

# MSc Clinical and Psychosocial Epidemiology

- MSc Clinical and Psychosocial Epidemiology ..... 1
- Learning journey..... 2
- Obligatory courses ..... 3
  - Professional Skills training ..... 3
  - Project-based learning..... 4
  - Chronic disease epidemiology ..... 6
  - Interdisciplinary research..... 7
  - Study design..... 8
  - Health measurement instruments ..... 9
  - Advanced statistics ..... 10
  - Health behaviour change ..... 11
  - Complex health interventions..... 12
  - Scientific Integrity ..... 13
- Track-specific courses ..... 14
  - Lifecourse epidemiology ..... 15
  - Intervention research from a lifecourse perspective ..... 16
  - Health Systems and population health ..... 17
  - Health Systems and policy evaluation ..... 18

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# Learning journey

## YEAR 1

Block 1 : EXPLORING	Block 2 : UNRAVELING	Block 3 : RESOLVING	Block 4 : PREPARING
<b>Theme:</b> <i>Health-related challenges in society</i>	<b>Theme:</b> <i>Pathways to health and Disease</i>	<b>Theme:</b> <i>Development and evaluation of interventions</i>	<b>Theme:</b> <i>Designing new research</i>
<b>Courses:</b> Chronic disease epidemiology Study design Interdisciplinary research	<b>Courses:</b> Health measurements instruments Advanced statistics Track-specific course	<b>Courses:</b> Health behavior change Complex health interventions Track-specific course	<b>Courses:</b> Elective Scientific Integrity Development of a research proposal
<b>Project-based learning:</b> Development of an interdisciplinary research agenda for prevention and management of chronic diseases	<b>Project-based learning:</b> Consultancy project: concise and clear recommendations for a government	<b>Project-based learning:</b> Designing and evaluating complex interventions: from analyses to action	<b>Project-based learning:</b> Track-specific project
<b>Professional Skills Training: Leadership, Collaboration, Creative problem-solving</b>			

## YEAR 2

Block 1 :	Block 2 :	Block 3 :	Block 4 :
<b>Courses:</b>			
<ul style="list-style-type: none"> <li>• Advanced Statistics               <ul style="list-style-type: none"> <li>• Intro to R</li> <li>• Electives</li> </ul> </li> </ul>			
<b>Research:</b>			
<ul style="list-style-type: none"> <li>• Master Thesis</li> <li>• Writing a research proposal</li> </ul>			
<b>Professional Skills Training: Leadership, Collaboration, Creative problem-solving</b>			

## Obligatory courses

Course name	<b>Professional Skills training</b>
Learning outcomes	<p>The main objective of the professional skills training is to stimulate the learning process and further develop those competences that are essential for a research-related career. During the professional skills training we focus on two important domains:</p> <ul style="list-style-type: none"> <li>• Organization and management skills</li> <li>• Leadership, collaboration and creative problem-solving skills</li> </ul> <p>At the end of the course, students are able to:</p> <ol style="list-style-type: none"> <li>a. Identify opportunities for learning through reflection on their own attitudes, skills and behaviours</li> <li>b. Demonstrate competences essential for success in the workplace, including communication, interdisciplinary teamwork, creative problem-solving, and leadership</li> <li>c. Develop an action plan to enhance the application of skills in new situations</li> </ol>
Description	<p>In this course, we apply a variety of strategies, including interactive lectures, self-assessment tools, workshops, assignments, and informal meetings, to strengthen students' professional skills. In the workshops, you reflect, practise and apply skills using real practice scenarios and exercises. You also set individual learning goals based on your current needs, experiences and skills.</p> <p>During informal meetings, we invite experienced researchers to share their personal struggles, challenges and strategies to overcome them. The skills training is complemented by mentor meetings in small groups (6-8 students) and individual coaching. You develop your own action plan aimed at the application and further development of your skills in other courses and projects.</p> <p>During the whole course, you work on a portfolio focused on your individual learning trajectory. This portfolio contains information on the main lessons learned during the workshops and results of the assignments. You reflect on your needs, positive experiences, struggles and actions to further develop your skills in other situations. The portfolio is discussed with a mentor twice a year.</p>
Hours per week	Variable, 2-4 hours
Teaching methods	Tutor group, interactive lectures, workshops, assignments
Assessment	Portfolio: pass or fail
Coordinator(s)	Dr. Frederike Jörg, Dr. Thea van Asselt

