Research Master in Health Sciences

First year courses

**Research Master Health Sciences Year 1**
Fac. Health, Medicine and Life Sciences

**Introduction to Epidemiology**

EPI4920
Period 1
28 Aug 2017
1 Sep 2017

[Print course description](#)
ECTS credits:
1.0
Instruction language:
English
Coordinator:

- B.A.J. Verhage

Fac. Health, Medicine and Life Sciences

**Observational Research**

EPI4921
Period 1
4 Sep 2017
27 Oct 2017

[Print course description](#)
ECTS credits:
6.0
Instruction language:
English
Coordinator:

- P.A. van den Brandt

Fac. Health, Medicine and Life Sciences

**Intervention Research in Health Care**

**Full course description**

There are various aspects to take into consideration when constructing an RCT and many of the issues involved will be discussed in lectures, through practical and discussion groups: design options, issues in good clinical practice such as informed consent, blinding, issues in multicentre trials, power calculation and randomization, missing values and data-analyses in general.
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Furthermore, participants will learn to critically appraise the publications of clinical trials. As there are many potential errors associated with health services research, this module will focus on various key features of RCT design, with particular emphasis on design, validity and data-analysis.

A well-designed, methodologically sound RCT evaluating an intervention can provide strong evidence of a cause-effect relation if one exists. These studies are often used to chance practice and taken up in guidelines, being the ultimate goal of research on therapeutic effectiveness. On the other hand, poorly designed studies are dangerous because of their potential to influence practice based on flawed methodology.

The umbrella term ‘intervention study’ refers to those study designs in which one or more independent variables are manipulated by the investigator, whereas the other independent variables are kept constant or controlled at the same time. This ‘experimental’ approach is regarded the most powerful study design for discovering causal relationships and can be the sturdiest ways of doing research, however, has many ethical and design issues to be taken into account. This module will focus on experimental research in human beings outside the laboratory. ‘Clinical trial’ is a common name to indicate this type of experiments especially as it is often used to assess the efficacy and effectiveness of a new treatment for patients.

Course objectives

Knowledge and understanding

Ability to distinguish between various classes of intervention studies (e.g. pre-experimental, quasi-experimental and true experimental designs; parallel group designs, cross-over designs, N-of-1 design, non-inferiority trials etc). 1.

Knowledge of and insight into the rationale of and prerequisites for experimental intervention research. 2.

Knowledge of the historical development of intervention trials. 3.

Ability to identify the core elements of the ‘classic’ intervention study design (RCT = parallel, placebo-controlled, double-blind, randomized trial): choice of study subjects (in- and exclusion criteria, study size), choice of outcome measures and follow-up time (PICOT). Ability to choose intervention strategies and contrasts, informed consent procedure, randomization, prestratification, blinding, dealing with protocol deviations (drop-outs, non-compliance, missing values), registration of (serious) adverse events. 4.

Ability to distinguish between various alternative intervention study designs (e.g., cross-over design, factorial design, Latin square design, prerandomization design (Zelen design), sequential analysis approaches, N of 1 trial designs, group-randomized trial design). 5.

Ability to distinguish between alternative methods of random allocation of trial participants: adaptive vs. fixed allocation randomization procedures (e.g., simple randomization, stratified randomization, block randomization, response randomization, replacement randomization, biased coin method, minimization, balancing, unequal randomization). 6.

Knowledge of and insight into relevant aspects of the design/choice of the study population (e.g., inclusion and exclusion criteria, eligibility considerations, source for selection, recruitment procedures, patient registration). 7.

Knowledge of and insight into relevant aspects of the design/choice of the intervention (e.g.,
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treatment schedule (route of administration, dosage, duration), intervention contrast (placebo, usual care), dealing with co-interventions). 8.

Knowledge of and insight into relevant aspects of the design/choice of outcome measurement (e.g., primary vs. secondary outcome measures, timing of measurements, quality aspects (validity, reliability, sensitivity-to-change / responsiveness), intended vs. unintended effects). 9.

