Reflection on career choices in clinical neurosciences

A Restellini1 and C Piguet2,3

Abstract
Medical faculties are responsible for high-level training, not only on clinical skills but also on scientific research and medical advances. There is an evident need to promote academic careers to ensure the continuity and improvement of top-notch health care. Even if Switzerland is one of the countries with the highest medical density per inhabitant, the lack of interest for academic careers has increased, resulting in difficulties to form clinician-scientists and ensure succession. In this article, we reflect on the challenges and the potential solutions in the training of an academic career.

Keywords
Mentoring, academic career, research, clinical neurosciences

Introduction
With more than 37,000 practitioners, Switzerland is one of the countries with the highest medical density per inhabitant,1 arguably ensuring that our health care system is one of the most developed in the Western world. Academically speaking, Switzerland also performs well in the rankings of the number of research articles published compared to the size of its population.2

Nowadays, medical education is mostly performed in high-level university centers and their related medical faculties, which are not only responsible for medical training but also for scientific research and medical advances. Given this, it is crucial to stimulate interest in academic careers to ensure the continuity and improvement of our health care system. Currently, future professors are not only selected based on their high-level clinical skills but also on their ability to develop research projects and fundraise financial support and on their educational skills, enabling knowledge transmission through teaching and conferences.

In this context, university centers are required to rapidly select and train efficient young academics capable of facing future challenges, which most often require them to undertake research projects. However, with more and more young specialists choosing the route of private practice due to better work/life balance, compared to the academic route burdened with institutional constraints, the lack of interest for academic careers has increased.3 Psychiatry is particularly affected by this trend. The historical gap taken from biological medicine has limited interest in fundamental science, replaced by an emphasis on psychotherapy. The subjective nature of such approaches partially impairs direct implementation of scientific approaches proposed in other disciplines, although a great amount of research work on mechanisms of psychotherapy is currently done in cognitive neuroscience. Nevertheless, in psychiatry, perhaps more so than in other medical disciplines, the gap between clinical and academic interest is large, diminishing the enthusiasm of young medical doctors to pursue an academic career. Actions should be undertaken to promote those physicians who are willing to combine clinical and scientific work, which is necessary for the development of the fields of child–adolescent psychiatry and adult psychiatry.4

To evaluate potential solutions to promote academic careers of clinician-scientists, here, we enumerate some
of the major institutional mechanisms for career encouragement and confront relevant obstacles that limit such a challenging career.

**Institutional career encouragement mechanisms**

The current challenges faced by university centers require early development of both clinical and research skills. While clinical skills have long been the center of medical education, research skills have not, which has resulted in the omission of the development of these skills in most curricula. Over the last 40 years, several mechanisms have been developed in an attempt to decrease this gap and stimulate the uptake of dual careers.

One of the first steps was made with the implementation in several universities worldwide, including Harvard medical school and the faculty of medicine of Geneva, of problem-based learning (PBL) as an educational tool. This approach, first implemented in 1969 at McMaster University, relies on medical knowledge acquisition based on the dissection and discussion of clinical cases in a small group of students using textbooks and scientific articles under the supervision of a senior advisor (clinician and/or researcher). This method allows students to familiarize themselves with scientific articles and scientific communication, and above all to research and the selection of valid information. The PBL is ongoing in Geneva for more than 20 years, with regular assessments and modifications. In addition to providing a more effective means of learning, this approach also helps to develop the skills necessary and essential to undertake academic work, as it helps to develop students’ critical thinking skills, other than those offered directly by their faculty.

Additionally, several elective courses are offered by Swiss medical universities for students, who are motivated to have a first impression of what it entails to undertake research or to allow the acquisition of writing skills as well as fundamental science techniques.

Finally, all medical students in Switzerland are now required to write a master’s thesis, pushing them to perform a small research project.

At the postgraduate level, a national MD–PhD program was implemented in 1992 in Switzerland, based on the American dual model, which was first established in 1964. This program allows graduated physicians to complete a second course of study in fundamental science to obtain a doctoral degree (minimum 3 years). Several scholarships are available to finance the program, including a grant from the Swiss National Science Foundation (limited to young physicians and accessible for up to 3 years postgraduation, approximately 10 students selected per year). This program, although very selective (126 participants from 1992 to 2007), is highly beneficial. According to the Swiss MD–PhD Association, 89% of participants pursue an academic career, which entails conducting a research project and 50% of those who had completed the program by 2002 had a professorial position in 2008. Even if these numbers are quite old, they still give an overall idea of the situation. Furthermore, a recent study showed that among the students taking part in the Swiss MD–PhD program, a significant proportion of them (35.2%) was able to publish more than six publications after completing this program. Additionally, several postgraduate courses are offered by Swiss Universities in the form of a certificate of advanced studies (CAS), a diploma of advanced studies, or a master of advanced studies, enabling the development of specific skills, such as statistics, epidemiology, or public health, provided an agreement with the clinical service to remove the clinical duties several days per months to allow adequate participation.

