

Scientific researcher training

Epidemiologist B

Educational Programme

August 2024



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General information

This document lists a wide range of courses aimed at epidemiological research. The combination of courses covers all elements of clinical epidemiological research. Each chapter contains a description of a course. After a description of the course, the objective, the study load in ECTS, the conditions for participation, the teaching methods, and the type of assessment are stated. The programme is primarily intended for PhD students, but is – in principle – also open to those who have already obtained their PhD degree.

Vision

It is the vision of the Department of Clinical Epidemiology that educational activities in different settings increases the learning effect. Also, there is no fixed order in which the different educational activities should be followed, such as the conceptual and application-oriented courses, unless stated otherwise.

Structure of the programme

Those who decide to follow the Epidemiologist B training will be exposed to many different educational activities. They choose for themselves which educational activities they want to include in their programme. However, a large part of the courses is compulsory. Two courses can be regarded as basic courses that are often a precondition for participation in other courses. The course 'Basic methods and reasoning in biostatistics' is a prerequisite for many statistics courses. The course 'STudy designs and their Application in etiological Research Training (START)' is a prerequisite for many of the other epidemiological courses.

After these introductory level courses, more advanced course can be followed, both for statistics and for epidemiology. For statistics these include Regression analysis, Survival analysis, and Design and organization of clinical trials, and for epidemiology these include Prediction modelling and intervention research, Causal inference, and Meta-analysis. It is advised to follow the most complex course at the end of the training, namely Capita Selecta. This course discusses the latest developments in the field of epidemiology. Nevertheless, the order in which the courses are followed is to some extent flexible.

Methodology

The candidate must write a methodological essay or give a lecture on a methodological subject at least once during the training process. This document or presentation should reflect the current knowledge of a particular methodological subject, preferably a subject in line with one's own research.

Portfolio

Those who are admitted to the Epidemiologist B training keep an electronic portfolio with evidence of the acquired competences, including:

* education
* congresses attended
* conducted Research
* publications
* presentations
* self-evaluations and assessments
* methodological presentation or essay
* teaching activities

Course programme

A) Compulsory courses within the LUMC (19.5 ECTS in total):

* Onderzoeksopzet en analyse (in Dutch) (2) [Note, for non-Dutch speaking candidates suitable alternatives can be discussed with the programme director]
* Study designs and their application in etiological research training (‘START’) (3)
* Basic methods and reasoning in biostatistics (1.5)
* Regression analysis (1.5)
* Prediction modelling and intervention research (‘PINT’) (3)
* Causal Inference (3)
* Survival analysis (1.5)
* Meta-analysis (1)
* Clinical trials (1)
* Capita Selecta (2)

B) Examples of elective courses within the LUMC:

* Analysis of repeated measurements (1.5)
* Advanced epidemiological methods (2)
* Skills for the practising epidemiologist (‘SKIPE’) (1.5)

Epidemiology of diseases

No specific course 'Epidemiology of diseases' is offered within the LUMC, because the content (having knowledge of both the frequency and determinants of some important diseases, knowledge of health statistics and the use of disease and death registrations) is extensively covered within the curricula of Medicine and Biomedical Sciences of Leiden University, spread over various modules. Those with previous education where this is not covered in the curriculum, must acquire this knowledge. This is possible, for example, at the Epidemiology and Biostatistics department of the VU Medical Center.

**Disclosure**

The information listed in this document has been updated in June 2022. Nevertheless, it may not contain the latest information. No right can be derived from this document. In case of uncertainty, you are referred to the course coordinators.

# Onderzoeksopzet en analyse

‘Schiermonnikoog’

## Course description

*Note. This course is taught in Dutch. This description is therefore also in Dutch.*

De cursus richt zich op het verwerven van kennis over opzet, uitvoering, analyse en interpretatie van klinisch wetenschappelijk onderzoek. Hiertoe worden de volgende onderwerpen behandeld: onderzoeksopzet, randomisatie, persoonsjaren, standaardisatie, matching, Kaplan-Meier analyse en verschillende vormen van regressie (lineair, logistisch, Cox). Tijdens de cursus wordt voortdurend theorie afgewisseld met oefeningen, zodat de deelnemers de gangbare epidemiologische analysemethoden aanleren, met potlood en papier en ondersteund door computerdemonstraties.