Ability to identify pros and cons of a run-in period (qualification period). 10.

Knowledge of and insight into the role of placebo intervention within the context of a randomized trial. 11.

Knowledge and insight into the characteristics and differences between pragmatic and explanatory designs regarding designing, performing and interpreting the results of such trials. 12.

Knowledge and understanding of the so-called mixed methods designs. Designs were a combination of quantitative and qualitative research methods are used 13.

Knowledge, understanding and skills regarding procedures that deal with protocol violations. 14.

Knowledge of and insight into strategies and procedures of statistical analysis of intervention trial results (e.g., intention-to-treat vs. per-protocol (valid cases) analysis, appropriate statistical techniques). 15.

Knowledge, understanding and skills regarding procedures for sample size and power calculation in intervention trials and more in general. 16.

Ability to interpret the results of an intervention trial and to draw balanced conclusions with respect to the effectiveness of an intervention. 17.

Knowledge of and insight into the requirements for intervention trial protocols and reports. 18.

Knowledge of and insight into planning, organizational, administrative and other practical aspects of intervention trials (e.g., documentation, design of forms, standard operating procedures (SOPs), data management, audits, multicentre trials). 19.

Knowledge of and insight into the ethical and legislative aspects of intervention trials (e.g., METC-procedures, WMO, GCP, international harmonization, requirements). 20.

**Recommended reading**

The major objective of this course is to prepare students optimally for the use of statistics in their practical work and the period after. The student is taught to apply the most commonly used statistical analysis techniques in a responsible way. Also should he be better able to judge the statistical facets of research as carried out by others.

The training aims at applying advanced statistical techniques in a responsible way. The emphasis will be on concepts underlying the statistical techniques and on interpreting the results, with the mathematics being kept to a minimum. The course material is primarily based on SPSS software. The use of R and STATA will only be briefly approached.

The following techniques will be treated

Analysis of variance and (co)variance

1. Linear regression
2. Logistic regression
3. Analysis of survival times
4. Analysis of repeated measures (linear multilevel models)

For each topic there are two lectures and two tutorials. During the first tutorial, theoretical issues are discussed while emphasis on the interpretation of results obtained with SPSS on real data sets is given in the second tutorial. Concerning the lectures, the first one is more theoretical and involves the presentation of the method and the assumptions behind. In particular, the consequences of violating the assumptions are investigated. The practical interpretation of software outputs is also of great interest. In the second part, we analyze a real dataset together and debate over the best choices to make to analyze the data. Then, we discuss how the results can be summarized to be presented to an audience with minimal statistical knowledge.
Course objectives

After completing this unit the participants should have acquired the knowledge and skills required for the independent use and critical assessment of various (multivariable) statistical analysis concepts, procedures and techniques which are prominent in epidemiological research:

1. Analysis of variance and covariance.
2. Linear regression analysis techniques
3. Logistic regression analysis for binary outcome variables
4. Analysis of survival data
5. Analysis of repeated measurements (linear multilevel models)

For each of this statistical technique, the participant should be able to deal with confounding, interaction and outliers, be aware of the assumptions underlying the use of the technique, know some advantages and disadvantages of the technique, interpret results and use dummy coding. The participant should also be able to choose an appropriate statistical analysis strategy, given a specific epidemiological research question and study design.

