

ONDERZOEKERIJ

Research Master Clinical Research
Erasmus University Rotterdam
Report of the limited programme assessment

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Executive summary

The outcome of the external assessment of the research master's programme Clinical Research (CR) of Erasmus University Rotterdam (EUR) by an NVAO approved panel is positive.

The two-year full-time programme aims to train students to become excellent clinical investigators with an above-average level of epidemiological knowledge. The panel values the combination of gaining sound methodological knowledge and the opportunity to acquire hands-on research experience within clinical practice. These courses are offered by NIHES, an internationally renowned centre for quantitative health research. Given the large overlap with the other research master's programme offered by NIHES (Health Sciences), the panel encourages the management to explore the possibility of a merger of the two research master's programmes Clinical Research and Health Sciences.

The panel established that the curriculum is in a transitional phase. From September 2021 onwards, a revised curriculum was initiated. The panel considers both the old and the new curriculum to be an appropriate reflection of the intended learning outcomes of the programme, comprising theoretical and methodological knowledge and skills as well as academic and research skills. The panel welcomes the structural use of online learning activities that facilitate interactive in-class sessions and self-paced learning. The panel is positive about the opportunity for students to choose from many electives to tailor the programme to their specific interests and needs. However, the high number of short electives also brings the risk of fragmentation. The panel advises the programme to monitor closely how students of the current cohort perceive this.

The panel is convinced of the research-oriented focus of the programme. The curriculum provides students ample opportunities to develop research skills in their specific area of interest. The panel advises encouraging students to do part of their study abroad. The main component of the curriculum concerns the research project (67 EC previous curriculum, 65.8 EC current curriculum). CR students do their research project in one of the clinical research departments of Erasmus MC. The panel values the guidance by both an advisor and a supervisor. The advisor is a member of Clinical Research Advisory Board and helps the student to find a research project and a supervisor. The supervisor provides the actual supervision during the research project and assesses the student, whereas the advisor provides more general guidance by using their own clinical research network. The panel noted that there are differences in the availability and commitment of the advisors. Given the crucial role the advisors play in the guidance of the students, the panel encourages the management to further professionalise the role of the advisor in the programme.

The panel thinks highly of the staff members, who are acknowledged scientists in their field. During the visit, the panel met very competent and enthusiastic staff members. The study guidance in general appears to be sufficiently well-organised.

The assessment system of the programme is clearly also in a transitional phase, and a lot of work remains to be done. The panel is pleased with the intention of the programme to balance the number of written exams and to increase the number of assignments. The panel also endorses the implementation of rubrics and encourages the programme to introduce clear assessment criteria and make those criteria transparent to students and tutors. The panel is also positive that most assessments will be graded pass/fail. However, the panel also noted that the programme needs to further elaborate the assessment system and make better use of the learning benefits of formative assessment methods.

The Chamber Research Masters of the Examination Board Erasmus MC (CRMEB) is responsible for the examination and assessment quality of the programme. The panel urges the CRMEB to continue its



efforts in monitoring the quality of assessments, not only of the courses but especially of the master's theses.

Point of attention is that not all students are aware of the requirements to become registered as Epidemiologist A by the *Vereniging voor Epidemiologie*. The panel advises to communicate these requirements right at the start of the programme.

The theses are the result of empirical studies, have a clear academic style, a proper methodical section, and a critical discussion of results. The panel considered the masters theses to be of good quality and the panel has the impression that graduates achieve the intended learning outcomes of the programme. The panel is positive about the career chances of the graduates of the programme, most working as a clinical scientist in which they need the scientific knowledge and analytical skills acquired in the research master's programme.

The chair and the secretary of the panel hereby declare that all panel members have studied this report and that they agree with the judgements laid down in the report. They confirm that the assessment has been conducted in accordance with the demands relating to independence.

Date: 18 January 2022

Frans Ramaekers
(chair)

Esther Poort
(secretary)



1. Introduction

1.1 Administrative data

Name of the programme:	M Clinical Research (research)
CROHO number:	60312
Level of the programme:	Master of Science
Orientation of the programme:	Academic
Study load:	120 EC
Location:	Rotterdam
Variant:	Full-time
Submission deadline:	1 May 2022

1.2 Introduction

This report focuses on the assessment of the research master's programme Clinical Research. This assessment forms part of a cluster assessment of six research master's programmes at three universities. The cluster was divided into two subclusters, each consisting of three programmes: a health cluster and a molecular cluster. Appendix A provides an overview of the six participating research master's programmes and the composition of the total panel.

The assessment is based on the standards and criteria described in the NVAO Assessment Framework for the Higher Education Accreditation system of the Netherlands 2018 (limited framework). Research master's programmes must meet a number of additional criteria as described by the NVAO (specification of additional criteria for research master's programmes, 2016).