Course name	<b>Project-based learning</b>
Learning outcomes	<p>The main objective of Project-based learning is to apply the knowledge and skills from other courses to address real-world challenges.</p> <p>At the end of the course, students are able to:</p> <ul style="list-style-type: none"> <li>• Conduct small research-related projects from conceptualisation to completion, including formulating research questions, designing methodology, analysing data, and presenting findings</li> <li>• Produce a short report, presentation or other communication strategy that effectively communicates project goals, processes, and outcomes to a specific audience</li> <li>• Demonstrate professionalism and manage time and tasks effectively to ensure the successful completion of the project</li> </ul>
Description	<p>In Project-based learning, you use theory, knowledge, research methods and skills from other courses to address complex health challenges. In each of the four projects, you start with a challenging problem or question connected to a real-world issue. You conduct your research project individually or together with your classmates. You communicate findings through a range of formats, such as posters, presentations, and policy advice, among others. Project-based learning provides you with relevant practical experiences as a researcher and allows you to practice skills such as critical reflection and combining new ideas and concepts.</p> <p>The course is taught in four blocks during the first academic year. Examples of projects are:</p> <p>1) Development of an interdisciplinary research agenda focused on a societal health problem. To facilitate the development of the research agenda, students learn to systematically search for scientific literature.</p> <p>2) Consultancy project: a government requests advice from a National Institute, such as the Health Council in the Netherlands or the Centers for Disease Control and Prevention in the United States, to provide advice and guidance on a specific topic (e.g. vaccine uptake, health inequalities, climate crisis and environmental health). You will pose as a member of this National Institute and will prepare a discussion paper and draft policy recommendations. The discussion paper will be discussed during a committee meeting, and you take care of the reporting. At the end of the project, you prepare a press release.</p>

	<p>3) Funding agencies offer researchers the opportunity to submit a research proposal to advance the knowledge for a specific topic. You will develop a research proposal using the format and agenda of a funding agency. You will work both independently and as a part of a team.</p> <p>4) Development of a problem statement: a well-defined problem statement is the foundation of any successful research project. It serves as a roadmap for problem-solving and decision-making. You will write a research problem statement, in which you explain the societal importance of the problem, the current knowledge gaps, and the needs of different stakeholders. The statement links to the student's own master thesis project.</p>
Hours per week	Variable, 4-6 hours per week
Teaching methods	(Interactive) lectures, individual and group work, peer review and feedback
Assessment	Group and individual assignments
Coordinator(s)	Prof. dr. Sandra Brouwer, Dr. Hanneke Wardenaar-Wigman, Dr. Andrea de Winter

Course name	<b>Chronic disease epidemiology</b>
Learning outcomes	<p>The objective of this course is to help you thoroughly understand chronic disease patterns over time by looking at them from a long-term perspective.</p> <p>At the end of the course, students are able to:</p> <ul style="list-style-type: none"> <li>• Effectively identify and critically evaluate current evidence concerning the aetiology, pathophysiology, prevention, diagnosis, prognosis, and treatment of various chronic diseases.</li> <li>• Demonstrate an advanced understanding of epidemiological principles pertaining to chronic diseases, including their incidence and prevalence rates, associated risk factors, and current trends in different countries and contexts.</li> <li>• Evaluate how biological, psychological, social and environmental factors influence the onset and course of chronic diseases</li> </ul>
Description	<p>You will learn about the onset, disease course and burden of common chronic diseases such as diabetes, cancer, cardiovascular diseases, chronic obstructive pulmonary disease, dementia and mental health disorders. You acquire - or strengthen previously acquired - medical or psychological knowledge regarding aetiology, pathophysiology, prevention, diagnosis and treatment of chronic diseases. You learn about their epidemiology, covering incidence and prevalence, risk and protective factors, and you discuss new trends such as the increase in mental health problems among youth. We address the potential influence of a large range of biological, psychological, social, and environmental factors with examples of state-of-the-art research. You learn to explain worldwide differences in risk factors, incidence and prevalence of various diseases. Some themes will be addressed in more detail such as: biological effects of chronic stress, inflammation and metabolic programming.</p> <p>To apply your knowledge, you create and present concept maps showing how different factors relate to chronic diseases. You'll explain how strong these relationships are and reflect on potential mediation, effect modification and confounding.</p>
Hours per week	10 weeks, 10-12 hours per week
Teaching methods	Interactive lectures, assignments
Assessment	Exam and assignment
Coordinator(s)	Dr. Henk Groen

