed at regional and national level, both care organizations and academic institutes. Internationally the department collaborates on several themes with a number of research groups from universities in Denmark, US, Australia and Ireland.

The culture in the department is highly collaborative, competition is limited as most project leaders work in somewhat separate fields. Many staff members also work in care organizations and combine practice with research. This adds to the already high workload, but at the same time is considered a valuable combination, ensuring that relevant research is being carried out and knowledge is transferred to practice in an understandable way.

The majority of both PhD candidates and the staff of the Department are female, which reflects current developments in the Netherlands – the majority of both medical students and new GP trainees are female. However, in the top of the Department the gender balance is currently reversed.

## Research quality

The committee has seen and heard ample evidence that the research in the domain of musculoskeletal symptoms and disorders is world leading, taking into account research approach, coherence and quality of scientific output. The academic reputation of this research line, especially the Osteoarthritis (OA) research group, is excellent, reflected in a number of awards, honorary professorships and personal grants. The group regularly publishes in top journals such as the *N Engl J Med*, The *Lancet*, *JAMA,* and *BMJ*. They participated in the Lancet Low Back Pain Series Working Group publishing three influential papers on low back pain in the Lancet in 2018.They have carried out a number of large scale, influential randomized clinical trials evaluating the effectiveness of several treatment modalities for hip and knee osteoarthritis. They also have

established an OA trial bank, enabling the conduct of meta-analysis based on individual patient data. Several members of the group are involved as coauthor in national and international clinical guidelines and they have authored 12 Cochrane reviews and meta-analyses in the domain of MSK Researchers of this group participate in various ACEs of Erasmus MC.

The committee really appreciates that the department also carries out research on symptoms and diseases of children in primary care, they are one of the few groups worldwide who conduct research on this topic, thus really adding to the body of knowledge in this domain. Especially, the department's work on overweight and obesity in children is important, as this is an important and growing health concern, especially in groups with a low socio-economic status.

Intellectual Disability research is a relatively young research discipline. The research line definitely contributes to knowledge about mental and physical health issues in this seldom studied population. Studies carried out in this population pose a number of challenges, which the department is dealing with in an admirable way. The department has developed two instruments to measure health in people with ID, which is an important contribution both to research and to practice. The longitudinal HA-ID study into the Healthy Aging of people with intellectual disabilities is unique in the world and will yield important knowledge for delivering optimal care for people with ID. The committee was very impressed by the scientific output of this line, reflected in the number of completed PhD thesis in this research line: 12 theses in the period of 2013-2018.

The department collaborates with a number of regional and national organizations in various research projects and makes excellent uses of existing cohorts such as The Rotterdam Study, Generation-R and the IPCI-database

## Relevance to society

The committee noticed that the department pays a lot of attention to enhancing their relevance to society and underpins this with a number of excellent activities, products and memberships.

Impressive are the efforts to enhance societal relevance, such as starting *artrose gezond* (healthy osteoarthritis). In order to supply information to people with osteoarthritis, the department organizes workshops and invites patients to participate in focus groups and research, to discuss the relevance and meaning of research findings for patients, and also to discuss relevant research questions and outcomes measures for patients.

The committee also especially likes the efforts to invite GPs and patient advisory panels to discuss potential research questions in order to enhance the clinical and societal relevance of the research. Furthermore, the department has written several manuals and policy documents for professionals. The research contributes to the scientific underpinning of recommendations in guidelines, the department also actively participates in the development of guidelines and also contributes to professional journals, thus disseminating their knowledge.

## Viability

The department’s targets are clear, evidenced by a number of relevant goals and activities. The research lines are firmly established with an abundance of relevant research topics. The collaboration with other departments in the theme is good and still expanding. The department also collaborates with a number of clinical departments and participates in a number of academic centers of excellence (ACEs), such as Bone and Joint ACE, the spine ACE, the healthy weight ACE, the Allergy ACE.

The department has a very good functioning and extensive network of GP practices (PRIMEUR). Recently, the department has established the HA-ID consort with three organizations providing care for people with intellectual disability. The department has a large GP data registry and has access to other databases and cohorts within the Health Sciences Theme. The committee especially appreciates the AIOTHO trajectories, the joint vocational training and PhD trajectory, thus ensuring that future staff is well equipped for academic tasks, while still soundly embedded in practice.

