

Bewerbungsunterlagen Lehrpreis 2018 – Bob Siegerink

// Name der Veranstaltung

Extracurricular training in Clinical Epidemiology for Medical Students: creating a stimulating environment for the curious student

Before I came to Germany 4 years ago, I worked in the Netherlands as both a student and later teacher of epidemiology. There, epidemiological education is mainly organized through departments of clinical epidemiology within University hospitals and not through separate schools of public health. Therefore, I am used that medical students receive a thorough education in clinical epidemiology during their studies. For example, the regular curriculum at Leiden University contains ~15 ECTS focused on clinical epidemiology and related subjects. Additionally, extracurricular courses, many of which I helped design and organize, add another 30 ECTS. All these activities help resulted in a stimulating learning environment focused on clinical research.

After settling in into my new job at the Charité in late 2014, it became clear to me that the education that students received within the normal curriculum was fragmented, quite focused on biostatistics and not on clinical research methodology itself. Next to that, the extracurricular activities for interested students were limited. For that reason, I have started several courses and extracurricular activities to see what type of activities can cater to students interested in clinical research. First, I started these activities to create a micro-cosmos of clinical research focused activities around my own group and institute to cater for our own students. However, knowing that my impact as a single teacher and educator would be limited, I later teamed up with like-minded colleagues to set up a stimulating, epidemiology-focused environment for the curious student.

// Lehr- und Lernziele

After spending 12-18 months in the different courses I teach and organize, as well as being part of my team, students

1. Understand, apply and know the limitations of both classic and modern epidemiological methods.
2. Understand the practical application of statistics, both basic and more complex.
3. Can initiate and successful finish a clinical research project by taking the lead in interdisciplinary teams.
4. Developed skills like critical thinking, critical appraisal of scientific literature, producing useful peer reviews and able to clearly report findings, preparing them for a career in clinical research.
5. Know what it takes to become and stay a scientist that adds value to its field of medicine, now and in the future.

The extent to which these goals are achieved is dependent on the number of activities the student take part in; the six doctoral students currently under my supervision have, by design, the most intensive program.

// Inhalte und Gliederung der Veranstaltung

I have understood that I was nominated for the “**DGEpi-Preis für exzellente Lehre in der Epidemiologie**” not because of one particular course or class that I teach, but for my overall teaching concept where I put the individual student central. Even though this reason fits with the philosophy behind my teaching approach (see sections 2 and 4), this does put me in the difficult position to provide you with a condensed yet insightful summary of the different activities. I have chosen to provide a point-by-point description of the different activities I have developed over the last 3.5 years

- **Internships** – Internships in my team contain all elements of research. This includes developing the research ideas into project proposals, contribute in data collection - including lab work if needed, analyses and interpretation of data and preparing a manuscript submission to a peer reviewed journal. Naturally, students are supported by me and my team at every step, but the students are expected to be in the lead. This even includes decisions with regard stipend applications, abstract submission, authorship etc. The philosophy behind this is that I believe that students learn the most when they own the project and learn to identify problems and issues that come with that. Checks and balances are in place for example by involving multiple team members into a student project, and at least one individual meeting per week between the student and me help to keep the student stay on track. A key principle is that students have to identify problems and can suggest potential solution, but they are never expected to solve the identified issues on their own: learning can only be done in a safe environment where mistakes have no direct consequences. Next to the scientific project, the broader education in epidemiological methods of the student is guaranteed through participation in the courses and other teaching activities I organize, listed below.
- **Journal clubs** – I have run several informal journal clubs in which classic methods papers, but also original research papers showcasing both correct and incorrect application of different epidemiological methodologies. These journal clubs are always small (max 10 individuals, mix of students and scientist) and discussion is fostered by having all attendees contribute written questions beforehand.
- **Module: Clinical epidemiology in stroke** – This module within the postgraduate Master “cerebrovascular medicine” was focused on the methodological aspects of clinical stroke studies. Normally, the modules consist of home study and a week classroom instruction, taught by a series of instructors (up to 15). I have decided to be the only instructor in order to maximize coherence and consistency throughout the course week. Although the module was for MDs on paper, I have always brought in a handful of medical students to participate.
- **Navigating numbers** – The informal journal clubs have led to the development of a journal club as part of the masterclass series “Navigating Numbers”. Motivated and selected students read and discussed 10 papers and the book “Bad Pharma” by Ben Goldacre. This masterclass is accredited with 2 ECTS and is be part of the so called Charité promotionsumgebung.
- **BEMC** – In collaboration with the Institute of Public Health, I have started the Berlin Epidemiological Methods Colloquium. Within this Colloquium, we invite top researchers to talk about epidemiological methods (BEMC-talks, 10 per year). BEMC talks often attract 50 attendees of which half can be counted as student (medical or PhD). Recently,