Recommended reading


EPI4923
Period 2
30 Oct 2017
22 Dec 2017
Print course description
ECTS credits:
6.0
Instruction language:
English
Coordinator:

- S. Vanbelle

Teaching methods:
Lecture(s), PBL, Training(s)
Assessment methods:
Written exam
Keywords:
9712 Analysis of (co)variance, Linear regression, logistic regression, Survival analysis, Analysis of repeated measures
Fac. Health, Medicine and Life Sciences

Clinimetrics: from Biomarkers to Quality of Life

Full course description

This 8-week module deals with the various aspects of health measurement. Health is always the main (dependent) variable in epidemiologic research. By means of tutorial group discussions,
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lectures, and exercises the students will be made familiar with the various aspects of health (and exposure) measurement: the concept of health and the various dimensions of the health concept; the use of health and vital indicators in public health planning and evaluation; the organization of health-related information and the structure and practical use of a major disease classification system (ICF); various forms of national and international health registries; the structure and contents of (inter)national public health surveillance systems; the various types of health measurements scales that have been developed for health status measurement and health outcome evaluation; the main principles of measurement theory, in particular the theoretical underpinnings of health and exposure measurement (clinimetrics); the main criteria of the methodological quality of a health measurement scale including reliability, validity, responsiveness and interpretability; the steps in the development, field testing and evaluation of a health outcome measurement scale; and the main principles of diagnostic testing and population screening for disease. The module covers the range from biomarkers until quality of life.

After having chosen their thesis topic in October, students will have covered the basic knowledge they need, in terms of study designs, measurement instruments and statistics, to be able to specify the outline of their research proposal and prepare a well formulated research question. by learning how to develop a general outline of their thesis study protocol and formulate a research question for their thesis ("outline and research question"). The moment in time for this activity within the whole master program is carefully chosen. thesis

Within this module students will start working on their thesis topic. The module objectives include:

**Course objectives**

- Ability to distinguish between the various dimensions of health and vital indicators in public health planning and evaluation
- Knowledge of and insight into the principles of classifying health and disease phenomena, and the use of health classification systems
- Knowledge of and insight into the principles and methods of public health surveillance
- Ability to distinguish between the various types of health measurement scales
- Knowledge of and insight into the role of biological markers within the context of health measurement and health monitoring
- Knowledge of and insight into the theory of health and exposure measurement (clinimetrics), and the relevant aspects of the quality of a health measurement scale (e.g., validity, reliability, sensitivity-to-change)
- Ability to distinguish between the subsequent steps in the development and evaluation of a health outcome measurement scale
- Knowledge, insight and skills required for the critical evaluation of a health measurement scale
- Knowledge of and insight into the main principles and procedures of diagnostic test (strategy) development and evaluation
- Knowledge of and insight into the main principles and procedures of population screening of health problems and risk factors, and the evaluation of screening activities.
- Knowledge of other indicators of health measurement which are often used by policy makers, such as the quality-adjusted life years (QALYs), the disability-adjusted life years (DALYs), and the cost-of-illness.
- Knowledge of the concepts and measurement of health and (health-related) quality of life, such as well-being, life satisfaction, and capabilities.
- Knowledge and insight of systematic reviews for health measures,
- Knowledge and insight with the full range of health measures (from biomarkers until quality of life measures),
- Knowledge and insight on how to formulate a research question,
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- Basic knowledge of and insight into the outline of a(n epidemiological) research proposal

**Recommended reading**


EPI4924
Period 2
30 Oct 2017
22 Dec 2017

Print course description
ECTS credits:
6.0
Instruction language:
English
Coordinator:

- C.H.G. Heuts - Bastiaenen

Teaching methods:
Assignment(s), Lecture(s), Work in subgroups, Presentations, Skills
Assessment methods:
Assignment, Attendance, Presentation, Written exam
Keywords:
validity, reliability, validity to change, responsiveness, Diagnostics, prognose, evaluation, biomarkers, quality of life
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**General Principles of HTA & Trial-based Evaluation**

RHS4021
Period 3
8 Jan 2018
2 Feb 2018

Print course description
ECTS credits:
6.0
Instruction language:
English
Coordinator:

- S.M.A.A. Evers
Qualitative Research

RHS4022
Period 4
5 Feb 2018
6 Apr 2018
Print course description
ECTS credits:
6.0
Instruction language:
English
Coordinator:

- J.S.M. Krumeich

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Systematic Literature Review and Meta-analysis

EPI4928
Period 4
5 Feb 2018
6 Apr 2018
Print course description
ECTS credits:
6.0
Instruction language:
English
Coordinator:

- A. Wesselius

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Ethics of Health Care Research

Full course description

This module provides both a basic introduction into ethical aspects of healthcare research as a deepening of some specific ethical issues in conducting healthcare research.