## Learning objectives

De kandidaat:

* leert vanuit de basisprincipes van de klinische epidemiologie gevorderde onderwerpen te begrijpen en toe te passen;
* heeft inzicht in de verschillen en overeenkomsten tussen observationeel en interventieonderzoek;
* rekent met de verschillende risicomaten;
* past zelfstandig gevorderde analysetechnieken toe, zoals matching, standaardisatie en multipele lineaire regressie;
* interpreteert de resultaten van data-analyses van klinisch epidemiologische onderzoeken.

## Course credits

De cursus beslaat zes dagen. De totale duur van de cursus, inclusief toets enige weken later, is 56 uur, wat staat voor 2 ECTS.

## Requirements for participation

De cursus is bestemd voor hen die betrokken zijn bij patiëntgebonden klinisch wetenschappelijk onderzoek. Dit kunnen zowel klinisch werkzame artsen, assistent-geneeskundigen, maar ook specialisten en onderzoekers in opleiding zijn. Individuen die in opleiding zijn tot Epidemioloog B worden met voorrang toegelaten.

## Preparation

Verondersteld wordt dat deelnemers in het bezit bent van de volgende literatuur:

* Vandenbroucke & Hofman, Grondslagen der Epidemiologie

Tijdens de cursus ontvangen de deelnemers een cursusklapper met theorie, artikelen en oefeningen. Tevens ontvangt men hand-outs van alle lessen.

## Assessment

Onder meer wordt in groepjes gewerkt aan een onderzoeksopzet, waarbij deelnemers wordt gevraagd deze te presenteren aan het einde van de cursus. Indien er sprake is geweest van actieve en volledige deelname en het behalen van het schriftelijk tentamen, dan krijgt men het certificaat uitgereikt.

## Dates en registration

### Dates

The course is organised once per year by Boerhaave Nascholing, [www.boerhaavenascholing.nl](http://www.boerhaavenascholing.nl).

### Registration

Het inschrijfformulier is te vinden op de website van de afdeling Klinische epidemiologie; zie LUMC/Organisatie A – Z/Klinische Epidemiologie/Onderwijs en opleidingen/Cursus Epidemiologie op Schiermonnikoog. Het formulier dient geheel ingevuld opgestuurd te worden aan mw. Y. Souverein, y.souverein@lumc.nl

### Costs

Aan deze cursus zijn kosten verbonden. Het bedrag is inclusief logies en maaltijden maar exclusief reiskosten. Voor meer informatie zie website afdeling Klinische Epidemiologie.

## Course coordinator

Prof. dr. F.R. Rosendaal, department of Clinical Epidemiology

# STudy designs and their Application in epidemiological Research Training (START)

## Course description

The course ‘STudy designs and their Application in epidemiological Research Training’ (START) focuses on basic study designs commonly applied in epidemiology. The course mainly deals with epidemiological studies addressing etiologic research questions and question about pharmacoepidemiology.

Topics (per session)

1. Dynamic populations
2. Cohort studies
3. Case-control studies
4. Confounding
5. Selection bias
6. N-of-1 studies
7. Self-controlled designs
8. Test-negative designs
9. Application 1. Example study on Covid-19
10. Application 2. Example study on Covid-19

## Learning objectives

At the end of this course, participants:

* Understand fundamental aspects of epidemiologic study designs, including the case-control design, cohort design, cross-sectional design, and self-controlled designs.
* Can apply the theory about different study designs (and their caveats) in order to design a realistic epidemiological study that can be expected to convincingly answer a research question.
* Understand risks of bias that may be encountered in observational epidemiological studies (mainly confounding, selection and information bias)
* Understand basic principles of the analysis of an epidemiological study, including the role of chance
* Know different measures of frequency of disease and measures of association
* Know basic principles of causal inference in epidemiological research
* Can discuss the pros and cons of different design choices in the setting of a concrete research question

## Course credits

The course consists of 10 meetings, each of which, including preparation, requires approximately 4 hours. Including preparation for the exam, the course requires approximately 84 hours, i.e., 3 ECTS.

## Requirements for participation

There are no requirements for participation. The course is also open to researchers at the LUMC who are not in training to become Epidemiologist B. However, those in training have priority.

## Preparation

In preparation for each meeting, participants read the specific paper (see reading material list below). In addition, each participant prepares at least 3 questions. One question relates to details of the paper. One question links the topic of the paper to an application (for example one’s own research topic). The third question puts the topic in a broader epidemiological perspective. Prior to the meeting the three questions plus their possible answers (or the direction thereof) are send to the instructors.