we also started the BEMC journal club, in which we read a methodology paper linked to the topic of the BEMC talk of that month. BEMC journal clubs are more focused on students and attendance fluctuates between 7-10 students per meeting. Both BEMC talks and the BEMC journal club can earn a student 2 ECTS each within the Charité promotionsumgebung.

- **Doctoral workshop** – Together with 2 other senior scientist, I supervise a doctoral workshop of about 15 doctoral students (MD and PhD) who are working on various epidemiological projects. In this workshop, the students decide for themselves what they actually bring to the table and want to discuss. This includes, but is not restricted to their own research. This monthly workshop counts for 2 ECTS.
- **Critical thinking in Translational Medicine** – This 5 ECTS course is a mandatory module within the two masters programs, i.e. “Medical Neurosciences” and Molecular Medicine”. I have designed, organized and taught the course for two years now, educating a total 2 x 40 students on a series of topics focused on the scientific enterprise. Issues like women in academia, hypes in science, research waste, open science, changes in peer review and non-publication of clinical trials provide the background for this course where critical thinking is trained. Most notable teaching formats in this course are the “Oxford style” debates, group assignment to write a blog post on a controversial topic I science, and, again, the discussion of the book Bad Pharma. The course is designed with both instructors always present in order to ensure continuity between each weekly 4 hour long session. Even though this course was formally part of two master programs, I made sure that selected medical students joined the MSc students in order contribute and learn from eachothers unique perspective.
- **PhD program Health data science** – This year, the Institute of Public Health, the Institute of Biometrics and Clinical Epidemiology as well the BIH institute for the transformation of biomedical research QUEST, have joined forces to start a formal, structured PhD program in Health Data Sciences at the Charité. As the only scientist of the PhD program committee who is not formally associated with these departments, I believe that one of my roles is to make sure that the program will keep a broad focus and not just cater to students from the organizing institutes. Even though not targeted towards medical students, I am sure that having this program at the Charité is going to further strengthen and solidify the extracurricular epidemiological teaching environment. Some of the courses and initiatives I have mentioned above are official part of the program, while some other courses and activities are still in development.

As my approach is not a formal program, I cannot provide a single number to indicate the size and success of this approach. I can, however, paint a picture of the successes of the six students that are currently part of the research team. For example, two students have been accepted in the first and so far only round of a newly minted MD/PhD program at the Charité, with only 15 places in that round. Three medical students have successfully obtained a stipend (Sonnefeld stiftung promotionsstipendium, FAZ promotions stipendium, Deutschland Stipendium), and one PhD student was available to secure a 3 year funding in competition (65%, E13). Most recent achievement is that one master student has been admitted to a highly competitive, PhD program at Trinity College in Dublin, supported by a full stipend.

There are many benefits that the different teaching activities I have started in the recent years are not all part of a closed, fixed program. First of all, it allows students to pick and choose the

topics and courses that are fit best with the needs, time and, arguably more importantly, the interest of the student. Second, it allows to adopt the content of a course or activity quite rapidly when to improve the quality, as well as its coherence with newer activities. Nevertheless, a more formal program also has its benefits, not in the least for the student who gets formal recognition for the extracurricular activities. Luckily, I see an emerging possibility where it might be possible to keep the flexibility we have now with the added benefit of a formal program with the recent introduction of the “promotionsumgebung” at the Charité. Medical students pursuing a medical doctorate can browse the extracurricular activities within that environment and take part in activities of their choosing in order to collect the required ECTS.