Basic questions which will be dealt with are: What is the historical background of the development of research ethics? Which ethical problems are related to health research as compared to health care? How can researchers deal with these problems? How can researchers identify and deal with potential tensions between ethical requirements and methodological restraints? Which is the role of the Research Ethics Committee (REC)?

Specific ethical issues in healthcare research which will be explored are a.o.: What is the value of informed consent and what are possible exceptions? When and why is it justified to use deception in
research? What about involving vulnerable people – children, mentally handicapped, prisoners, etc. – into healthcare research? What ethical issues are raised by biobanks? What does research integrity require from health researchers?

In a training session the writing of a participant information leaflet will be trained, because this a key-document to enhance or safeguard informed consent by potential research participants.

**Course objectives**

**Knowledge and insight**

- Knowledge and insight with regard to the historical background of (research) ethics
- Knowledge and insight with regard to central concepts in research ethics (respect for autonomy, risks, burdens and potential benefits of the research)
- Knowledge and insight with regard to specific ethical issues (vulnerable participants, biobanks, deception, design-related) in healthcare research and how to behave ethically responsible regarding these issues.
- Knowledge and insight with regard to the theory and practice of ethical reviewing of research protocols

**Applying knowledge and understanding**

- Ability to identify ethical issues when designing healthcare research
- Ability to write Participant Information Leaflet such as to enhance and safeguard informed consent
- Ability to identify and discuss ethically salient arguments

**Making judgements**

- Ability to develop a balanced view on basic ethical problems in research with human beings.

**Communication**

- Ability to communicate arguments and conclusions to colleagues in the tutor group.
- Ability to describe complex scientific research in a way comprehensible for laypeople participants

**Learning skills**

- Study and understand conceptual aspects of research ethics.
- Ability to discuss ethical issues with fellow-students

**Recommended reading**

Literature will be announced in the course book, covering historical, judicial and ethical sources.

RHS4023
Period 5
9 Apr 2018
8 Jun 2018

[Print course description](#)
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6.0
Instruction language:
English
Coordinator:

- D. Horstkötter

Teaching methods:
Assignment(s), Lecture(s), Work in subgroups, Presentations, Skills
Assessment methods:
Assignment, Attendance, Written exam
Keywords:
ethics, informed consent, vulnerable populations, biobanks, ethical committee,
ParticipantInformationLeaflet
Fac. Health, Medicine and Life Sciences

Modelling in Health Technology Assessment

RHS4024
Period 5
9 Apr 2018
8 Jun 2018
Print course description
ECTS credits:
6.0
Instruction language:
English
Coordinators:

- M.A. Joore
- C.D. Dirksen

Fac. Health, Medicine and Life Sciences

Acquiring Advanced Professional Skills (part 1)

Full course description

Research proposal, scientific English course). the writing development, (portfolio module this for ‘Writing a research proposal’ winds up the first year as a complete module. Hence, parts of this module are provided to make the requirements of the separate courses for the research master students more severe (journal clubs, research orientation), other parts of this programme are specific course sciences researchers, and linked with the health future of education the for essential be to considered be the student and his supervisors. To meet these wishes we have chosen, for practical reasons, to set up a separate ‘third-stream’ module ‘Acquiring advanced professional skills’, which comprises elements that can by student the of development professional the upon reflection well as critical as taught be need for scientific integrity to reaccreditation committee emphasized the KNAW The Health Sciences Research master’s programme shares part of its modules with the Epidemiology master’s programme. Initially, the KNAW has commanded that modules from the ‘regular’ Epidemiology programme can be used, be it under the express condition that the end terms of the modules were made more severe for the HSR
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master’s students. Also the