In parallel, a couple of scientific journals have developed special sections to encourage young clinicians to pursue scientific editing, producing scientific research. They allow young clinicians to familiarize themselves with the processes underlying scientific communication and peer-reviewing, in which academic practitioners are required to perform. In the field of neuroscience, we are lucky to have one of the first journals to provide a specific “junior section,” with members of the editorial board who are representatives of young clinical scientists (Clinical and Translational Neuroscience).

Finally, most of the subspecialty organizations, including Swiss ones, have awards for young researchers/clinicians and provide opportunities to present their work.

**Limitations and challenges**

Despite these training programs in research and academic requirements in medical curricula, lack of continuity in an academic career still persists. In our opinion, several limitations partially contribute to this phenomenon.

The first important point to note is the small proportion of physicians who have access to research-oriented training programs. As an example, with a mean of 370 medical students who obtain their degree in the French-speaking part of Switzerland, and around 720 in the German-speaking part (there is no training center in the Italian-speaking part yet), Switzerland produces 1090 newly trained physicians per year. As described in the previous paragraph, students with access to the MD–PhD program are limited. Based on the numbers cited above, we find an average of 8–10 students per year accessing the MD–PhD program scholarship. As a result, less than 1% of medical graduates may benefit from the MD–PhD scholarship. Furthermore, even when funding is not the limiting factor, the time it takes for students to undertake the research is not considered a priority in clinical fellowships. Even though training during employment opportunities exists (such as CAS), it is often complicated and difficult for trainees to be discharged of clinical duties to have time to focus on research requirements. Therefore, a physician who misses
the opportunities offered during or just after medical studies will have few possibilities to acquire the skills required to pursue an academic career after graduation, let alone start a research project. In that context, to have the opportunity to acquire research-specific knowledge, students must often make early career choices. Subsequent career opportunities often rely on the development of a network of contacts and mentors that will guide students once their degree is obtained. Considering that every application must be supported by previous publications, their preparations must commence months or years in advance to increase the probability of success and to obtain grants for young researchers. These applications obviously depend not only on the applicant’s motivation for studying in a specific research program but also on the support he/she gets from his/her network and mentors. A late choice in a specialization can therefore be detrimental when considering academic career development.

Thus, the training offered during university years has a greater impact on students who have already chosen a specialization or at least already know that they want to pursue an academic and research-oriented career. However, a significant proportion of students changes their career intention between the time they are at the undergraduate level and after graduation. This is even more the case when we consider the choice of specialty, such as psychiatry, which represents only 2–3% of students’ choice in early training years, meaning that most medical graduates choose their specialty late in their studies or at the postgraduate level. Because of this late choice, these physicians are therefore less likely to acquire research skills and a network of contacts useful for his/her career. The large proportion of foreign doctors conducting their specialization training in Switzerland also needs to be taken into consideration. With 43.4% of Swiss specialist titles (FMH) awarded to foreign doctors, there is a significant proportion of working physicians who do not come to Switzerland equipped with a network of contacts or through a mentoring program. This entails that these candidates would likely need to spend a significant amount of time developing a new network and therefore could miss opportunities to pursue a university career. To give a more concrete example, in the Swiss MD–PhD program, which starts after completing the medical studies, less than one-third of the students are foreigners.

Secondly, as mentioned above, with an average of 11.6 working hours per day performed by young clinicians in Swiss medical university centers, the time dedicated to acquire research skills is very limited unless stipulated within working contracts and will mostly be performed during personal time at the expense of social and family life, questioning the real benefit of such personal investment. The institutional workload is constantly increasing due to the complexity of the health care system, particularly in a university hospital. In an era in which personal development is seen as a priority, it is inevitable that any reduction of personal time becomes, for some individuals, a significant obstacle to pursue an academic career.

Third, several studies have evaluated the benefit to choose an academic career versus private practice. One major conclusion finds that such a choice is highly influenced by average expected future earnings. In any specialization, the average income for private practice is significantly higher than the one obtained as an academic practitioner. However, these observations come from a significantly different health care system. It seems important to remember that working as a doctor in a public hospital in Switzerland could provide a more comfortable and stable social security than the one a private practitioner can obtain.

Finally, it is important to note the decrease in social recognition attributed to physicians. Indeed, the choice to pursue an academic career often appears to be associated with more significant personal investment than a private career. Such an investment could be compensated by the social position of an academic title. Nowadays, although social recognition is still an important factor in the choice of medical studies, physicians often report the lack of recognition of their work. This further impairs potential personal investment. In addition to a general loss of social status, the clinician-scientist also faces a specific nonrecognition from his/her peers, who sometimes view research as a way to escape significant clinical duties, whereas it is actually often performed on top of such duties.

