1st year :	**Module 1**
Module Title:	**Epidemiology and Evidence Based Practice: concepts**
Number of Credits:	**10 EC**
Module leader:	**G.S. de Wolf, MSc**
Lecturers :	**Prof. C.Lucas, PhD / M. Stuiver, PhD / E. Bakker, PhD / B. Snoeker, MSc / B. Spek, PhD**

Aim of the module:

This module enables students to recognise and improve their management of clinical uncertainty and to translate this uncertainty into focused clinical questions and a decision structure. This enables students to construct efficient and effective strategies for finding good quality research evidence pertinent to the problem solving and make themselves familiar with basic concepts for interpretation of this evidence.

Overall synopsis:

Students are introduced to different views on practice variation and errors in health care decisions and EBP is introduced as a countermeasure. Library and information handling skills are introduced to help answer 3- or 4- way focused clinical questions (PICO). Students are made aware of three main sources of bias in presented evidence (selection & information bias and confounding). Students are introduced to common calculations of basic effect sizes (prevalence, incidence, density, RR, OR and AR) as well as derived measures (RRR & NNT) and are introduced to strategies how to structure the evidence to facilitate clinical decision making (decision tree).

Learning objectives as a whole:

- The student can explain the foundations of evidence based practice
- The student can utilise typologies designed to categorise sources of uncertaintiy and can describe the merits, flaws and consequences of human reasoning
- The student can develop 3- or 4- way focused clinical questions which reflect this uncertainty (PICO)
- The student can develop efficient and effective search strategies likely to yield valid, clinically relevant research evidence
- The student has fluent skills in the calculation of basic measures of disease frequency and measures of clinical effect
- The student is able to structure evidence into a decision tree to help a clinical decision
- The student can recognise and name the three main categories of bias in clinical research

Assessment strategy:

Knowledge of basic concepts of evidence-based practice and clinical epidemiology will be tested via an exam with predominantly open-ended questions.

Notes:

Final mark for this module will only be granted if the student has turned in a (preliminary) "Introduction" section of her/his own research proposal.

Session 1: Lecture – Introduction into science
The lecture demonstrates the limits of human resoning and how science helps to extent those limits. Students are introduced into the fields of epidemiology, clinical epidemiology and evidecence based practice.

Learning Objectives
The student can discribe the similarities and differences between epidemiology, clinical epidemiology and evidence based practice

Session 2: Lecture – ASK: Recognizing and capturing clinical uncertainty
Students are introduced into the causes of (clinical) uncertainty, and how this uncertainty can result into errors in clinical decision making. Students are introduced into the first step of the appoarch of the evidence practice to counteract these errors.

Learning Objectives
Student can name the various areas of clinical uncertainty, can explain the concept of practice variation, can name the three major sources of error in clinical decision-making, can describe basic principles and steps (5) in evidence-based practice, and can describe the structure of a focused, well formulated, clinical question using PICO

Session 3: Lecture – ASK: Patient safety & Research etics
Students are introduced into ethical considerations on scientific equipoise, patient safety and the application od both in ethical appraisal of clinical research. Furthermore students are introduced into how these considerations have taken form in (inter)national laws and regulations.

Learning Objectives
Students can make an informed decision on whether a research proposal needs ethical approval by a METC.

Session 4: Lecture – APPRAISE: Precision & Validity
Students are introduced to how sources of random error and sources of systematic error are manifest in research, and are introduced to different techniques to control for error and bias.

Learning Objectives
Student knows: the sources random error and systematic error; techniques to reduce and report on random error (95% CI); how systematic error is introduced into research, and how it can be avoided (study design)

Session 5. Lecture – APPRAISE: Bias & Confounding
The lecture will alaborate upon the previous lecture. Students are introduced into different approaches and techniques to prevent research from bias (study design) or to correct for bias (correction for confounding)

Learning objectives
Student can make an initial informed choice for study design and can apply basic techniques to correct for bias.

Session 6: Lecture – APPLY: Frequency & Association
Students are introduced into differences between closed and open populations and into basic techniques to discribe absolute and relative frequencies of events in both. Students are introduced to basic statistical concepts.

Learning objectives
Students are fluent in interpreting and computing prevalence, incidence, RR and OR. Students can interpret 95% CI and p-values and can comment on statistical power and chances of type I and type II error.

Session 7: Lecture – APPLY: Using research to address uncertainty
Building upon the content of all previous lectures, students are introduced into various techniques to integrate evidence towards a clinical decision. Benefits and drawbacks of RRR, NNT, dependent probabilities and decision trees are discussed.

Learning objectives
Student is able to use the language of probability and utility in a formal, systematic, and quantitative decision analysis. Student is able to individualise results from research to patients by using clinically relevant measures (RRR, NNT/NNH)

Session 8: Lecture – AUDIT: Clinical decision making & Putting it all Together
The whole module will be put into perspective. It will be discussed how medical practice in general and medical decision making in particular can benefit from science.

Learning objectives
Student can critically reflect on the role of science and clinical expertise in clinical decision making. Student can structure the different ingredients into a clinical decision.