1.3 Panel composition

In total, seven panel members participated in this cluster assessment. Three panel members participated in all assessments (the core panel). In addition, each cluster subpanel included two extra panel members (see Appendix A). The panel that assessed this research master's programme consisted of the following members:

- Prof. Frans Ramaekers (chair), professor emeritus Molecular Cell Biology, Maastricht University;
- Dr. Jolanda van der Zee, associate professor in Education of Biomedical Science and Medicine, Leiden University;
- Prof. Marieke van der Schaaf, professor of Research and Development of Health Professions Education, University Medical Center Utrecht;
- Prof. Monique Breteler, Director of Population Health Sciences, German Center for Neurodegenerative Diseases (DZNE), professor of Population Health Sciences, University of Bonn, Germany;



- Lotte Klein BSc (student member), student M Clinical and Psychosocial Epidemiology (research), University of Groningen.

The panel was supported by drs. Esther Poort, who acted as secretary.

All panel members and the secretary have signed a declaration of independence and confidentiality. In this declaration they affirm not to have had any business or personal ties with the programme in question for at least five years prior to the review.

The NVAO approved the composition of the panel on 25 May 2021.

1.4 Working method

Preparation

On 28 June 2021, the panel of the entire cluster held a general online kick off meeting. In this meeting, the panel received an introduction to the assessment framework and discussed the working methods in preparation to and during the site visits.

The programme drew up a self-evaluation report describing the programme's strengths and weaknesses. This self-evaluation report included a chapter in which the students reflected on the programme. The panel members prepared the assessment by analysing the self-evaluation report and the appendices provided by the institution. The panel also studied a selection of fifteen master's theses and the accompanying assessment forms from the programme. The theses selection was made by the panel's secretary based on a provided list of at least thirty theses of the most recent years. In the selection, consideration was given to a variation in assessments (grades) and topics.

The panel members individually formulated their preliminary findings and a number of questions they wanted to raise during the site visit. The secretary made an overview of these preliminary findings and questions and sent it to the panel members as a starting point for the preparation of the panel during the site visit.

Visit

The online site visit took place on 27 October 2021 (see Appendix B for the schedule). During the preparatory meeting, the panel discussed the preliminary findings and decided which questions to raise in their meetings with the programme representatives. During the visit, the panel spoke with representatives of the management, students, lecturers, alumni, and Examination Board. Everybody involved in the programme had the opportunity to inform the panel in confidence about matters they consider important to the assessment. No one made use of this opportunity. The panel used the last part of the visit to evaluate the interviews and had a second meeting with the programme's management to receive answers to any remaining questions. At the end of the visit, the chair presented the panel's preliminary findings and impressions of the programme.



Report

The secretary drew up a draft report based on the panel's findings. This draft report was presented to the members of the panel and adjusted on the basis of their feedback. After adjustments, the draft report was sent to the institution for verification of factual inaccuracies. The secretary discussed the programme's comments with the chair, after which the secretary drew up the final report and circulated it to the panel for a final round of comments.

The report follows the four standards of the NVAO's Assessment Framework 2018 (limited framework): 1) the intended learning outcomes, 2) the teaching-learning environment, 3) assessment, and 4) achieved learning outcomes. Regarding each of the standards, the assessment panel gave a substantiated judgement on a three-point scale: meets, does not meet, or partially meets the standard. The panel subsequently gave a substantiated final conclusion regarding the quality of the programme, also on a three-point scale: positive, conditionally positive, or negative.

Development dialogue

Although clearly separated from the process of the programme assessment, the assessment panel members and programme representatives will conduct a development dialogue in early 2022, with the objective of discussing future developments of the programme in light of the outcomes of the assessment report.



2. Review

2.1 Intended learning outcomes

The intended learning outcomes tie in with the level and orientation of the programme; they are geared to the expectations of the professional field, the discipline, and international requirements.

Findings, analysis, and considerations

The research master's programme Clinical research (CR) at Erasmus Medical Centre (Erasmus MC) is one of three master's programmes offered by the Netherlands Institute for Health Sciences (NIHES). NIHES provides graduate and postgraduate education in medicine and health sciences. Other NIHES master's programmes are the research master's programme Health Sciences (HS 120 EC) and the master's programme in Health Sciences (70 EC). The panel also assessed the research master's programme HS. The department of Epidemiology and Public Health provides the lecturers, while all clinical departments host students for their research projects.

CR envisions training students to become excellent clinical investigators with an above-average level of epidemiological knowledge. The panel applauds this intention of the programme to contribute to the education of clinical scientists. The programme provides courses on quantitative health research methodologies with a strong focus on study design, methodology and biostatistics relevant for patient-based research. These courses are offered by NIHES, an internationally well renowned centre for quantitative health research. In addition, the programme guides students to bring this epidemiological knowledge into practice by conducting research in one of the departments of Erasmus MC. The programme clearly leverages on its setting in which it is embedded in this large academic centre with a broad range of patient-centred research topics. The panel appreciates this combination of gaining sound methodological knowledge and the opportunity to acquire hands on research experience within clinical practice.

CR formulated intended learning outcomes in line with the Dublin descriptors. The panel verified the relationship between the intended learning outcomes and the Dublin descriptors. It observed that all Dublin descriptors are evident in the intended learning outcomes. The panel is of the opinion that the intended learning outcomes are conventional, focusing on the knowledge and skills of a researcher in quantitative methods and culminating in written work. According to the panel this corresponds with general, internationally accepted descriptions of a master's programme with an academic research orientation. Moreover, the research-oriented nature of this research master's programme has been clearly substantiated in the intended learning outcomes. However, the panel is of the opinion that the intended learning outcomes should be regularly evaluated on being sufficiently future oriented. To be more future oriented, the panel advises integrating students' personal and professional development in its intended learning outcomes. According to the panel, these learning outcomes should reflect the preparation of students for the complex, rapidly changing context. This underlines a need for more attention in the curriculum to the social impact of research and to changing visions on research, such as open science.

