Established in 1871
Swiss Medical Weekly
Formerly: Schweizerische Medizinische Wochenschrift
The European Journal of Medical Sciences

**Review article: Current opinion** | Published 17 December 2012, doi:10.4414/smw.2012.13738
**Cite this as:** Swiss Med Wkly. 2012;142:w13738

# Reforms of the pre-graduate curriculum for medical students: the Bologna process and beyond

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## Summary

For several years, all five medical faculties of Switzerland have embarked on a reform of their training curricula for two reasons: first, according to a new federal act issued in 2006 by the administration of the confederation, faculties needed to meet international standards in terms of content and pedagogic approaches; second, all Swiss universities and thus all medical faculties had to adapt the structure of their curriculum to the frame and principles which govern the Bologna process. This process is the result of the Bologna Declaration of June 1999 which proposes and requires a series of reforms to make European Higher Education more compatible and comparable, more competitive and more attractive for Europeans students. The present paper reviews some of the results achieved in the field, focusing on several issues such as the shortage of physicians and primary care practitioners, the importance of public health, community medicine and medical humanities, and the implementation of new training approaches including e-learning and simulation. In the future, faculties should work on several specific challenges such as: students' mobility, the improvement of students' autonomy and critical thinking as well as their generic and specific skills and finally a reflection on how to improve the attractiveness of the academic career, for physicians of both sexes.

***Key words***: *student; curriculum; Bologna; pedagogy; skills; faculty*

## Introduction

Already in the nineties, there was a sense that the pre-graduate curriculum for medical students should be changed to suit the evolution of the medical field and the demography of the population [1]. This was done in two inter connected ways:

First, back in 2000, the joint commission of the Swiss Medical Schools (in German and French: SMIFK/CIMS) had decided to set up a working group with the task of creating a catalogue of learning objectives to reflect more concretely the aims of medical studies. This goal was met with the publication of the first "Swiss catalogue of learning objectives/SCLO", ratified by all medical faculties in 2002. Given the experience derived from the use of the SCLO over a number of years, it was decided to review its content and a second edition was published in 2008. Also, at the level of the confederation, a new federal act was issued on 23 June 2006 concerning university medical professions, an act which became effective in September 2007. Up to that time, there were only a few paragraphs of a federal law dating back to 1887 to guide Swiss medical schools in the choice of learning objectives. This new act defined the goals of undergraduate, postgraduate and continuing education for the medical professions [2].

The new legal framework has not only been inspired by the need to meet international standards, but it also complies with one of the cornerstones of the Bologna process in increasing the autonomy of universities and, in particular, of medical faculties. The Bologna process creates a "European Higher Education Area" (see:http://ec.europa.eu/education/higher-education/bologna_en.html ), a system that allows for more homogeneity, comparability and flexibility between and across faculties all over Europe. Switzerland is actually one of the few countries which has decided to apply the Bologna process to the medical faculties [3]. While the content and structure of the curricula and examinations in all five faculties used to be the responsibility of the federal government, the Swiss medical faculties have thus become entirely responsible for the content of their curricula as well as the design of the various formative and summative evaluations for the six years of pre-graduate medical training. As in many other countries, the Confederation wanted to keep some control over the qualifications of medical students and the federal parliament decided to introduce a common federal licensing examination which was taken for the first time in 2011. This federal examination is open to all medical students who have completed their studies (and have therefore already obtained their Masters degree) and want to practice medicine in Switzerland. It is the same for all students and is composed of an extensive multiple choice questionnaire as well as an objective structured clinical examination (OSCE), as described further in this paper. Moreover, all medical faculties are subjected to an accreditation process run by international experts, under the auspices of the Swiss Center of Accreditation and Quality Assurance in Higher Education (OAQ;www.oaq.ch/pub/en/

procedures ). By the middle of 2012, all five medical faculties had successfully gone through this process.