Course name	<b>Interdisciplinary research</b>
Learning outcomes	<p>Interdisciplinary research is needed to tackle complex multifaceted problems effectively. In this course you learn to combine theories and knowledge from different disciplines.</p> <p>At the end of the course, students are able to:</p> <ul style="list-style-type: none"> <li>• Evaluate the health challenges in society from the perspective of different disciplines</li> <li>• Apply understanding of concepts, theories and methods from different disciplines to analyse and address specific health challenges</li> </ul>
Description	<p>Interdisciplinary research refers to the integration of information, methodologies and perspectives from multiple academic disciplines to address health challenges faced by our society. In this course, you explore health challenges from the perspective of different disciplines such as medicine, public health, psychology, sociology, demography and health economics. We aim to enhance interdisciplinary thinking and help you understand how complex health issues are addressed within and across different disciplines.</p> <p>Main goals and characteristics of both tracks are also presented with the aim to familiarize students with the lifecourse approach and health system approach and, if needed, enable students change their decision about which track they want to pursue.</p> <p><b>Content of the course</b></p> <ol style="list-style-type: none"> <li>1) Key concepts, theories, and research methods from various fields are introduced, shedding light on the strengths and challenges unique to each discipline.</li> <li>2) Examples of novel interdisciplinary epidemiological research are discussed to illustrate the importance of the interdisciplinary approach. Students will explore how the perspectives of different disciplines might have contributed to the quality and impact of the research in the articles.</li> <li>3) Attending research meetings of different departments to broaden students' theoretical and methodological knowledge</li> </ol>
Hours per week	5 weeks, 22 hours per week
Teaching methods	Lectures, interactive lectures, discussions
Assessment	Assignment
Coordinator(s)	Dr. Catharina Hartman, Prof. dr. Sandra Brouwer, Dr. Hanneke Wardenaar-Wigman

Course name	<b>Study design</b>
Learning outcomes	<p>At the end of the course, students are able to:</p> <ul style="list-style-type: none"> <li>• Critically evaluate different types of epidemiological designs and analyse sources of bias in epidemiological research</li> <li>• Apply methods used in community-based screening and understand properties of diagnostic tests</li> <li>• Apply statistical methods for evaluation of community-based interventions</li> </ul>
Description	<p>In this course, you learn the main principles and practices of epidemiological research. You will explore various study designs and assess sources of potential biases within epidemiological studies. By the end of this course, you will have gained the essential scientific and methodological knowledge to effectively engage in epidemiological studies.</p> <p><b>Content of the course</b></p> <ol style="list-style-type: none"> <li>1) Epidemiological research: classification of epidemiological research, study design, data analysis in epidemiology, validity, precision, effect modification, bias and confounding</li> <li>2) Community-based screening: methods to estimate the burden of disease, to assess the potential effects of early treatment, properties of community-based diagnostic tests, population-attributable risk, effect size and sensitivity, specificity and positive and negative predictive values</li> <li>3) Community-based interventions: strategies for randomization, quasi-experimental studies, statistical methods (ordinary regression and multilevel analyses), potential problems and solutions in data collection</li> </ol>
Hours per week	5 weeks, 22 hours per week
Teaching methods	Interactive lectures, examples of epidemiological research from different disciplines
Assessment	Written exam
Coordinator(s)	Prof. dr. Harold Snieder