The panel also assessed the research master's programme Health Sciences (HS). Reading the self-evaluation reports of both HS and CR, the panel noted that these research master's programmes are to a large extent the same. Both programmes have almost the same learning outcomes, the same curriculum, and the same teaching staff. The main difference between the two programmes concerns



the (choice of the) research project and the research supervision. Students also reported in the student chapter that the differences between the two programmes are not entirely clear. During the site visit, the management indicated that it has been regularly discussed whether it would be desirable to merge the two research master's programmes offered by NIHES. The panel is in favour of such a merger and encourages NIHES management to seriously explore this possibility. If the outcome of this exploration is that merging the programmes will not result in a more efficient and improved programme, the panel recommends that the distinction between the two programmes be made clearer. The distinction should also be reflected in a clearer distinction of the intended learning outcomes of the two research master's programmes.

Conclusion

The intended learning outcomes are well described in terms of level and orientation and reflect the research orientated nature of the research master's programme. The programme therefore meets standard 1.

2.2 Teaching-learning environment

The curriculum, the teaching-learning environment and the quality of the teaching staff enable the incoming students to achieve the intended learning outcomes.

Findings, analysis, and considerations

Curriculum

The research master's programme CR is a two-year full-time programme of 120 EC, divided into four semesters. Until 2020/2021, the programme consisted of common core courses, elective courses, and a research project. A complete outline of the curriculum can be found in Appendix E, figure 1.

The panel considers the curriculum to be an appropriate reflection of the intended learning outcomes of the programme, comprising theoretical and methodological knowledge and skills as well as academic and research skills. Both in the student chapter and during the interview, students indicated that they are satisfied with the programme that provides them an up-to-date high-quality training in research knowledge and skills.

Until 2020/2021, the first semester started with three weeks of introductory courses that are part of the Erasmus Summer Programme (ESP), focussing on the principles and methods of applied quantitative research in medicine and health care. After the ESP, all students followed common core courses on study design and biostatistics, and courses on Clinical Epidemiology, Clinical Translation of Epidemiology, and Principles in Causal Inference. In the second semester students started with their research project, guided by their supervisor. During this period, students also followed several electives. In the third and fourth semester students spent most of their time on their research project. During the fourth semester students also followed core courses on Pharmaco-Epidemiology, Advanced Clinical Trials and Advanced Analysis of Prognosis Studies, as well as additional elective courses and seminars.

During the second and fourth semester, students followed electives on quantitative medical and health research offered by ESP. In addition, students chose electives based on their interests and professional needs. These can also be external electives (in- or outside Erasmus MC Master programmes). The



Examination Board, the advisor, and supervisor need to approve the level and content of these external elective courses.

During the entire programme, students also follow compulsory courses on Lifelong Learning Skills (LLS), consisting of one-day modules focusing on scientific integrity and intercultural communication, and a series of peer-to-peer support group meetings. Next to these LLS compulsory courses, students choose some LLS electives, including electives on leadership and teamwork, presentation skills and networking skills. In addition, students are required to attend 12 research seminars per year. Visiting conference meetings also counts towards the number of research seminars. Students maintain a Personal Education Programme (PEP), in which they plan their programme, register meetings with advisor and supervisor, and register the attended seminars.

From September 2021 onwards, a revised curriculum has started (see also Appendix E, figure 2). An important change in the revised programme is a core curriculum in the first semester that is the same for both CR students and HS students. All other courses, including the CR core courses in the fourth semester of the previous curriculum, have become electives, and are scheduled in the second and fourth semester and second ESP.

The panel studied the new and the old curriculum and is convinced that it covers many topics and competences without becoming superficial. The panel is in general positive about the coherence and structure of the curriculum. It considers the curriculum as recognisable for students with a common foundation, and a gradual build-up in core curriculum and a series of lifelong learning courses throughout the programme.

A point of attention is the number and programming of the elective courses. The elective courses are short and intensive, often less than one week. Although this offers students the opportunity to choose from many courses to tailor the programme to their specific interests and needs, it also brings a risk of fragmentation. It can also lead to too much dispersion for students when the overarching curriculum is not clear to them. In addition, the timing of the elective courses in the second semester of the second year is not ideal, because it makes these courses not supportive for the research project. The panel advises the programme to monitor closely how students of the current cohort perceive this.

If the management decides that CR will be continued as a separate programme (instead of a merger with HS, see standard 1), the panel advises to strengthen the profile of CR. One possibility would be expanding the core curriculum with courses that are highly relevant for all CR students, such as the BROK course or a course focusing on writing a proposal for the Medical Research Ethics Committee (METC). During the site visit, students indicated welcoming such core courses on these relevant subjects. In addition, the panel also advises to invest in strengthening the CR cohort coherence by facilitating more interactions between CR students during courses.