## Assessment

Active participation during this course is important. Preparation for each meeting (see above) is required. In addition, attendance to each of the sessions is mandatory. Assessment of this course will be in the form of a take-home assignment. Detailed requirements will be communicated to the participants.

## Dates and registration

### Dates

In principle, the course is taught twice per year.

### Registration

Registration for the course is done via Tamara Wienen, secretary of the department of Clinical Epidemiology, thmcwienen@lumc.nl.

### Costs

There is no charge for this course.

## Course coordinators

Prof. dr. R.H.H. Groenwold, department of Clinical Epidemiology

Prof. dr. O.M. Dekkers, department of Clinical Epidemiology

#  Basic methods and reasoning in biostatistics

## Course description

The LUMC course ‘Basic Methods and Reasoning in Biostatistics’ covers the fundamental toolbox of biostatistical methods plus a solid methodological basis to properly interpret statistical results. The course is a mandatory part of the LUMC Graduate School Programme and a prerequisite for any of the advanced biostatistical courses offered by the LUMC.

## Learning objectives

At the end of this course, participants:

* can apply basic methods of data description and statistical inference (t-test, one-way ANOVA and their non-parametric counterparts, chi-square test, correlation and simple linear regression, logistic regression, introduction to survival analysis and introduction to repeated measurements)
* are familiar with aspects of reasoning in biostatistics, including study design, good statistical practice, and multiple testing.

## Course credits

This is a 1-week course, i.e., 1.5 ECTS.

## Requirements for participation

None

## Preparation

Students will receive access to an e-learning which consists of 10 modules. By the beginning of the course, participants are expected to master the topics of the first 5 modules. The modules 6-10 will be covered during the week of the actual course, as will the lectures and accompanying short videos.

## Assessment

In order to obtain a certificate of attendance, passing the post-course exam is a requirement. In addition, participation in the live lectures on Monday, Tuesday and Wednesday is mandatory.

## Dates and registration

### Dates

This course is taught twice per year. For details, see www.boerhaavenascholing.nl.

### Registration

Registration can be done via Boerhaave Nascholing. For details, see www.boerhaavenascholing.nl.

### Costs

There are costs associated with this course. For details, see www.boerhaavenascholing.nl.

## Course coordinators

Dr. ir. N. van Geloven, department of Biomedical Data Sciences

Dr. M.D.M. Rodriguez Girondo, department of Biomedical Data Sciences

# Regression analysis

## Course description

This course consists of both theoretical backgrounds and practical aspects of modelling data using regression models. The focus is on linear and logistic regression models, although other models such as Poisson models or nonlinear regression models for continuous data will also be discussed.

Topics covered include simple linear regression, multiple linear regression, analysis of variance and covariance (using a regression approach), adjustments for confounding, interaction, polynomial and other nonlinear regression models, logistic regression, goodness-of-fit, multivariate modelling, conditional logistic regression, generalized linear regression models, and predictive modelling

## Learning objectives

At the end of this course, participants:

* can formulate different regression models and describes in which situations they are used.
* know how to include categorical covariates and interaction terms in a regression model.
* understand the connections between t-tests, (co)variance analysis and linear regression.
* can define the difference between etiologic research and prediction models.
* can choose the correct regression model for a particular research question and substantiates the choice.
* can determine whether a model fits and what to do if the model conditions are not correct.
* knows how to interpret the results of a regression model.

## Course credits

This course consists of 5 days and, including the final assignment, it is worth 1,5 ECTS.

## Requirements for participation

Basic knowledge of statistics, as taught in the course *Basic methods and reasoning in biostatistics*.

## Preparation

None

## Assessment

Attendance is mandatory. At the end of the course, an assignment must be made, which will be graded.

## Dates and registration

### Dates

This course is taught once per year. For details, see [www.boerhaavenascholing.nl](http://www.boerhaavenascholing.nl) .

### Registration

Registration can be done via Boerhaave Nascholing, <https://www.boerhaavenascholing.nl/werkzaam-als/phd/> [http://www.boerhaavenascholing.nl/](http://www.boerhaavenascholing.nl).

### Costs

There are costs associated with this course. For details, see [www.boerhaavenascholing.nl](http://www.boerhaavenascholing.nl) .