Course name	<b>Health measurement instruments</b>
Learning outcomes	<p>At the end of the course, students are able to:</p> <ul style="list-style-type: none"> <li>• Critically evaluate the operationalization of a concept by examining its clarity, what you want to know and how you will assess the concept</li> <li>• Assess the health measurement instruments' quality and select the most suitable instrument for a specific research question</li> <li>• Evaluate and improve the items used to measure a concept, based on a factor analysis</li> <li>• Assess the importance and ways to interpret meaningful changes in scores over time</li> </ul>
Description	<p>During this course, you will learn the basics of developing and evaluating measurement instruments. Attention will be paid to the following themes:</p> <ol style="list-style-type: none"> <li>1) Types of measurements and operationalizing</li> <li>2) Validity &amp; Factor Analyses</li> <li>3) Reliability</li> <li>4) Responsiveness</li> <li>5) Interpretability</li> </ol> <p>During the second phase of the course, different research challenges related to measurement instruments will be addressed. For example, we will discuss how to ensure that measurement instruments are sufficiently tailored to the target population (e.g. health literacy, culture). We will examine the challenges associated with the instruments' ability to detect changes, and we will discuss the consequences and ways to manage missing or incomplete data in questionnaires. We will also explore whether results of repeated measurements can be interpreted similarly if the instrument is applied in different phases of life or under different circumstances.</p>
Hours per week	5 weeks, 20-23 hours per week
Teaching methods	Interactive lectures, assignments, additional support via e-modules
Assessment	Assignments and open book exam
Coordinator(s)	Dr. Maya Schroevers, Dr. Arnout Smit

Course name	<b>Advanced statistics</b>
Learning outcomes	<p>The aim of the Advanced Statistics course is to deepen the statistical knowledge with regard to the design, implementation and evaluation of scientific research.</p> <p>At the end of the course, students are able to:</p> <ul style="list-style-type: none"> <li>• Use modern software tools for data analysis and data science.</li> <li>• Apply descriptive statistics for data exploration, including measures of spread and central tendency, measures of association and causation.</li> <li>• Fit a range of models such as the chi-square, the t-test, variance analysis, linear least square regression (LLSR) and generalized linear models (GLM).</li> <li>• Utilize statistical inference techniques, including confidence intervals, and hypothesis testing procedures, to draw conclusions from data and recognize situations in which such methods are appropriate.</li> </ul>
Description	<p>In this course, you learn to tell a compelling story using data. You learn to independently perform and interpret statistical analyses using R. You will both refresh and deepen your knowledge of statistics, learning about sophisticated statistical techniques such as multiple linear least square regression or survival analysis. You will be introduced to problem-solving practices in biostatistics and epidemiology using a data-driven approaches. The course assumes no prior programming/coding experience. It is designed to avoid you getting stuck, providing the tools you need to progress according to your interest and in your time as much as possible. During the course, you will also master some valuable R skills that will allow you to conduct your data analysis in R.</p>
Hours per week	10 weeks, 10-12 hours per week
Teaching methods	Lectures, practical session
Assessment	Written assignment
Coordinator(s)	Dr. Douwe Postmus

Course name	<b>Health behaviour change</b>
Learning outcomes	<p>At the end of the course, students are able to:</p> <ul style="list-style-type: none"> <li>• Describe various factors affecting people's (health) behaviours, drawing from theories and frameworks, and articulate the complexity of behaviour change.</li> <li>• Critically assess the strengths, limitations and societal implications of various psychological theories and research methodologies regarding health behaviour change.</li> <li>• Apply knowledge and insights gained from theoretical concepts, research methods, and research articles about health behaviour change to real-life situations.</li> <li>• Reflect on factors that inspire, motivate and enable individuals across various sectors, including healthcare professionals, to change their behaviours</li> </ul>
Description	<p>In this course, we delve into the intricate dynamics of behaviour change through a psychological and psychiatric epidemiological lens. Diverse perspectives will be considered, such as those of patients and healthcare professionals. We incorporate concepts and models from psychology to comprehensively address the complexities of behaviour change within prevention and healthcare contexts.</p> <p>The course will focus on several key topics, including learning and motivation, development and personality, decision-making, adjustment to chronic illness and overcoming barriers to behaviour change among healthcare professionals.</p>
Hours per week	10 weeks, 11 hours per week
Teaching methods	Interactive lectures, assignments and presentations
Assessment	Oral exam
Coordinator(s)	To be determined