The main component of the curriculum concerns the research project (67 EC previous curriculum, 65.8 EC current curriculum). CR students do their research project in one of the clinical research departments of Erasmus MC. Students are advised and supported in their choice by a member of the Clinical Research Advisory Board, who are senior clinician-scientists themselves. In September/October, after the start of the programme, each student meets with the Programme Director and a Programme Coordinator to discuss their research interests. The Programme Director assigns one of the members of the Clinical Research Advisory board based on the interests of the student. This advisor does not act as the primary supervisor of the research project, but advises the student in the choice of supervisor, helps him/her by using their own clinical research network, and guides them in their project by adding methodological research supervision. The panel values this guidance by both an advisor and a supervisor. In general students and alumni were pleased with their advisor and supervisor. However, students and alumni indicated that there are differences in the availability and commitment of the



allocated advisor. To ensure that all students receive the guidance from their advisor as intended, the panel recommends to professionalise and structure this advisory role.

During their research project, students follow the research cycle by designing their study, collecting data, analysing data, and writing a scientific paper (the Master's thesis). Students work closely together with the research group at the supervisor's institute/department, and they regularly meet with their supervisor, on average 0.5-1 hour per week. All supervisors are senior faculty members at Erasmus MC with considerable experience (minimally at PhD level) in one or more of the specific research subjects.

The panel highly values the opportunity for students to acquire research experience under the guidance of a day-to-day supervisor with hands on experience in the clinical research field that matched the specific interest of the student. However, the panel encourages the management to consider allowing the split up of the project or to find another way for students to gain experience with different research topics and methods. A key additional benefit of two research projects is that this would make students less dependent on the same supervisor for a longer period. Moreover, this would also offer more possibilities for students to follow an international internship.

The self-evaluation report states that in exceptional cases (<2% of theses), the master's thesis is an extensive study protocol. This protocol needs to be sufficiently well-written and detailed for submission to a medical review board, it needs to be a particularly complex study, with an excellent review of the literature, and a very well-developed data analysis paragraph. However, the panel strongly recommends that this should not be allowed, as development as a researcher demands that research master's students get acquainted with the entire research cycle.

During the site visit, the panel learnt that a number of students chooses for a clinical lab internship. It is not clear to the panel how these students are trained in lab techniques prior to this project as the courses focus on epidemiological research. It advises the programme to make this more explicit.

The panel is convinced of the research-oriented focus of the programme. The curriculum provides students ample opportunities to develop research skills in their specific area of interest. The academic context to the programme is not only embodied in the staff members and the curriculum, but also in the opportunities for students to get involved in their supervisor's research and to participate in a wide range of research seminars, workshops, and conferences.

The programme claims to have a fully international learning environment. The panel agrees that with 30% international teaching staff, the staff population ensures an international teaching environment. However, the panel noted that most students are Dutch and there is hardly any opportunity for students to perform an international research project. The panel states that going abroad helps students to develop a truly international orientation and to start building their own international research network. Since the programme has sufficient international contacts, for example with Harvard University, there should be opportunities to strengthen international exchange. The panel recommends the programme to encourage (especially the Dutch) students to spend part of their studies at a university abroad.

The language of instruction is English. The programme management substantiates its choice by arguing that it allows the international staff to convey their knowledge, providing students with the opportunity to get in touch with a broad range of researchers in an international field. In addition, the use of English facilitates an international classroom. The panel supports this choice.

The programme is based upon the educational principles of the Erasmus MC Educational Vision for the research masters, including 1) student ownership, active learning and personalised learning; 2) the embedding in a research environment and the integration of theoretical knowledge and practical skills; and 3) the use of the scaffolding model and apprenticeship model. The panel agrees that these



principles fit well with a research master's programme. After studying the curriculum, it also recognised aspects of this concept in the programme, such as the strong embeddedness in the research environment and the personalised learning by the many electives. The panel was pleased with the further explanation of the management on how these principles were translated in the CR programme. Students are constantly confronted with real-life cases and are challenged to find solutions by working together with fellow students by using didactical strategies such as case-based learning and team based-learning. However, when asking students and staff about the didactical concept, the panel noticed that they were not aware of these didactical strategies. The panel advises the programme that the educational philosophy not only exists on paper, but that it will be consistently implemented and is recognised by students and staff.

The programme uses several teaching methods. A lot of effort has been put into offering technology-enhanced learning activities as preparation for the interactive in-class sessions. The panel is positive about this blended format that facilitates self-paced learning.

Admission

The panel established that the programme is highly selective. The CR research master is open for students with an academic bachelor's degree in medicine or biomedical research or a broad bachelor's education with sufficient basic subjects in medicine and/or biomedical sciences and/or medical biology. Other admission criteria are English language proficiency, interest in performing quantitative research, and study results. Applicants are asked to write a motivation letter and in some cases an interview is part of the selection procedure. Over the last three years, on average 38% of the applications was rejected.

Yearly, on average thirteen students start in the programme, this mainly concerns Erasmus MC medical students. The programme would welcome more external students, including international students, and started to promote the programme more broadly. The panel endorses the need for a broader and larger student population. Therefore, the panel was pleased to note that this year (2021/2022), the number of students has increased to 24, including eight international students. The panel encourages the programme to continue promoting this broader inflow of students and to monitor if this broader group of students finds their way in this programme which was mainly targeted at Erasmus MC medical students.