## Course coordinator

Dr. B.J.A. Mertens, department of Biomedical Data Sciences

# Prediction modelling and INTervention research (PINT)

## Course description

During the course ‘Prediction modelling and INTervention research’ (PINT) various epidemiological topics are discussed that are relevant to researchers in medicine and public health, ranging from the design and analysis of diagnostic test accuracy studies to pragmatic randomized trials and studies of adverse effects of medical interventions. Concepts are discussed based on examples from clinical research practice. Epidemiological theory will be practised by means of (computer) assignments.

## Learning objectives

At the end of this course, participants:

* understand the conceptual differences and similarities between diagnostic, prognostic, etiologic and intervention research
* understand differences in design and analysis of studies of intended and unintended (side) effects of medical interventions.
* understand differences and similarities between pragmatic and explanatory trials
* recognize the key steps in designing a pharmaco-epidemiological study
* know the basic steps to develop a (diagnostic or prognostic) prediction model
* can calculate measures of performance of a diagnostic test
* can estimate measures of performance of prediction models
* understand the potential problems of overfitting and know about possible solutions such as shrinkage

## Course credits

The course consists of 12 meetings, each of which, including preparation, requires approximately 4 hours. Including the take-home assignment, the course requires approximately 84 hours, i.e., 3 ECTS.

## Requirements for participation

Successful participation in the course *Study designs and their application in epidemiological research* is a requirement for this course. This course is for Epidemiologist B trainees only. However, should there be spots left, then non-trainees can participate as well. However, those in training have priority.

## Structure of the course

The course has various activities. During most of the sessions the emphasis is on knowledge about epidemiological theory. Materials (articles) and related questions are distributed prior to the meetings. Participants must prepare the relevant questions prior to each meeting. In addition, there are 4 practical sessions, in which the participants perform a (computer) assignment prior to the meeting. This is discussed during the meeting. The purpose of these assignments is to put the theory into practice and plan the analysis of a study.

## Assessment

Attendance to each of the sessions is mandatory. There is an assignment at the end of the course, that must be made and will be graded.

## Dates and registration

### Dates

This course is taught once per year.

### Registration

Registration for the course is done via Tamara Wienen, secretary of the department of Clinical Epidemiology, thmcwienen@lumc.nl.

### Costs

There is no charge for this course for LUMC employees.

## Course coordinator

Prof. dr. R.H.H. Groenwold, department of Clinical Epidemiology

# Causal inference

## Course description

The course Causal Inference focuses on causal inference in observational studies, specifically studies of the effect of medical interventions or etiologic factors. Although randomized trials are the paradigm to study causal inference, this design is not discussed in detail during this course. Concepts are discussed based on examples from clinical research practice. Epidemiological theory will be practiced by means of practical (computer) assignments.

## Learning objectives

At the end of this course, participants:

* Can provide a definition of a causal effect and requirements to be able to estimate that effect.
* Understand key differences between randomised and observational studies and their implications.
* Can use a directed acyclic graph (DAG) to develop an analysis plan for an observational study.
* Can apply methods to ordinary datasets to estimate causal effects.
* Understand the differences between methods to estimate causal effects.
* Understand the differences between confounding, selection bias, and measurement bias.
* Recognize the challenges in estimating effects of time-varying treatments.
* Understand requirements for investigating effect modification and interaction.

## Course credits

The course consists of 11 meetings, each of which, including preparation, requires approximately 4 hours. Including the take-home assignment, the course requires approximately 84 hours, i.e., 3 ECTS.

## Requirements for participation

Successful participation in the course *Study designs and their application in epidemiological research* is a requirement for this course. This course is for Epidemiologist B trainees only. However, should there be spots left, then non-trainees can participate as well. However, those in training have priority.

## Structure of the course

The course has various activities. During most of the sessions the emphasis is on transferring knowledge about epidemiological theory. Materials and related questions are distributed prior to the series of meetings. Participants must prepare the relevant questions prior to each meeting. In addition, there is 1 practical session, for which the participants perform practical assignments prior to the meeting. These are discussed during the meeting. The purpose of these assignments is to put the theory into practice.

## Assessment

Active participation during this course is important. Therefore, attendance to each of the sessions is mandatory. The formal assessment for this course is in the form of an assignment This assignment can be worked on throughout the course in pairs. The final report will be graded.