Despite this strong performance, network and activities, there are some concerns. Conducting research in general practices or other care organizations outside the hospital is challenging and time consuming. A permanent infrastructure for this kind of (external) research is lacking. The

committee noticed that funding of the research lines heavily relies on external funding and direct funding has decreased over the years (2012-2018).

## PhD training and supervision

The General Practice Department has as large number of PhD students (approximately 45) compared to the research staff. All PhD students are supervised by a PI and a full professor. The number of AIOTHO's (trajectory that combines GP training with a PhD program is expanding. Many of these AIOTHO's also complete the MSc Clinical Epidemiology training at NIHES.

## Conclusion

The Department of General Practice has an engaging mission and is clearly very well equipped and dedicated to carry out this mission. Reflecting the broad field of general practice, and the relatively young field of intellectual disability medicine, the department has a number of research lines, which are very productive, internationally recognized, and contribute significantly to the knowledge base and to various national and international guidelines for practice. The department collaborates with a number of departments in Erasmus MC and also have strong networks outside the hospital. The department also heavily invests in the interaction with both patients and health care workers in order to ensure that their research addresses urgent and relevant questions, and research findings are discussed and put into perspective. The leadership of the department encourage an open and collaborative culture, supports its PhD students in various ways and fosters their AIOTHOs, who combine a PhD trajectory with their vocational training, thus ensuring that future staff is well equipped for academic tasks and leadership, while still connected with every day practice. The lack of funding for a lasting infrastructure for carrying out research outside the hospital is a point of concern.

# VII. Recommendations

In the relevant chapters the department specific recommendations are provided. Below the committee provides three overall recommendations to the Health Sciences Theme and Erasmus MC.

1. The scientific achievements of all four departments, astonishing in their breadth and depth, have a major impact on the health of the public, in Rotterdam, in the Netherlands, in Europe and in the world. All four departments are doing well and are expected to continue to thrive. But a failure to leverage the strengths of these outstanding research departments would be a first-order missed opportunity. The committee recommends that Erasmus MC invests in the development and continuity of the infrastructure of these departments. The committee also recommends that the Erasmus MC Executive Board enables and stimulates other departments to benefit from the knowledge, expertise and infrastructure of these departments.

2. All four departments in the Health Sciences Theme identified the European GDPR rules as a threat to research efforts. The departments have more or less adapted, though they can receive assistance from Erasmus MC on managing the problem, cannot seek appropriate amendments and exceptions for medical research by themselves. Erasmus MC needs to address this European GDPR problem collectively, together with other Dutch and European Universities.

3. The Rotterdam Study and the Generation R Study are key research facilities that serve many departments, and they provide PhD students with the opportunity to not only participate in data-collection activities but also to use the data for their papers and dissertations. These research resources also deserve strong institutional support.

# Appendices

## Appendix 1: Short CV of committee members

**Henriëtte van der Horst (chair)** is Professor of General Medicine and chairman of Division VI Primary Care, Public Health and Methodology at the Amsterdam UMC. Previously, she was Head of the Department of General Medicine and Elderly Medicine at VUmc. In 2017 she chaired the annual NHG Congress. She also served as chairman of various national committees and working groups, including two ZonMw program committees and the committee on the review of GP core values and core tasks. For a long time she has been involved in the Academic Network of General Practice, coordinating research projects and training GPs. Van der Horst studied medicine at the VU, and also did her the vocational training for general practice at the VU. After working part-time as a GP, she started teaching at the Department of General Practice of the VU In 1985. In 1997 van der Horst received her PhD with a thesis on the effectiveness of patient education and counselling for patients with irritable bowel syndrome in general practice. Her research specialties are research into medically unexplained physical symptoms and care for patients with unexplained symptoms.