Staff

One of the appendices to the self-evaluation report contains a list of all academic staff members participating in the programme. The majority of teaching staff holds at least a PhD degree (91%) and a substantial number holds a professorship (34%). Teaching staff without a PhD include some clinical lecturers and junior researchers who assist in courses and the teachers of some of the skills courses.

Around 30% of the teaching staff is international, of which 25% holds an appointment at Erasmus MC and 75% are guest lecturers.

The panel acknowledges the staff's excellent scientific quality and international academic reputation. The excellent research quality of the teachers is also evident from last year's positive research assessment. According to this research assessment, the scientific achievements of departments involved in the programme, 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.



The panel is of the opinion that on the one hand, the excellent research contributes to the relevance of the programme, and on the other hand, it also offers students optimum opportunities to get to know the scientific professional field.

The panel has met with a team of lecturers. It is clear to the panel that students are part of a high-quality and committed research environment. The content of the courses is closely connected to the research conducted by teachers and supervisors within the CR research master, so that students are up to date on recent developments and findings and participate in current research.

During the visit, the panel confirmed the involvement and enthusiasm of the staff. In addition, students were very pleased with the involvement of staff members. According to the students, there is always a lot of interaction between the staff and the students. Guest lecturers are appreciated because they add different perspectives and bring a lot of value on specific topics.

It is university-wide policy that all staff members possess a University Teaching Qualification (UTQ) or Senior University Teaching Qualification (SUTQ). Of all teaching staff appointed at Erasmus MC, 64% holds or trains for a UTQ and 10% holds or trains for a SUTQ. The panel encourages the programme management to foster UTQ-SUTQ certification among lecturers.

During the online visit, the panel met competent and enthusiastic members of the Clinical Research Advisory Board (advisors) who were very engaged with the students and the programme. As mentioned before, students and alumni indicated that there are differences in the availability and commitment of the advisors. This was confirmed by the advisors, and they also agreed with the panel that the role and status of the advisor could be standardised and be made more explicit. Given the crucial role the advisors play in the guidance of the students, the panel encourages the management to give priority to their further professionalisation.

Study load and study guidance/mentoring

According to the panel the programme load is heavy, but the programme appears to be feasible. The panel was pleased to note that the management recently addressed the study load of the programme by adjusting the EC of courses.

Three programme coordinators involved in student counselling keep track of the study results of each student and meet with a student if the results are insufficient for more than one course. In addition, students can contact their programme coordinator in case of study-related or personal problems. The panel is pleased with the recent introduction of an independent student advisor who will be appointed by the Graduate School and is available for all students who seek advice from a counsellor not related to the programme organization.

COVID-19

Due to the COVID-19 pandemic, almost all education of the programme in the past year switched to online teaching and assessment in the past year. The panel asked students and teachers about their experience with online teaching. Whilst COVID-19 evidently had an impact on the interaction between student and teachers, both are positively surprised about the online possibilities. Students mentioned that there was still a lot of discussion possible. However, they preferred more face-to-face interaction with fellow students. The panel concluded that although the COVID-19 situation is not an optimal teaching and learning situation, the programme still allows students to achieve the academic objectives.

From the interview with the management, the panel understood that all education will still be online this fall. Next year, the programme will probably offer a hybrid programme, in which students can



choose to participate online or physically. The panel recommends the programme not to structurally switch to an online variant of the programme, because this requires a different didactic approach.

Conclusion

The panel concludes that the programme fulfils all specific requirements for the teaching and learning environment of a research master's programme and therefore meets standard 2.

2.3 Student assessment

The programme has an adequate system of student assessment in place.

Findings, analysis, and considerations

Assessment policy and methods

The panel took note of the programme's vision on assessment in which it strives to design assessment that challenges students to be creative, develop ideas themselves and carry them out. The programme stands for assessment in learning as it utilises it to contribute to the development of knowledge, insight, skills and attitude, rather than only evaluate knowledge. The panel was pleased with this vision on paper, however, in practice it established that it needs further elaboration and implementation.

The panel established that the programme is in a transitional phase. In the previous curriculum, most courses were assessed by a written exam. In the curriculum that started last September, the programme will balance the number of written exams and increase the number of assignments. The panel strongly supports this transition because the use of assignments fits well with the vision on assessment of this research master. The panel understood that the programme intends to use rubrics for every summative assignment in order to make the assessment as transparent and objective as possible, and to provide students with useful feedback. The panel endorses the use of rubrics and encourages the programme also to introduce clear assessment criteria as soon as possible and make those criteria transparent to students.

The core competence exam is the only written exam included in the revised curriculum. The aim of this exam is to assess the knowledge of students of the core concepts of epidemiology. This allows students to work on integrating the material from different courses and linking concepts, instead of considering each course's material separately. The exam takes place at the end of the core curriculum in the first semester and will be organised digitally through Testvision. Questions will be pulled from a question bank that will be developed in the coming years. According to the panel, it is important that students also learn from this exam. Therefore, it encourages the programme to balance a summative assessment function with a formative assessment function, for instance by providing students feedback on the content of the exam before and after the examination, and by linking supervision and mentoring to this exam.