To adapt the content of the quality of their curriculum to the existing international standards, and also to comply with the Bologna process, the five Swiss faculties have therefore largely modified their syllabi. Although these syllabi remain fairly heterogeneous in their design, they have all incorporated a number of changes, some of them originating from the Bologna process. These include a division of the training period into two phases, the one of Bachelor and the one of Master, the introduction of the ECTS system (ECTS for: European Credit Transfer System), a Master thesis, and a modular organisation of the curriculum. Besides the 2007 federal act, several important publications have inspired both the content of the 2nd edition of the SCLO and the reforms implemented in the medical faculties. Among others, mention should be made of a report from the Swiss Council of Science & Technology [4], a report from the federal council [5, 6] and a broadly distributed report from a Lancet Commission, published in 2010 [7]. These all highlight the major issues that most countries currently face, such as the current or predicted shortage of physicians, the importance of primary care, the necessity of raising students' awareness of public and community health, ethics and medical humanities, and professionalism, etc. The following commentary builds on a previous publication from the University of Basel [8] and attempts to outline some of the past, present and future changes which have been, or will be, made to the Swiss curricula in order to address these challenges.

## The shortage of physicians

After years of having warned medical faculties that they were training too many physicians, politicians have recently come to realise that Switzerland is in fact facing a future shortage of physicians, especially in the field of primary care [5]. For the past one or two years, politicians and the lay press have turned their attention to the risks linked to the increasing number of foreign physicians hired by hospitals to fill the gap left by a lack of trained Swiss doctors. In response to this situation, faculties have succeeded in recent years in increasing the number of medical students by 15 to 30%, in most instances without any major increase in their teaching budgets. At present [9], although the number of medical students finishing their curricula increased from around 600 to around 850 between 2006 and 2011 (in Lausanne from ~120 to ~160/year), faculties have so far been unable to attain the target recommended in the aforementioned reports [4, 5, 10] of 1,200 students graduating each year. If the gap is to be filled, it will not be without a significant increase in the budget of all faculties, and a greater involvement of university *and* non-university hospitals in bedside teaching. In fact, the main limiting factor in the number of medical students trained each year is *not* linked to the introduction of the numerus clauses (which actually does not exist in Lausanne and is only indicative in Geneva) but to the restricted number of opportunities for the teaching of clinical care.

## A pre-graduate training driven by roles and competencies

In the 1990s, the Royal College of Physicians and Surgeons of Canada set up an initiative to address the question of how best to prepare physicians who would be effective in the twenty-first century environment and who would genuinely be able to meet the needs of their patients. This led to the widespread and widely-used concept of CanMEDS, which has been refined over the years [11]. The Joint Commission of the Swiss Medical Schools was greatly inspired by this work in creating the above mentioned Swiss catalogue of learning Objectives/SCLO. In its second edition, it stresses a number of qualifications that physicians should acquire during their pre- and post-graduate training. It highlights the importance of clinical skills (history taking, physical examination, basic semiology) and includes generic skills such as professionalism, openness to ethics and medical humanities, inter-professionalism and team approaches to clinical care. In many ways, this programme addresses the analysis of the Lancet report [7]. This has led all faculties to introduce areas beyond the acquisition of pure scientific knowledge such as simulation, e-learning, case-based clinical reasoning and seminars in ethics.

## New technologies: simulation and e-learning

One of the ways in which medical faculties can respond to the increased demand for skilled physicians, given the above mentioned shortage of bedside training places, is to rely on simulation [12]. All faculties now have a simulation programme. These include the utilisation of mannequins and plastic models, but above all, the inclusion in training of so-called simulated/standardised patients who are able to simulate specific clinical situations or symptoms and to react in specific ways, depending on students' behaviour. This has also led to the implementation of a new type of exam: the OSCE (Objective Structured Clinical Examination). During this exam, students are required to rotate through a set of stations and perform several specific tasks using simulated/standardised patients. The new Federal Licensing Examination (FLE) includes a half-day OCSE. Besides overcoming, to some extent, the shortage of real patients, the use of simulated patients also allows the involvement of students in various situations without exposing real patients to the risk of misbehaviour or medical errors. It also has the advantage of offering a standardised assessment, which is less subject to the potential bias of the expert's personal interpretation. E-learning offers another path for training students in an interactive way, and the increasingly sophisticated technologies involved (so called ICTs/Information Communication Technologies) will probably allow for new teaching and assessment approaches in the future.