Course name	<b>Complex health interventions</b>
Learning outcomes	<p>At the end of the course, students are able to:</p> <ul style="list-style-type: none"> <li>• Reflect critically on how complex interventions work, how they can be adapted, evaluated and implemented</li> <li>• Adapt interventions to new contexts</li> <li>• Apply creative problem-solving techniques to generate and develop original ideas for intervention research</li> </ul>
Description	<p>In this course, we focus on the development, adaptation, evaluation and implementation of complex interventions. Complex interventions are interventions that involve multiple components, targeting diverse behaviours and requiring interdisciplinary expertise that are delivered and evaluated on different levels (e.g. patients, healthcare professionals, organisations). Understanding how interventions work, where they work and for whom are key elements of this course. You learn about co-creation methods and how you can stimulate collaboration with diverse stakeholders to enhance the quality of interventions. You learn about the methods to adapt interventions to fit a new context and to evaluate effectiveness, cost-effectiveness and implementation processes. Changing policies and practices is quite challenging. In this course, we will reflect on leadership and effective actions to promote changes and create positive societal impact.</p>
Hours per week	5 weeks, 22 hours per week
Teaching methods	Interactive and guest lectures, assignments, discussions with experts
Assessment	Assignment and oral presentation
Coordinator(s)	To be determined

Course name	<b>Scientific Integrity</b>
Learning outcomes	<p>At the end of the course, students are able to:</p> <ul style="list-style-type: none"> <li>• Critically appraise ethical issues that may arise throughout the different stages of research process</li> <li>• Identify ethical principles, laws and regulations during all phases of research process</li> <li>• Discuss and propose solutions to ethical challenges in research practice</li> </ul>
Description	<p>Good scientific research is also ethically sound research, but what does this mean? The aim of this course is to introduce you to problems and tools of research ethics to guide you towards conducting research in a responsible manner. Topics covered in the Scientific Integrity course address all phases of scientific research from research problem selection, methodology and working with research subjects to issues of international collaboration, commercialization and authorship. The course is designed as an interactive course training you to recognize ethical issues in your daily work and allowing you to discuss opportunities to address ethical issues. Institutional and other tools are discussed such as the role and functions of Institutional Review Boards, laws and regulations, the UMCG protocol and risk-benefit assessments.</p>
Hours per week	5 weeks, 16 hours per week
Teaching methods	Interactive lectures, assignments and discussion
Assessment	Assignment
Coordinator(s)	Dr. Els Maeckelberghe

## Track-specific courses

### **Lifecourse health development track**

In this track, the focus lies on unravelling how chronic diseases and mental health problems develop and progress over time by applying a lifecourse approach. Understanding the processes that lead to changes in health and well-being and improving prevention and treatment strategies are key aspects of this track. You learn how a person's age, lifestyle, stressful life events, or stage of illness affects these processes.

Courses: [Lifecourse epidemiology](#) and [Intervention research from a lifecourse perspective](#)

### **Health systems and prevention track**

In this track the focus lies on the application of a systems approach as a strategy for designing and evaluating population-targeted prevention programs. You learn to apply health systems thinking as a strategy for designing population-based prevention strategies and to evaluate the impact of large-scale programmes or policies on population health, well-being and healthcare costs. You also acquire practical experience during an internship allowing you to put research into practice to make a measurable impact on society.

Courses: [Health Systems and population health](#) and [Health Systems and policy evaluation](#)

Course name	<b>Lifecourse epidemiology</b>
Learning outcomes	<p>At the end of the course, students are able to:</p> <ul style="list-style-type: none"> <li>• Select lifecourse concepts to explain health and disease outcomes across all stages of life</li> <li>• Apply relevant life course concepts to develop research questions for a selected topic or theme from a lifecourse perspective</li> <li>• Reflect critically on statistical methods to build and test lifecourse models.</li> </ul>
Description	<p>Lifecourse epidemiology examines how various experiences and exposures throughout a person's life influence human development, health and disease. In this course, you learn how early life experiences and transitions, such as entering the workforce, parenthood or end-of-life care, may impact health and well-being throughout life. You will explore various lifecourse concepts to understand health differences in a population, such as causal pathways (e.g. accumulation, chains of risk) or timing of exposure (critical and sensitive periods). You learn about the complex interplay between biological, behavioural, and psychosocial factors influencing health across all stages of life, across generations, and for various health outcomes.</p> <p>Using the lifecourse approach, you will develop your own research questions on topics such as health inequalities, premature birth, resilience and mental health, or lifestyle and environment. Through collaborative small group work, problem-solving activities, and discussions with peers, you will learn to apply lifecourse thinking in research on health across the lifecourse. Additionally, journal club sessions will give you the opportunity to discuss the latest research findings from various disciplines, with a practitioner or field expert present to offer valuable insights.</p>
Hours per week	
Teaching methods	(Interactive) lectures, Journal club sessions, Assignment
Assessment	
Coordinator(s)	