In the revised curriculum all assessments will be graded pass/fail, with the exception of the performance of the research project and the written master's thesis, which will be graded numerically. In the eyes of the panel, this new grading system can contribute to the principles of personalised and integrative learning. The panel is of the opinion that with the introduction of this grading system, providing qualitative feedback and coaching of students is very important to support students' learning processes. Additionally, adequate communication to students and to future employers (through elaboration on



the grades list) is necessary to overcome the barriers and worries students might have about not receiving numerical grades.

During the site visit, the panel discussed the use of formative assessment during several interviews. The programme management indicated that several courses already make use of formative testing. However, the panel noticed from discussions with students and staff that there is room for improvement in the way formative assessment is organised. According to the panel, the programme needs to give more (systematically) attention to formative assessment as a learning tool throughout the courses.

Grading of the theses

The panel studied the thesis assessment forms and the thesis assessment procedure for grading the master's theses. The supervisor assesses the student's conduct and attitude, execution of the project, focus on results and organisation skills, and ability to cooperate. The master's thesis is assessed by the supervisor and by two members of the Clinical Research Advisory Board. To maintain independence, these two members cannot be the first advisor who guided and advised the student before and during the research project. According to the self-evaluation report, the supervisor and two advisors assess the research paper independently, using a rubric to assess the paper on its introduction, methods, results, discussion, organisation, structure and writing style. The final (numerical) grade is based on the assessment of the student's performance during the project (1/3) and of the thesis (2/3). If the grades of the supervisor and second and third assessor differ more than 1 point, the Programme Director decides on the final grade, which should be within the range of grades awarded by supervisor and second and third assessor. If necessary, a meeting is planned to discuss the grades and come to a consensus.

The panel has reviewed a sample of fifteen research master's theses, including the assessment forms. The panel noted that different assessment forms are used over the years. In addition, the thesis assessment forms contained very limited qualitative feedback. It was not clear to the panel, what the exact role of the advisor was in the assessment of the theses and how the assessors contributed to the final grading of the theses. The panel discussed this with the management. The management explained that this assessment procedure has been introduced in 2020. Therefore, it was not yet visible in the sample of theses assessments studied by the panel. Moreover, the use of rubrics was recently further improved based on the initial experiences, for example by making narrative feedback on each criterium mandatory. The panel concluded that with these new modifications, and if carried out correctly by the supervisors, the assessment system of master's theses is adequate.

In addition to the grading of the research project there are several other formal assessments of the research project: 1) a research proposal; 2) a midterm presentation and end presentation; and 3) a defence. The panel noted that the amount of formative feedback during the research project differs strongly per supervisor. The panel welcomes the fact that students keep a Personal Education Programme (PEP). To further enhance the quality of the assessment, the panel suggests structuring the formative feedback during the research project, for instance by using the PEP.

Examination Board

The Examination Board (EB) is responsible for the examination and assessment quality of all bachelor's and master's programmes at Erasmus MC. In 2018, the Research Master Examination Board joined forces with the EB of the bachelor's and master's programme Medicine and has become the Chamber



Research Masters of the EB Erasmus MC (CRMEB). The CRMEB operates as an independent body and safeguards the quality and level of the assessments, assessment system and achievement of learning outcomes, determines whether students meet the requirements set out in the Teaching and Examination Regulations (TER), and sets the rules and guidelines that are supplementary to the TER for the five research master's programmes and postgraduate master's programme.

Since 2018 the CRMEB has further professionalised, for example by introducing the Assessment Carrousel. The Assessment Carrousel consists of two examiners of the programme, one assessment expert, one member of the programme board, and two members of the CRMEB. The Assessment Carrousel has access to the assessment files, checks the quality of the exams, inspects the evaluations, assesses the format of the exam and evaluation, monitors the exam procedure and, if necessary, advises the programme board and reports to the CRMEB. The programme aims to rotate all courses on a four-year schedule, with particular attention to the core courses that are required for all students. The thesis assessment will be evaluated on a yearly basis. Due to the large number of assessments, CRMEB has not yet reviewed all assessments, thesis assessments will start at the end of this year.

The panel urges the CRMEB to continue its efforts in monitoring the quality of assessments, not only of the courses but especially of the master's theses. It is confident that the CRMEB is well equipped and positioned to safeguard the quality of the assessments, but a lot of work remains to be done. Adequate support and facilitation of the CRMEB by the organisation is therefore very important.

Conclusion

The panel concludes that CR has an adequate assessment system. The programme therefore meets standard 3.

2.4 Achieved learning outcomes

The programme demonstrates that the intended learning outcomes are achieved.

Findings, analysis, and considerations

The master's thesis serves as the final evaluation of research competence to demonstrate that the academic objectives of the programme have been realised. The panel read fifteen theses of the programme. In general, it considered these to be of good quality. The theses are the result of an empirical study, have a clear academic style, a proper methodical section, and a critical discussion of results. All theses the panel studied demonstrate that students have the ability to conduct research at a research master's level. The panel agrees with all grades and would have given the same marks, deviating maximally by 0.5 only, sometimes giving a slightly higher or slightly lower grade than the grade given by original assessors of the programme. In the opinion of the panel, a number of theses is suitable for publication. The panel is convinced that graduates achieve the intended learning outcomes of the programme.