### An emphasis on primary care, community medicine and interdisciplinarity

Although the shortage of physicians is widespread among medical disciplines (with some exceptions), one of the major challenges in the coming years will be to ensure that all

regions of Switzerland are fully covered as far as primary care physicians are concerned. One explanation among others for the lack of interest of medical students in primary care is that most of the training during pre-graduate studies is run by specialists from various disciplines working in university hospitals. Increasing the attraction for general practice among students requires a coherent and ongoing effort on the part of medical faculties. Several faculties have begun to address this problem. Already in 1999 , the "Institut für Hausarztmedizin" in Basel had implemented so-called "Einzeltutoriat", an opportunity for medical students to work with practicing primary care physician [13]. Lausanne and Zürich have had for several years a chair and an Institute for General Practice. Nearly all faculties currently offer practical teaching sessions of varying duration taking place within the offices of private general practitioners [14]. Despite these efforts, the University of Geneva's annual survey focusing on the intentions of students regarding their post-graduate training shows that the proportion of physicians who want to embrace a career in primary care remains low and should be increased [15].

The SCLO, besides stressing some of fundamental of primary care in its first part, also calls for raising awareness among medical students to issues related to public health and community medicine. On page 18 and 19, it states that "physicians are integral participants in healthcare organisations, organising sustainable practices, making decisions about allocating resources, and contributing to the effectiveness of the healthcare system" and that "they responsibly use their expertise and influence to advance the health and well-being of individual patients, communities, and populations". Indeed, an increasing number of physicians in the future should and will be involved in running school health programmes, designing and implementing prevention and health promotion strategies, reflecting upon or advocating the organisation of sound health care systems, and in thinking about policies which impact on the health of the population. Teaching about these issues is not so easy, especially as it is still very important to safeguard enough time to provide the core knowledge and competencies that every medical student should have acquired by the end of his/her training. In Lausanne, the problem has been solved by designing a multidisciplinary longitudinal module (running from Bachelor 1 to Masters 2) that deals with most of these issues.

## An openness to interdisciplinarity, ethics, and social science ("medical humanities")

The planned revision of the current federal law on medical professions requires faculties to raise the awareness of students training in health professions of the importance and implications of interdisciplinary approaches. It is as well stated in the SCLO that "As collaborators, physicians effectively work within a healthcare team to achieve optimal patient care". The team approach has indeed become important in many instances; besides its crucial role in hospital units such as oncology and palliative care, intensive care and neonatology. There are also the new ways of delivering primary care and the increasing success of models incorporating primary care physicians, physiotherapists, nurses and psychologists in the same location. As a tentative response to this challenge, the school of medicine in Lausanne, in close collaboration with the two Nursing HES and the University Hospital, has set up a working group to review how to train students from various professions to work together [16]. Among other projects, this working group has organised – in 2011 on a limited scale but in 2012 for around 350 students – a whole week-end training session in the inter-professional team approach [17]. Over the two days, medical as well as nursing students, midwives, physiotherapists and technicians in medical radiology, learnt about team functioning and inter-professionalism, and discussed, in small groups. complex clinical vignettes under the guidance of trained tutors. Also, several faculties have now created a position for the teaching of medical ethics as well as various initiatives to inform students about the importance of social sciences and medical humanities [18]. These include lectures, seminars and the production of a personal review of various areas such as sociology, anthropology, the history of medicine, and so forth.

## Promoting research and academic careers

Besides the necessity of enlarging the range and scope of competencies acquired during pre-graduate training, it is also extremely important that medical students develop a good insight into the importance of research, as well as how to incorporate new knowledge, techniques and approaches into their everyday work. This requires an understanding of what an evidence-based approach involves. The SCLO therefore states that "As Scholars, physicians demonstrate a lifelong commitment to reflective learning, as well as the creation, dissemination, application and translation of medical knowledge". One of the innovations from the (Bologna) reform is the introduction in all faculties of a master thesis: the compulsory production of a piece of personal research, facilitated by an academic staff member. This research can cover many different subjects, ranging from basic laboratory research to small epidemiological surveys, including reviews of clinical cases, generation of a teaching tool, etc. This thesis is granted 15 ECTS credits, which is the equivalent to half an academic semester.