Course name	<b>Intervention research from a lifecourse perspective</b>
Learning outcomes	<p>At the end of the course, students are able to:</p> <ul style="list-style-type: none"> <li>• Critically reflect on lifecourse research aimed at improving health and well-being across all stages of life</li> <li>• Formulate future research directions and innovative approaches to create more effective interventions based on a lifecourse approach</li> </ul>
Description	<p>In the second course of the lifecourse track, you build up on your knowledge from the first course and explore advanced methods used in the lifecourse research. By employing a lifecourse approach, researchers and policymakers can develop more effective strategies to improve and maintain good health across the lifecourse. In this course, you will learn about interventions from a lifecourse perspective, such as optimizing health trajectories, targeting critical periods, and addressing both individual and socio-environmental factors. Examples and challenges of lifecourse-based interventions designed to promote health and well-being across different stages of life will be discussed during interactive lectures. Additionally, by working with longitudinal datasets such as the unique TRAILS cohort study with its 18-year follow-up, you will gain firsthand experience and insights into the challenges related to the lifecourse approach.</p> <p>In journal club sessions, you will deepen your understanding of the latest developments across various disciplines by engaging in discussions and reflections on lifecourse research. The topics covered will include methodology, interpretation of the results, strengths and limitations, and potential future research directions. You will discuss articles that employed a lifecourse approach to enhance prevention, interventions, or policies. Each week, two students will be selected to stand as “experts” to provide a summary of the chosen scientific article. Following the summary presentation, the students will engage in discussion.</p>
Hours per week	
Teaching methods	(Interactive) lectures, Journal club sessions, Assignment
Assessment	
Coordinator(s)	

Course name	<b>Health Systems and population health</b>
Learning outcomes	<p>At the end of the course, students are able to:</p> <ul style="list-style-type: none"> <li>• Explain the concept of a ‘health system’, its objectives and elements, and analyse how these elements interact to address public health challenges;</li> <li>• Describe major demographic trends and epidemiological transitions and analyse what this means for health systems around the world, using data visualization tools to make informed policy decisions;</li> <li>• Develop and critique population-based prevention strategies, incorporating stakeholder analysis to enhance the efficacy and reach of health interventions.</li> </ul>
Description	<p>Health Systems and population health gives an overview of major theories and concepts of health and prevention on a systems level. You learn to apply interdisciplinary and intersectoral research to practical policy questions, aiming to solve complex public health problems related to societal issues like pandemics, ageing, increasing levels of chronic diseases, widening health inequalities, migration and urbanization. Key to tackling these issues is the application of a systems approach to health.</p>
Hours per week	
Teaching methods	
Assessment	Assignments
Coordinator(s)	Prof. dr. Sandra Brouwer

Course name	<b>Health Systems and policy evaluation</b>
Learning outcomes	<p>At the end of the course, students are able to:</p> <ul style="list-style-type: none"> <li>• Apply demographic methods to understand and monitor trends in population health;</li> <li>• Formulate a research design for evaluating the impact of population-based prevention strategies on health, well-being, and costs using observational data;</li> <li>• Apply health policy analysis to understand how prevention strategies are formed and implemented;</li> <li>• Provide evidence-based recommendations to policymakers for solving complex public health issues.</li> </ul>
Description	<p>This interdisciplinary course provides practical approaches for understanding how prevention strategies are formed and implemented on a population level, how their impact can be evaluated, and how findings can be communicated for evidence-based policymaking.</p> <p>Specifically, you learn about using population data, including the Lifelines Public Health dataset, the Human Mortality database, and other open registries, for 1) understanding and monitoring trends in population health, 2) evaluating the impact of population-based prevention strategies on health, well-being, and costs, and 3) providing evidence-based solutions to complex public health issues. In the assignment through a health policy brief, all aspects learned in this course come together.</p>
Hours per week	
Teaching methods	
Assessment	Assignments
Coordinator(s)	Dr. Raun van Ooijen, Prof. dr. Sandra Brouwer