**Stefania Boccia** is full professor of Hygiene and Public Health at the Università Cattolica del Sacro Cuore (UCSC) in Rome. She is the Director of the Section of Hygiene of the Department of Public Health of UCSC) and President of the Public Health Epidemiology Section of the European Public Health Association (EUPHA) where she also served as Vice President of the Public Health Genomics section until 2018. From 2016 -to 2018 she was Adjunct Professor at the Mount Sinai Medical School, New York. In 2018 she founded the spin-off "Vihtali srl" (Value In Health Technology and Academy for Leadership & Innovation) in UCSC. She coordinates the project titled "European network staff eXchange for integrAting precision health in the health Care sysTems" (ExACT) funded by the EC within the H2020 Marie-Slodowska Curie projects (MSCA-RISE). She is partner of a number of projects funded by the EC. She coordinated the "Personalized PREvention of Chronic Diseases" project (PRECeDI, EU-H2020 MSCA- RISE), and she was partner of "Cancer Control in Europe" (CANCON, JA DG SANCO), ERAWEB I and II (Erasmus Mundus, FP7), the "Determinants of Diet and Physical activity project" (DEDIPAC, JPI); and the "Public Health Genomics European Network" (PHGEN I and II, DG Sanco, FP6 and FP7).

**Jane Frölund Thomsen, MD, PhD** Is head of the Department of Occupational and Environmental Medicine at the University of Copenhagen. Frölund Thomsen Is appointed by the National Board of Health to the committee of industrial injuries. As part of her clinical practice she makes specialist reports on patients with claims regarding occupational injuries. The main areas of her research interests are musculoskeletal disorders, mainly upper limb disorders; measurements of biomechanical exposure; job exposure matrices; psychosocial conditions at work and mental health; mercury exposure in small-scale gold mining. In the Sharm-project (Shoulder, arm, hand-project), exposure-response relationships are established between biomechanical exposure such as repetition and exertion of force and upper limb disorders (eg. carpal tunnel syndrome, impingement of the shoulder), with a focus on sex differences. She also does research in psychosocial work factors as risk factors for mental disease (e.g. depression) through a multicenter project, the PRISME project. Here, a large group of civil servants were examined in 2007 and again in 2009 and the prevalence and incidence of depression were determined. The associations between different psychosocial factors and the occurrence of depression, exhaustion and perceived stress have been examined as well as the role of cortisol. Frölund Thomsen is involved in several intervention projects in the Philippines, Uganda and Mozambique where a mercury-free gold extraction method is introduced as an effective alternative to the traditional method where large amounts of mercury are used with serious health consequences for workers and also residents because of environmental pollution.

**George Hripcsak, MD, MS**, is Vivian Beaumont Allen Professor and Chair of Columbia University's Department of Biomedical Informatics and Director of Medical Informatics Services for New York-Presbyterian Hospital/Columbia Campus. He is a board-certified internist with degrees in chemistry, medicine, and biostatistics. Dr. Hripcsak's current research focus is on the clinical information stored in electronic health records and on the development of next-generation health record systems. Using nonlinear time series analysis, machine learning, knowledge engineering, and natural language processing, he is developing the

methods necessary to support clinical research and patient safety initiatives. He co-chaired the Meaningful Use Workgroup of U.S. Department of Health and Human Services' Office of the National Coordinator of Health Information Technology. He led the effort to create the Arden Syntax, a language for representing health knowledge that has become a national standard. Dr. Hripcsak is a fellow of the National Academy of Medicine, the American College of Medical Informatics, and the New York Academy of Medicine, and he chaired the U.S. National Library of Medicine's Biomedical Library and Informatics Review Committee. Dr. Hripcsak serves as PI–with co-PI David Madigan–of OHDSI's Coordinating Center, which is based at Columbia University. His recent pharmacovigilance research has included medication-wide association studies, treatment pathways, large-scale observational studies, and next-generation phenotyping to better exploit electronic health record data for observational research.

**Bruce M. Psaty, M.D., Ph.D., M.P.H.**, is Professor of Medicine, Epidemiology, and Health Services and Co-director of the Cardiovascular Health Research Unit at the University of Washington, Seattle, WA USA. Dr. Psaty earned his M.D. and Ph.D. from Indiana University and his M.P.H. from the University of Washington. His research interests include cardiovascular epidemiology, epidemiological methods, myocardial infarction, stroke, hypertension, diabetes, drug safety, pharmacoepidemiology, genetics, genomics, and pharmacogenetics. Dr Psaty is the principal investigator on several large epidemiologic studies and has had major roles as a cardiovascular disease epidemiologist at the coordinating centers of NIH-funded multi-center studies, including the Cardiovascular Health Study, the Multi-Ethnic Study of Atherosclerosis, and the Trans-Omics for Precision Medicine Program. Elected memberships include American Epidemiological Society, Association of American Physicians, the Institute of Medicine, now the National Academy of Medicine, and fellow of the American Heart Association. He was selected to give the 2018 Distinguished Alumnus lecture by the University of Washington School of Public Health. In 2013, the American Heart Association designated Dr Psaty a Distinguished Scientist. Dr. Psaty is also a member of the Board of External Experts of the National Heart, Lung, and Blood Institute.