## Dates and registration

### Dates

This course is taught once per year.

### Registration

Registration for the course is done via Tamara Wienen, secretary of the department of Clinical Epidemiology, thmcwienen@lumc.nl .

### Costs

There is no charge for this course for LUMC employees.

## Course coordinator

Prof. dr. R.H.H. Groenwold, department of Clinical Epidemiology

# Survival analysis

## Course description

Survival analysis is the study of life spans, that is, the time between an initiating event (such as birth, diagnosis, start of treatment) to a terminal event (such as recurrence, death). It is mainly used in the biomedical sciences. A special feature of survival data is that for several people the event does not occur during the window of observation. This phenomenon is called censoring and it requires special statistical methods in the analysis

## Learning objectives

At the end of this course, participants:

* know why standard static methods such as t-tests, chi-square tests and linear regression cannot be used in the analysis of survival data
* have knowledge and insight about the concepts of survival function, hazard, cumulative hazard, cumulative incidence, Kaplan Meier curve, Cox proportional hazard model, competing risks.
* can calculate a Kaplan-Meier estimator and a life table both manually and with statistical software.
* can adapt a Cox proportional hazards model to data and interpret the parameters correctly.
* can check whether the underlying assumptions of the Cox model are met and can adjust the model if the assumptions are not correct.
* can estimate the correct cumulative incidences for competing risks.
* can determines from a research question which method should be used to answer the research question.
* can independently apply the models for data with censored observations to data using a statistical analysis programme
* know how to interpret the output of this programme and draw the correct conclusions.

## Course credits

This course consists of 5 days and, including the final assignment, it is worth 1.5 ECTS.

## Requirements for participation

Basic knowledge of statistics, as taught in the course *Basic methods and reasoning in biostatistics*.

## Preparation

None

## Assessment

Attendance is mandatory. At the end of the course, an assignment must be made, which will be graded.

## Dates and registration

### Dates

This course is taught once per year. For details, see www.boerhaavenascholing.nl.

### Registration

Registration can be done via Boerhaave Nascholing, <https://www.boerhaavenascholing.nl/werkzaam-als/phd/> [http://www.boerhaavenascholing.nl/](http://www.boerhaavenascholing.nl).

### Costs

There are costs associated with this course. For details, see www.boerhaavenascholing.nl.

## Course coordinator

Prof. dr. M. Fiocco, department of Biomedical Data Science

# Meta-analysis

## Course description

Systematic literature research is often the basis for rational decisions in health care. Systematic literature research is often also the basis of guideline development, cost-benefit analyses and policy decisions. Meta-analysis is a quantitative summary of several studies within a systematic literature review. This three-day course will provide you with an overview of the principles of systematic literature search and the statistical methods used for meta-analysis.

## Learning objectives

At the end of this course, participants:

* can apply and use epidemiological (1) and statistical (2) principles of meta-analysis in such a way that they can independently perform a simple meta-analysis from question to manuscript. Specifically:
1. Epidemiological principles: formulating the research question, searching the relevant literature, risk of bias, heterogeneity of studies, publication bias, meta-analysis of observational studies and dose-response meta-analysis.
2. Statistical principles of fixed and random effect models, meta-regression, meta-analysis of proportions and assessment of publication bias.

## Course credits

This is a 3-day course of 7 hours per day, i.e., 1 ECTS.

## Requirements for participation

Basic knowledge of statistics, as taught in the course *Basic methods and reasoning in biostatistics*.

## Preparation

None

## Assessment

Attendance is mandatory. At the end of the course, an assignment must be made, which will be graded.

## Dates and registration

### Dates

This course is taught once per year. For details, see www.boerhaavenascholing.nl.

### Registration

Registration can be done via Boerhaave Nascholing, [http://www.boerhaavenascholing.nl/](http://www.boerhaavenascholing.nl).

### Costs

There are costs associated with this course. For details, see www.boerhaavenascholing.nl.

## Course coordinator

Prof. dr. O.M. Dekkers, department of Clinical Epidemiology
Prof.dr. S. le Cessie, department of Clinical Epidemiology

#  Statistical aspects of clinical trials

## Course description

In this course the design, implementation and analysis of randomised clinical trials are discussed. Topics include choosing the primary outcome and primary analysis for a trial, randomization and blinding, sample size calculation, heterogeneity of treatment effects, flexible designs (interim analyses and DSMBs), missing data, non-inferiority design and ethics.