I see a possibility that in the future we might have a so-called “clinical epidemiology specialization track” for doctoral medical students. In such a specialization track, all extra credits can then be earned from participating in epi-focused courses. Some of these courses might be open to all (e.g. book clubs, BEMC talks) with no pre-existing knowledge required, whereas others might be more tailored for a selected and more experienced group of students (e.g. doctoral workshop). That way, such a specialization track will result not only in a small, selected group of medical students well trained in clinical epidemiology, but will also allow many more students to at least be exposed to the basics of clinical research.

// Lehrkonzept/Methodik (ggfs. incl. Prüfungsformat)

The students that work within my group are my first responsibility: I only teach classes and activities if it helps me train the students in my team to become better scientists. With this key concept in mind, I believe that a good education to become a great researcher is based on four types of learning.

- **Learn by doing** – I expect students in my team to not only write their thesis, but also to participate in all other aspects of academic life. This includes attending courses and lectures, identifying sources of funding and when found help write grant proposals, contribute to peer review under the supervision of me or another senior member of the team, etc. A good example of this was when a student of the Master Cerebrovascular Medicine was looking for a so-called one-week “watch and learn” internship. He asked whether our team could host him. Instead of “watch and learn”, I asked him to read and discuss a paper I recently read and help me identify and understand all the different methodologies issues within this paper. Even though discussing these errors in the paper was the educational goal of that week, I asked the student to draft a muck-up “letter to the editor” as a teaching method. At the end of the week, we decided to submit the letter, which was subsequently published. I am convinced that by not only discussing the issues in the paper, but by drafting and submitting the letter to the editor, the yield of that week was much more compared to a simple “watch and learn”.
- **Learn through variation** – Even though “small scale” and “interactive” are two concepts that describe my teaching, I also make sure there is enough variation in the formats I apply to keep the students on the edge of their seats. More importantly, I try to identify and use heterogeneity within the group so that students not only learn from me, but also through peers. A good example is where I on purpose invite young medical students to a postgraduate Master module. The questions and remarks from the medical students are on a different level, which require the other participants to rethink and rephrase their own arguments and explanations.
- **Learn by organizing** – Organizing and chairing meetings illustrate that epidemiology is a team

science. By forcing students to take the lead, and give them continuous feedback on their performance, students will be able to improve on these important transferable skills. A good example can be found in the organization of what I call study meetings, meetings where scientist who all work on one particular study or dataset meet to line up their activities. Agenda setting for these meetings requires to think one step ahead and anticipate which issues on data-collection, data-management, consistency of data analyses will come up. Therefore, having students organize and lead these meetings further strengthens their epidemiological insight as well as the organizational skills needed to successfully run a clinical study.

- **Learn by teaching** – You only understand something if you can explain it. Therefore, all students at one point or another have to teach in one of the teaching activities. When doing so, the students do not replace me, as I will be present in class often acting as a duo with the student teacher. This does not only help me to ensure the quality of course, but also help me assess the progress of the students who is teaching the course. A third and most often forgotten benefit from this approach is that the students in this course receive two different stories about the same concept, making their understanding not dependent on a single explanation. A good example is one of our book clubs, where we read “Epidemiology: an introduction”. I invited a senior student from my team to participate, but is insisted to not prepare, as the discussed concepts should be familiar to her. The questions from the junior students require the senior students to come up with a variety of answers and examples, which is not always that easy, especially when one is not prepared. This forces the senior student to be agile and not rely on repeating previous examples she heard when the concept was explained to her the first time. The discussion that follows between me, the junior students and the senior student subsequently lead to a better understanding of the basic concepts by the junior students as well as a deeper understanding of the same concept by the senior student.

// Optional Unterrichtsmaterialien

- Critical Thinking in Translational Medicine
 - The syllabus of CTTM 2017/2018 can be found on my website www.bobsiegerink.com
- Berlin Epidemiological Methods Colloquium
 - Program of the different BEMC activities can be found here: www.BEMcolloquium.com