**Ann G. Zauber, Ph.D.** is a Member and Attending (equivalent to tenured Professor) in the Department of Epidemiology and Biostatistics at Memorial Sloan Kettering Cancer Center. She earned her Ph.D. in Biostatistics from Johns Hopkins University and had a Post-Doctoral Fellowship in Epidemiology at the University of Pittsburgh. Dr**.** Zauber's primary research focus is identifying and assessing ways to prevent and reduce the burden of colorectal cancer incidence and mortality, specifically through screening and surveillance. Her work involves population-based statistical modeling and precision medicine to identify effective and cost-effective screening strategies in order to better inform health policy and randomized clinical trials. Dr. Zauber leads the Cancer Intervention and Surveillance Modeling Network (CISNET) colorectal group, a multi-center group of microsimulation modelers sponsored by the National Cancer Institute. Dr. Zauber and her CISNET team have worked closely with Centers for Medicare and Medicaid Services Centers for Disease Control and Prevention on colorectal cancer screening and prevention, and the cost-effectiveness of available and novel screening tests in average and genetically predisposed (high risk) populations. Her CISNET team also has provided decision analyses to the United States Preventive Services Task Force and the American Cancer Society on age to begin, age to end, and intervals of rescreening for colorectal cancer. Dr. Zauber is also a leader in screening studies. She was the Principal Investigator for the National Colonoscopy Study, a multi-center randomized controlled trial for screening colonoscopy and fecal occult blood test, and a co-Principal Investigator on the NCI PROSPR I consortium. She demonstrated in the National Polyp Study that removal of adenomas, the precursor lesion of colorectal cancer, reduces both incidence and mortality of colorectal cancer.(Finalist ,Research Paper of the Year, British Medical Journal, 2013) She served on the advisory panel for the colorectal cancer screening recommendations for the International Agency for Cancer Research. Additionally, Dr. Zauber continues to serve as lead biostatistician on many national and international studies including, the Nordic-European Initiative on Colorectal Cancer, and a pilot study on screening in Nigeria. She is a member of the PanCAN Early Detection Initiative Data Safety Monitoring Board. She is a Fellow of the American Statistical Association and of the American Gastroenterology Association (AGA) . She was the recipient of the Research Service

Award (AGA) and the Distinguished Leadership Award (National Colorectal Cancer Roundtable).

## Appendix 2. Quantitative data on the departmental composition and financing

### Epidemiology Department

Composition of the department

| | 2013 | | 2014 | | 2015 | | 2016 | | 2017 | | 2018 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | # | FTE | # | FTE | # | FTE | # | FTE | # | FTE | # | FTE |
| Scientific staff | 70 | 58,67 | 64 | 53,77 | 65 | 52,84 | 69 | 44,2 | 63 | 40,77 | 74 | 45 |
| Support staff | 8 | 6,45 | 8 | 5,87 | 8 | 5,57 | 7 | 5,53 | 7 | 5,48 | 8 | 6,04 |
| **Total staff** | **78** | **65,12** | **72** | **59,64** | **73** | **58,41** | **76** | **49,73** | **70** | **46,25** | **82** | **51,04** |

Financing of the department

| | 2013 | | 2014 | | 2015 | | 2016 | | 2017 | | 2018 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | FTE | % | FTE | % | FTE | % | FTE | % | FTE | % | FTE | % |
| Direct funding | 22,91 | 35% | 15,42 | 26% | 12,23 | 21% | 12,72 | 26% | 14,53 | 31% | 15,35 | 30% |
| Research grants | 15,78 | 24% | 17,89 | 30% | 14,92 | 26% | 12,03 | 24% | 9,27 | 20% | 11,13 | 22% |
| Contract research | 26,43 | 41% | 26,32 | 44% | 31,27 | 54% | 24,97 | 50% | 22,45 | 49% | 24,56 | 48% |
| Other | - | 0% | - | 0% | - | 0% | - | 0% | - | 0% | - | 0% |
| **Total funding** | **65,12** | | **59,64** | | **58,41** | | **49,73** | | **46,25** | | **51,04** | |