Both in the student chapter and during the interview, students brought up a point of improvement. This concerns the possibility to be registered as Epidemiologist A by *de Vereniging voor Epidemiologie* (VvE; Dutch Society for Epidemiology). Students explained that there is very little difference in the courses followed between the CR programme and certain specialisations of the HS programme. Where these HS students automatically receive the Epidemiologist A registration, CR students need to apply for this at the beginning of the programme and ask for a supervisor who is a VvE registered



epidemiologist. Not all CR students are aware of this at the start of their programme. In the opinion of the panel, this registration also has an added value for CR students and the panel encourages the management to communicate this option and specific requirements right at the start of the programme.

About 70% of the alumni, graduated between 2016 and 2020, continued to pursue a PhD degree or have obtained a PhD. The majority of graduates who do not continue into a PhD programme, continue their career as medical doctor. Most alumni are now working as clinician scientists and spending time both on patient care and research. During the site visit, alumni reported that they were satisfied with their education and felt well-prepared for a career as clinical scientist. The panel is pleased that the programme is currently developing an alumni policy and encourages the programme to further strengthen the ties with alumni for example by inviting them as guest lecturers.

Conclusion

The panel concludes that students of the programme achieve an adequate final level and find suitable jobs. The programme therefore meets standard 4.



3. Strengths and recommendations

3.1 Strengths of the programme

The panel is impressed by the following features:

- Curriculum structure – The programme has a core structure as well as elective courses, which gives students ample opportunity to tailor the programme to their own interests;
- Research basis – The programme has a strong research component, both in the courses and in the research project;
- Teaching team – The teaching staff is dedicated and well-qualified. Staff members are experts in their respective areas, bringing in the latest developments in their field;
- Research environment – The core courses of the programme are educated at NIHES, known as a renowned research institute.
- The embedding in the Erasmus MC allows students to acquire research experience in a large academic centre with a broad range of patient-centred research topics.

3.2 Recommendations

For further improvement of the programme, the panel makes the following recommendations:

- Merging with HS – explore the possibility to merge with the research master's programme HS;
- Assessment – a) formulate clear assessment criteria and make those criteria transparent to tutors and students; b) include formative assessment of courses and research project more systematically in the learning trajectory of students. With the introduction of the pass/fail system, it even has become more important to provide qualitative feedback to support students' learning processes; c) continue monitoring the quality of assessments, not only of the courses but especially of the master's theses;
- Advisor – Further professionalise the role of the advisor in the programme;
- Internationalisation – Encourage students to do part of their study abroad;
- Electives – Monitor among students whether the high number and scheduling of the electives leads to a fragmentation of the programme. If CR will be continued as a separate programme (instead of a merger with HS), the profile of CR could be strengthened by replacing some electives with core courses that are highly relevant for all CR students;
- Registration Epidemiologist A – Communicate right from the start of the programme what the requirements are to be registered as Epidemiologist A by *de Vereniging voor Epidemiologen*.



4. Conclusion

The panel has found that the intended learning outcomes (standard 1), the teaching- learning environment (standard 2), the assessment system (standard 3) and the achieved learning outcomes (standard 4) meet the criteria.

The intended learning outcomes reflect the programme's aims and vision and are in line with the discipline and international requirements. The curriculum, the teaching methods, the quality of the teaching staff and the assessment system enable the incoming students to achieve the intended learning outcomes.

Standard	Judgement
Standard 1	Meets the standard
Standard 2	Meets the standard
Standard 3	Meets the standard
Standard 4	Meets the standard
Final conclusion	Positive



Appendix A – Panel composition and programmes of the cluster

The cluster consists of six research master's programmes:

66586	M Cardiovascular Research (research)	Vrije University Amsterdam
60312	M Clinical Research (research)	Erasmus University
60120	M Health Sciences (research)	Erasmus University
60375	M Infection and Immunity (research)	Erasmus University
60322	M Molecular Mechanisms of Disease (research)	Radboud University
60279	M Molecular Medicine (research)	Erasmus University

Panel composition of the cluster

Core panel

- Prof. dr. F.C.S. (Frans) Ramaekers, professor emeritus Molecular Cell Biology, Maastricht University;
- Prof. dr. M. (Marieke) van der Schaaf, professor of Research and Development of Health Professions Education, University Medical Center Utrecht;
- Dr. J. (Jolanda) van der Zee, associate professor in Education of Biomedical Science and Medicine, Leiden University.

Health Cluster

- Prof. dr. M.B. (Monique) Breteler, Director of Population Health Sciences, German Center for Neurodegenerative Diseases (DZNE), professor of Population Health Sciences, University of Bonn, Germany;
- L.M. (Lotte) Klein BSc, student M Clinical and Psychosocial Epidemiology (research), University of Groningen.

Molecular Cluster

- Prof. dr. J. (John) Creemers, professor of Biomedical Science, KU Leuven;
- V.E.J.M. (Victoria) Palasantzas MSc, student M Molecular Medicine and Innovative Treatment (research), University of Groningen (graduated in 2021).