## Learning objectives

At the end of this course, participants:

* have knowledge of and insight into the different options in the design and analysis of a clinical trial.
* can critically read scientific articles about clinical trials.
* can assess clinical trial protocols and discover and interpret methodological shortcomings.
* can analyse the data of a clinical trial.

## Course credits

This is a 2.5-day course, i.e., 1 ECTS

## Requirements for participation

Basic knowledge of statistics, as taught in the course Basic methods and reasoning in biostatistics.

## Preparation

None

## Assessment

Attendance is mandatory and assignments must be made.

## Dates and registration

### Dates

This course is taught once per year. For details, see www.boerhaavenascholing.nl.

### Registration

Registration can be done via Boerhaave Nascholing, <https://www.boerhaavenascholing.nl/werkzaam-als/phd/> [http://www.boerhaavenascholing.nl/](http://www.boerhaavenascholing.nl).

### Costs

There are costs associated with this course. For details, see www.boerhaavenascholing.nl.

## Course coordinator

Dr. ir. N. van Geloven, department of Biomedical Data Sciences.

#  Capita Selecta

## Course description

The Capita Selecta are group discussions on recent or classical methodological topics published in epidemiological and statistical journals. These are weekly meeting, that take place throughout the year at the Department of Clinical Epidemiology.

## Learning objectives

At the end of this course, participants:

* have a critical attitude towards methodological developments relevant for epidemiological research
* can have a scientific discussion about the methodology of an epidemiologic study

## Course credits

The course consists of 20 meetings, each of which, including preparation, requires approximately 3 hours. Hence, the course requires approximately 56 hours, i.e., 2 ECTS.

## Requirements for participation

Approval by the coordinators is required for participation. Participants should have completed a substantial number of courses, before starting with Capita Selecta.

## Preparation

Prior to each meeting, a paper will be circulated. Participants read the paper closely and prepare question. After each meeting, participants write a short summary, which will be part of their portfolio.

## Assessment

Active participation during this course is important. Therefore, attendance to at least 20 sessions is mandatory. Assessment (pass/fail) will be based on the written summaries. In addition, participants need to meet the following requirements: (1) write a short essay in English or give a presentation on an advanced methodological topic and (2) chair a group discussion on a methodological paper.

## Dates and registration

### Dates

This course runs continuously

### Registration

Registration for the course is done via Tamara Wienen, secretary of the department of Clinical Epidemiology, thmcwienen@lumc.nl.

### Costs

There is no charge for this course for LUMC employees.

##  Course coordinators

Prof. dr. S. le Cessie, department of Clinical Epidemiology

Prof. dr. O.M. Dekkers, department of Clinical Epidemiology

Prof. dr. R.H.H. Groenwold, department of Clinical Epidemiology

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#  Analysis of repeated measurements

## Course description

The course deals with statistical methods used in the situation where one or more outcome variables are measured repeatedly over time on the same experimental unit. Traditional regression models cannot be used for this type of data because the outcomes may be correlated. Other examples of studies where there is a similar dependence in outcome are clustered randomized trials and meta-analysis.

The course will first provide an overview of the classical approach of repeated measurements. After that, modern methods are introduced. This concerns the General Linear Mixed Model and the General Estimate of Equations (GEE) approach for the marginal models. Attention is also paid to the random effects model, for example random effects logistic regression. Examples of clinical and epidemiological applications will be given.

## Learning objectives

At the end of this course, participants:

* are familiar with the classical approach to data analysis of repeated measures and its shortcomings.
* know the theoretical background of the most recently used methods of data analysis of repeated measures, such as general linear models, random effect models and marginal models (GEE).
* know the differences in the interpretation of the coefficients in marginal and random effects models in logistic regression.
* can determine from a research question which method should be used to answer the research question.
* can apply the models independently to data using SPSS.
* can interpret the output of SPSS and draw correct conclusions.

## Course credits

This course consists of 5 days and, including the final assignment, it is worth 1.5 ECTS.

## Requirements for participation

Basic knowledge of statistics, as taught in the course *Basic methods and reasoning in biostatistics*.

## Preparation

None

## Assessment

Attendance is mandatory. At the end of the course, an assignment must be made. This assignment must be submitted and will be graded.

## Dates and registration

### Dates

This course is taught once per year. For details, see www.boerhaavenascholing.nl.