### Public Health Department

Composition of the department

| | 2013 | | 2014 | | 2015 | | 2016 | | 2017 | | 2018 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | # | FTE | # | FTE | # | FTE | # | FTE | # | FTE | # | FTE |
| Scientific staff | 138,26 | 110,61 | 137,40 | 109,92 | 115,06 | 92,05 | 116,75 | 93,40 | 126,24 | 100,99 | 134,19 | 107,35 |
| Support staff | 38,94 | 31,16 | 27,31 | 21,85 | 23,52 | 18,82 | 16,56 | 13,25 | 18,51 | 14,81 | 26,81 | 20,90 |
| **Total staff** | | | | | | | | | | | | |

Financing of the department

| | 2013 | | 2014 | | 2015 | | 2016 | | 2017 | | 2018 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | FTE | % | FTE | % | FTE | % | FTE | % | FTE | % | FTE | % |
| Direct funding | 75,43 | 53% | 63,52 | 48% | 50,94 | 46% | 31,73 | 30% | 26,39 | 23% | 37,68 | 29% |
| Research grants | 40,00 | 28% | 28,40 | 22% | 19,15 | 17% | 24,21 | 23% | 26,58 | 23% | 18,64 | 15% |
| Contract research | 26,34 | 19% | 38,30 | 29% | 39,38 | 36% | 50,72 | 48% | 62,83 | 54% | 71,76 | 56% |
| Other | - | | 1,55 | 1% | 1,40 | 1% | - | 0% | - | 0% | 0,17 | 0% |
| **Total funding** | **141,77** | | **131,77** | | **110,87** | | **106,65** | | **115,80** | | **128,25** | |

### Medical Informatics Department

Composition of the department

| | 2013 | | 2014 | | 2015 | | 2016 | | 2017 | | 2018 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | # | FTE | # | FTE | # | FTE | # | FTE | # | FTE | # | FTE |
| Scientific staff | 73,00 | 41,67 | 68,00 | 40,79 | 77,00 | 39,28 | 77,00 | 36,57 | 62,00 | 28,85 | 54,00 | 26,78 |
| support staff | 21,00 | 12,46 | 24,00 | 14,63 | 26,00 | 11,88 | 20,00 | 11,73 | 23,00 | 10,29 | 26,00 | 8,82 |
| **Total staff** | **94,00** | **54,13** | **92,00** | **55,41** | **103,00** | **51,15** | **97,00** | **48,30** | **85,00** | **39,14** | **80,00** | **35,60** |

Financing of the department

| | 2013 | | 2014 | | 2015 | | 2016 | | 2017 | | 2018 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | FTE | % | FTE | % | FTE | % | FTE | % | FTE | % | FTE | % |
| Direct funding | 5,05 | 9% | 5,86 | 11% | 5,08 | 10% | 5,71 | 12% | 5,40 | 14% | 5,19 | 15% |
| Research grants | 16,21 | 30% | 15,37 | 28% | 14,09 | 28% | 12,71 | 26% | 9,57 | 24% | 8,17 | 23% |
| Contract research | 32,87 | 61% | 34,18 | 62% | 31,98 | 63% | 29,88 | 62% | 24,17 | 62% | 22,24 | 62% |
| Other | – | 0% | – | 0% | – | 0% | – | 0% | – | 0% | – | 0% |
| **Total funding** | **54,13** | | **55,41** | | **51,15** | | **48,00** | | **39,14** | | **35,60** | |

**General Practice Department**

Composition of the department

| | 2013 | | 2014 | | 2015 | | 2016 | | 2017 | | 2018 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | # | FTE | # | FTE | # | FTE | # | FTE | # | FTE | # | FTE |
| Scientific staff | 24,00 | 15,01 | 28,00 | 15,14 | 27,00 | 14,54 | 25,00 | 14,26 | 29,00 | 17,19 | 34,00 | 18,75 |
| Support staff | 11,00 | 6,42 | 9,00 | 5,57 | 7,00 | 4,64 | 5,00 | 3,36 | 8,00 | 3,59 | 10,00 | 3,91 |
| **Total R&E staff** | **35,00** | **21,43** | **37,00** | **20,71** | **34,00** | **19,18** | **30,00** | **17,61** | **37,00** | **20,77** | **44,00** | **22,66** |