Beyond raising awareness of students about evidence-based research, all universities and faculties have the duty to attract young researchers/physicians to an academic career, and to promote an interest in research as a full or part-time job. At the pre-graduate level, this can be achieved in several ways besides the introduction of the Master thesis. For example, with the support of the Swiss National Science Foundation, the five medical faculties have developed the MD-PhD track, an educational pathway which includes the attainment of extra knowledge and competency in basic sciences to the equivalent of 30 ECTS. This further encourages the acquisition of the double MD-PhD which allows its holder to engage in high-level research while retaining (most of the time) a clinical activity. In the same area, and in response to demands from EPFL and

ETH [19], the school of medicine in Lausanne has recently opened a special "bridge" which allows students in biology or life science engineering to pass from their Bachelor directly into the Master of Medicine after a one-year transition period. The goal of this initiative is to promote the training of professionals who will benefit from in-depth training in life sciences and a thorough education in medicine. The Faculty of Geneva will soon be associated with this programme, and the faculty of Zürich is considering a similar project.

## Discussion

This commentary sheds some light on the major changes that have taken place in the pre-graduate training of medical students in Switzerland. Among others, there are some challenges which all medical faculties currently face and for which adequate responses will have to be found.

- A first challenge is to improve the mobility of students between Swiss and foreign faculties. Indeed, one of the important aims of the Bologna process is to create a European Higher Education Area to improve student movement across faculties. Some Swiss medical faculties have been more effective than others in promoting such exchanges, but, according to the opinion of medical students, the system remains too rigid to allow for a wide range of such exchanges.
- A second and major challenge is to find a fair and acceptable balance between two student needs: on the one hand, the need to acquire the generic capabilities listed in the new SCLO and, on the other hand, the need to be able to make use of the huge amount of scientific knowledge and discipline-specific competencies required to enter hospital-based medical practice as residents. This challenge reflects the never-ending tension faced by medical faculties, who are responsible both for nurturing their students' curiosity, autonomy and critical thinking (which is the job of all academic faculties) and for helping them acquire the vast amount of specific knowledge and skills required to practice medicine (a specificity of faculties which are also medical schools).
- A third challenge is due to the fairly inadequate nature of the assessment techniques used in most cases for the examination of students (e.g., multiple choice questionnaires) in relation to some of the objectives that have been described in this commentary. Medical educators in other countries have developed various new approaches to validate students' acquisition of competencies, such as the CST questions (Concordance Script Tests) or various forms of Computer-based Assessment (CBA). These should be implemented progressively in Switzerland too. The federal commission of the FLE is currently addressing this subject. Despite these promising advances, it should be kept in mind that such techniques will never fully replace exposure to real patients.
- Yet another challenge is to convince all colleagues – especially clinicians – participating in the training of medical students of the importance of their role as teachers and role models. The new approaches to medical education require ever greater consultation between teachers, especially during the Masters period, to ensure that the content of the courses is presented in an integrated way. It is less and less acceptable to teach all disciplines separately, but this collaboration requires time and many academic staff members have numerous other duties to occupy them. Indeed, in many cases, the publication of scientific papers is much more valued than the amount of energy given to teaching. Faculties will have to be inventive in developing procedures which will allow physicians involved in an academic track to be recognised for the time, competence and originality they bring to medical education. Along the same line, faculties will have to reflect on how to respond to the feminisation of the medical profession and on how to attract more women in the academic field, including the area of teaching.

The transformation of the curricula in all five Swiss medical faculties has been a fairly long and complex process that, given the rapid evolution in the field, is still not complete. In fact, one should consider this kind of reform as a never ending process – and one that must comply with the increasing complexity of the medical field and the changing needs of the population. To conclude, it is worth bearing in mind the following quotation from the Lancet report: *"Ultimately, reform must begin with a change in the mindset that acknowledges challenges and seeks to solve them"* [7].

***Acknowledgment:*** An earlier version of this paper has been submitted to the vice dean for academic affairs of the Faculty of Medicine of Geneva, Professor L. Bernheim. Also, although the vice deans for academic affairs from the five Swiss faculties have frequent contacts and exchanges, this article reflects the author's sole opinion of the situation.

**Funding / potential competing interests:** No financial support and no other potential conflict of interest relevant to this article were reported.

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