### Registration

Registration can be done via Boerhaave Nascholing, <https://www.boerhaavenascholing.nl/werkzaam-als/phd/> [http://www.boerhaavenascholing.nl/](http://www.boerhaavenascholing.nl).

### Costs

There are costs associated with this course. For details, see www.boerhaavenascholing.nl.

## Course coordinator

Dr. S. Tsonaka, department of Biomedical Data Sciences

#  Advanced epidemiological methods

## Course description

The course provides an overview of recent methodological developments in epidemiological research. Classical and modern methods to correct for confounding will be discussed, including standardisation, regression modelling, propensity scores, inverse probability weighting, and instrumental variable analysis. We also look at graphical methods to illustrate causal relations through Directed Acyclic Graphs (DAGs). These DAGs are a useful tool to track down confounding and selection bias, and to determine how one can correctly address bias and confounding in the data analysis. Other topics that will be discussed during the course include mediation analysis (i.e., determining the contribution of different paths between

exposure and outcome), competing risks (i.e., handling survival time data with multiple competitive outcomes), and handling missing data in data analysis.

This intensive course consists of interactive lectures, as well as many computer exercises.

## Learning objectives

At the end of this course, participants:

* Understand the potential problems of immortal time bias and know about possible solutions
* Understand the potential problems of missing data and know about possible solutions such as multiple imputation
* Understand the potential problems of measurement error and know about possible solutions such as multiple imputation
* Can apply different methods to control for confounding
* Can apply competing risk analysis
* Understand different approaches towards mediation analysis

## Course credits

The course consists of 4 days and requires approximately 56 hours (including preparation for the exam), i.e., 2 ECTS.

## Requirements for participation

To follow this course, knowledge of the basic concepts of epidemiological research is required (as discussed in the course *Research design and analysis*) as well as knowledge of regression models (linear regression, logistic regression, Cox model, as taught in the Boerhaave course *regression analysis*).

## Preparation

None

## Assessment

There is a formal assessment in the form of a presentation, where participants link one of the topics of the course to their own research. This presentation and accompanying discussion will be graded (pass/fail).

## Dates and registration

### Dates

This course is taught once per year.

### Registration

Registration for the course is done via Yvonne Souverein, secretary of the department of Clinical Epidemiology, y.souverein@lumc.nl.

### Costs

There are costs associated with this course. For details, we refer to the website of the department Clinical Epidemiology; [www.lumc.nl/org/klinische-epidemiologie](http://www.lumc.nl/org/klinische-epidemiologie).

## Course coordinators

Prof. dr. S. le Cessie, department of Clinical Epidemiology

Prof. dr. O.M. Dekkers, department of Clinical Epidemiology

Prof. dr. R.H.H. Groenwold, department of Clinical Epidemiology

#  SKIlls for the Practising Epidemiologist (SKIPE)

## Course description

The course ‘*SKIlls for the Practising Epidemiologist’* (SKIPE) concerns basic skills that are essential for a practising epidemiologist. Topics include initial data analysis, quality control, peer review, and consultation.

## Learning objectives

At the end of this course, participants:

* Have acquired skills that allow them to work independently as an epidemiologist
* Have knowledge of and be able to conduct consultations
* Have knowledge of and be able to peer review research paper
* Have learned to keep structured notes of their progress

## Course credits

1.5 ECTS (approximately 42 hours study load)

## Requirements for participation

None

## Preparation

None

## Assessment

Active participation during this course is important. In addition, the following three requirements are mandatory:

* preparation for each session;
* attendance to each session;
* writing personal portfolio (see below).

Assessment of this course will be based on the personal portfolio and an oral examination based on that portfolio. During the examination, participants will be assessed on their capacities regarding the skills that are trained during the course.

## Dates and registration

### Dates

The course is taught twice per year. Note, each session will be scheduled twice per year. Participants should attend each session once. However, sessions need not be followed consecutively (although it is highly recommended to follow Consultation-I and Consultation-II consecutively).

### Registration

Registration for the course is done via Tamara Wienen, secretary of the department of Clinical Epidemiology, thmcwienen@lumc.nl.

### Costs

There is no charge for this course for LUMC employees.

## Course coordinators

Prof. dr. R.H.H. Groenwold, department of Clinical Epidemiology

Dr. B. Siegerink, department of Clinical Epidemiology