Appendix B – Schedule of the visit

27 October 2021*

Time	Session
08.30 – 10.00	Preparation panel
10.00 – 10.30	Management
10.30 – 10.45	Evaluation
10.45 – 11.30	Students and alumni
11.30 – 11.45	Evaluation
11.45 – 12.15	Teaching staff and advisors
12.15 – 12.30	Evaluation
12.30 – 12.45	Examination Board
12.45 – 13.30	Lunch and preparing questions for management
13.30 – 14.00	Second meeting management
14.00 – 14.45	Evaluation
14.45 – 15.00	Presentation of first findings

* Due to the overlap with the HS programme (site visit 29 September 2021) an abbreviated program was used



Appendix C – Documents studied

- Self-evaluation report with appendices
 - Appendix 1 – Departments and institutes participating in the programme
 - Appendix 2 – Intended learning outcomes Research Master Clinical Research
 - Appendix 3 – Success rate and teacher education
 - Appendix 4 – Recommendations of the previous assessment panel
 - Appendix 5 – Overview of appendices that are digitally available
- Fifteen theses with assessment forms
- Teaching and Examination Regulations Research Masters 2020-2021 and 2021-2022
- Teaching and Examination Regulations Research Masters 2020-2021 and 2021-2022 Appendices
- Regels en Richtlijnen van de Examens voor de Research Master Opleidingen
- Annual report Examination Board Erasmus MC 2019-2020
- Programme overviews Research Master Clinical Research 2020-2021 and 2021-2022
- Assessment Policy and Assessment Plan Master of Science in Clinical Research 120 EC
- Overview Teachers/Quality of teachers
- Educational Vision Erasmus MC Research Masters
- Anonymised list of theses of the last three years
- SEP report Health Sciences Erasmus MC
- Research Themes Guide

Additional documents available for inspection

- Course selection available in Canvas:
 - WPO2 Advanced Topics in Decision Making in Medicine
 - EWP10 Advanced Clinical Trials
 - CE08 Repeated Measurements
 - CE16 Using R for Decision Modelling
 - CK10 Study Design
- List core competences
- Study guide 2021-2022
- Annual report ECRM 2019-2020
- Personal Education Plan (PEP) 2021-2022
- Assessment form group presentation
- Assessment form group assignment
- Research assessment form 2020-2021
- Research assessment form 2021-2022
- Updated Appendix 3, table 1 Success rate CR



Appendix D – Abbreviations

BoE	Board of Examiners
CR	M Clinical Research (research)
CRMEB	Chamber Research Master Examination Board
EB	Examination Board
EC	European Credit
EER	Education and Examination Regulations
ESP	Erasmus Summer Programme
HS	M Health Sciences (research)
LLS	Lifelong Learning Skills
METC	Medical Research Ethics Committee
NVAO	<i>Nederlands-Vlaamse Accreditatieorganisatie</i>
PEP	Personal Education Plan
PhD	Philosophia Doctor
SEP	Standard/Strategy Evaluation Protocol
TER	Teaching and Examination Regulations
UTQ	University Teaching Qualification
SUTQ	Senior University Teaching Qualification
VvE	<i>Vereniging voor Epidemiologie</i> (Society for Epidemiology)



Appendix E – Outline of the programme

Figure 1 Curriculum (until 2020/2021)

		First semester					Second semester	
ESP (3.5 EC) Review of maths and intro stat (1 EC)	Study design (4.3 EC)	Biostatistics I (5.7 EC)	Clinical translation of epidemiology (2 EC)	Clinical epidemiology (3.7 EC)	Principles in causal inference (1.4 EC)	Biostatistics II (4.3 EC)	ELECTIVES A + B = 11.1 EC	ESP (B)
							Research (33 EC)	
		Lifelong Learning Skills (see year 2 for EC)						

Second year

First semester	Second semester		
Research continued (34 EC) Midterm presentation. Writing master thesis, Final presentation, Defence	Pharmaco-epid and drug safety (1.9EC) Advanced topics in clinical trials (1,9 EC) Advanced analysis of prognosis studies (0.9 EC)	Electives C (6.5 EC)	ESP (C)
		Lifelong learning skills, PEP and SCO 2 (yr 1 + yr 2: 4.8 EC)	



Figure 2 Revised curriculum (from 2021/2022)

First year

First semester							Second semester			
Review mathematics and introduction to statistics (1 EC)	ESP (4.2 EC)	Study design (4 EC)	Biostatistics I (4.5 EC)	Biostatistics II (4.5 EC)	Clinical epidemiology (3 EC)	Public Health Research (3 EC)	Selected topics in epidemiology (3 EC)	Core competences exam (1 EC)	Electives A (A+B=10 EC)	Electives ESP (B)
								Research (30.8 EC)		
Lifelong Learning Skills (see year 2 for EC)										

Second year

First semester		Second semester	
Research (35 EC)		Core competences video (1 EC)	Electives C (C+D=10 EC)
Lifelong Learning Skills and PEP(yr 1 + yr 2: 5 EC)		Electives ESP (D)	