Advanced Professional skills, but also the parts to stiffen the requirements of the separate regular courses according to the guidelines of the KNAW. Acquiring course entire the of elements core the only encompasses not RHS4020 2. year in RHS5020 and 1 year in given is RHS4020 years where two over spread is skills Professional Advanced Acquiring

The course Acquiring Advanced Professional Skills consists of several subparts:

- Writing a research protocol (EPI4927)) course the of sessions training skills and lectures Writing the research protocol for the placement in year 2 (making use of the
- Writing scientific English
- professional behavior, lectures on research integrity) on reflection plan, development personal a of Development and evaluation of a portfolio (including 360 degree feedback, development
- Journal club
- Orientation of the research performed in the field of Health Sciences

Course objectives

Knowledge and understanding:

- Students learn about the contents of the various elements of a research proposal
- Students learn about various research and funding agencies, their strategies and procedures, their focus, their rules.

Applying knowledge and understanding:

- Students learn how to write and submit a research proposal in the wide field of health sciences research
- Students have the ability to review and assess the quality of existing research protocols

Making judgements:

- Student acts and complies with existing academic values, principles and rules to the best of one’s knowledge.
- Student can show that he or she critically evaluates his or her own behavior, viewpoints and methods and is open to evaluation by others.

Communication:

- Students learn how to write a research protocol
- Students can resent their research project for an audience of teachers and fellow-students.
- Student is able to ask for, receive and use in feedback a constructive attitude.

Skills for further teaching:

- Students can apply the gained skills in a future research environment.
- Student shows a willingness to learn from evaluations by changing his or her behaviour, position or methods.

RHS4020
Research Master in Health Sciences

Year
1 Sep 2017
6 Jul 2018

Print course description

ECTS credits:
6.0

Instruction language:
English

Coordinator:

- C.J.A.W. van Gool - de Vrede

Teaching methods:
Assignment(s), Lecture(s), Work in subgroups, PBL, Presentations, Research, Training(s), Working visit(s)

Assessment methods:
Assignment, Attendance, Portfolio

Keywords:
Skills Profession Practical Work-place Science

Second year courses

Research Master Health Sciences Year 2

Fac. Health, Medicine and Life Sciences

Master Research and Thesis

Full course description

The placement period is the ultimate chance for a student to apply the knowledge he/she has gained in the previous year, to develop their competencies as a researcher and to be able to make a start on their scientific CV. The total duration of the internship is 1280 hrs (34 weeks full time, 48 ECTS)

Course objectives

Knowledge and understanding

- In-depth knowledge and understanding of the subject matter of the master research & thesis
- Skills that are required in the subsequent phases of the research project: defining a research question; developing a study design; collection and balancing of relevant information; data collection, analysis and interpretation, drawing conclusions; for instance, data collection skills, measurement skills, organizational skills, communication skills, statistical skills, analytical skills, etc.
- Skills that are required to prepare the master thesis, based on the research project (e.g., writing skills).

Communication
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- Ability to communicate with experts and non-experts, both by means of written report (journal article) and oral presentation on the background and aim, theoretical framework, research question, design, methodological issues (choice of study population, choice of determinants / interventions and outcome measures, choice of measurement tools, choice of statistical analysis techniques), results, remaining uncertainties and conclusions of his own master research.

Learning skills Development of learning capacities that are required to be able to operate more independently in a more complex research environment in the near future.

RHS4013
Year
1 Sep 2017
31 Aug 2018
Print course description
ECTS credits:
60.0
Instruction language:
English
Coordinator:
- R.A. de Bie

Teaching methods:
Assignment(s), Paper(s), Research, Skills
Assessment methods:
Assignment, Attendance
Keywords:
Internship Training Thesis