Financing of the department

| | 2013 | | 2014 | | 2015 | | 2016 | | 2017 | | 2018 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | FTE | % | FTE | % | FTE | % | FTE | % | FTE | % | FTE | % |
| Direct funding | 9,67 | 45% | 9,36 | 45% | 7,61 | 40% | 4,37 | 25% | 5,34 | 26% | 8,29 | 37% |
| Research grants | 2,96 | 14% | 3,95 | 19% | 4,65 | 24% | 7,14 | 41% | 6,75 | 33% | 6,57 | 29% |
| Contract research | 8,80 | 41% | 7,40 | 36% | 6,92 | 36% | 6,10 | 35% | 8,56 | 41% | 7,80 | 34% |
| Other | - | 0% | - | 0% | - | 0% | - | 0% | 0,11 | 0% | - | 0% |
| **Total funding** | **21,43** | | **20,71** | | **19,18** | | **17,61** | | **20,77** | | **22,66** | |

## Appendix 3: Schedule of the site visit

**Monday 26th October**

| Time | Topic |
|---|---|
| 14.00-14.30 | Welcome & general introduction by the Dean (Dean, Theme Board members and Committee) |
| 14.30-14.45 | Introduction and preparation **Epidemiology** |
| 14.45-15.00 | Committee members: break |
| 15.00-16.00 | **Department of Epidemiology session 1**<br>Management/Leading staff |
| 16.00-16.15 | Debriefing first session Epidemiology |
| 16.15-16.45 | Committee members: break |
| 16.45-17.45 | **Department of Epidemiology session 2**<br>Academic staff |
| 17.45-18.00 | Debriefing second session Epidemiology |
| 18.00-18.30 | Feedback with committee members and discuss concept report Epidemiology |
| 18.30-19.35 | Break committee members |
| 19.30-19.35 | General introduction of online speed date session by Meg |
| 19.35-20.00 | Speed date round 1 |
| 20.00-20.25 | Speed date round 2 |
| 20.25-21.00 | General session PhD-students and committee members |
| 21.00-21.15 | Debriefing session PhD-students by committee members |
| 21.15-21.45 | Debriefing/discussion day 1 |
| 21:45 | End of day 1 |

**Tuesday 27th October 2020**

| Time | Topic |
|---|---|
| 14.15-14.30 | Introduction and preparation **Public Health** |
| 14.30-15.30 | **Department of Public Health (1)**<br>Management/Leading staff |
| 15.30-15.45 | Debriefing first session Public Health |
| 15.45-16.00 | Committee members: break |
| 16.00-17.00 | **Department of Public Health (2)**<br>Academic staff |
| 17.00-17.15 | Debriefing second session Public Health |
| 17.15-17.45 | Feedback with committee members and discuss concept report Public Health |
| 17.45-18.30 | Break committee members |
| 18.30-18.45 | Introduction and preparation **Medical Informatics** |
| 18.45-19.45 | **Department of Medical Informatics (1)**<br>Management/Leading staff |
| 19.45-20.00 | Debriefing first session Medical Informatics |
| 20.00-20.15 | Committee members: break |
| 20.15-21.15 | **Department of Medical Informatics session 2**<br>Academic staff |
| 21.15-21.30 | Debriefing second session Medical Informatics |
| 21.30-22.00 | Feedback with committee members and discuss concept report Medical Informatics |
| 22.00-22.30 | Debriefing/discussion day 2 and end of day 2 |

**Wednesday 28th October 2020**

| Time | Topic |
|---|---|
| 14.15-14.30 | Introduction and preparation **General Practice** |
| 14.30-15.30 | **Department of General Practice (1)**<br>Management/Leading staff |
| 15.30-15.45 | Debriefing first session Family Practice |
| 15.45-16.00 | Committee members: break |
| 16.00-17.00 | **Department of General Practice (2)**<br>Academic staff |
| 17.00-17.15 | Debriefing second session Family Practice |
| 17.15-17.45 | Feedback with committee members and discuss concept report Family Practice |
| 17.45-18.45 | Break committee members |
| 18.45-19.45 | Preparation for giving general feedback |
| 19.45-20.30 | Feedback session Heads of department and committee |
| 20.30-20.45 | Time for questions by Heads of department |
| 20.45-21.15 | Final appointments/conclusion of site-visits |
| 21:15 | End of site visit |

## Appendix 4: SEP Assessment Scale

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