**Discussion**

Currently, institutions need to develop the continuity of academic careers.

In this article, we focus on a few challenges in the training of an academic career, and the responses given by these institutions, from the point of view of junior clinical scientists in the field of psychiatry. It was not our intention to make an exhaustive list of all the challenges but to start a reflection and a discussion of this important issue.

In light of those responses and challenges exposed above, more time and more training for academic work seem essential and should be offered to young clinicians, either by giving more emphasis on research and academic careers or by improving the view and the attractiveness of those career choices.

The gender equity is also important. Despite the fact that the percentage of women in medical school is currently higher than men, this ratio is reversed in research programs and in academic positions. In the Swiss MD–PhD program, there are only 35.1% of women among the students. Although the reasons for this discrepancy are still a matter of speculation, this fact is more and more considered when promoting not only academic careers but also equality within them. Furthermore, with a decrease in benefits associated with an academic career choice, there is a need to focus on what could be the next and new advantage.
of such a personal investment. Perhaps, emphasis should be placed on the meaning and the intellectual wealth implied by the choice of an academic career from a self-development perspective as well. The real core of the training and the function of a doctor who chooses to pursue an academic career is not clear to young clinicians. A scientist working in a lab, or spending days on specific data, is an inaccurate portrayal of an academic career. On the contrary, fostering mentoring and role models of physicians happy to combine clinical, research, teaching, and management work might improve the image of academic careers. In fact, the lack of mentorship was identified as one of the main limitations of the MD-PhD Switzerland program. Some programs have understood this need for mentorships and therefore focus on this activity, as it is the case with the Young Clinical Neuroscientists (YouCliN) mentoring program, developed by the YouCliN network of the Swiss Federation of Clinical Neuro-Societies.\(^{37}\) Lowering the amount of administrative work and communicating more on research, the time spent with patients, and teaching might be beneficial. Nonetheless, with a health system that is increasingly more connected to society, the knowledge and the management of a health care system take a prominent place during the activity of medical professor. Enhancing the attractiveness of an academic career also depends on the content of the latter. Consequently, exposing the real day-to-day work of an attending physician could attract new people and provide more appropriate training for this type of career.

**Conclusion**

The appeal of an academic position has not completely disappeared. The intellectual stimulation offered in university centers, as well as the variety and complexity of cases observed, continues to stimulate the interest of working in an institution, and therefore to start an academic career. Moreover, young physicians probably underestimate the diversity offered by an academic career, covering clinical work, research, teaching and management skills.

Emphasizing the function and the responsibility of a doctor who is personally involved with the institution may create new interest and desire for these kinds of careers among younger clinicians. Currently, we hope that the efforts put toward a more engaging process to attract and support clinician-scientists, especially in the field of psychiatry, will be pursued.

**Acknowledgments**

We thank Dr Paul Klauser (CHUV/UNIL) for general discussion and his comments on a previous version of the manuscript.

**Author contributions**

AR and CP researched literature and conceived the first draft of the manuscript. All authors reviewed and edited the manuscript and approved the final version of the manuscript.

**Declaration of conflicting interests**

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

**Funding**

The author(s) received no financial support for the research, authorship, and/or publication of this article.

**ORCID iD**

A Restellini 
https://orcid.org/0000-0002-8524-3516

**References**

1. Hostettler S and Kraft E. Statistique médicale 2019 de la FMH: forte dépendance de l’étranger. Bull Méd Suisses 2020; 101(13): 450–455.
2. SCImago. SCImago Journal & Country Rank, https://www.scimagojr.com/countrysearch.php?country=ch (n.d., accessed 18 April 2020).
3. Straus SE, Straus C, Tzanetos K, et al. Career choice in academic medicine: systematic review. J Gen Intern Med 2006; 21(12): 1222–1229.
4. Revet A, Hebebrand J, Bhide S, et al. Dual training as clinician-scientist in child and adolescent psychiatry: are we there yet? Eur Child Adolesc Psychiatry 2018; 27(3): 263–265.
5. Collaborative Stars. Medical research and audit skills training for undergraduates: an international analysis and student-focused needs assessment. Postgrad Med J 2018; 94(1107): 37–42.
6. Neville AJ. Problem-based learning and medical education forty years on. Med Princ Pract 2009; 18(1): 1–9.
7. Barrows HS. Problem-based learning in medicine and beyond: a brief overview. New Dir Teach Learn 1996; 1996(68): 3–12.
8. Thomas RE. Problem-based learning: measurable outcomes. Med Educ 1997; 31(5): 320–329.
9. Al-Drees AA, Khalil MS, Irshad M, et al. Students’ perception towards the problem based learning tutorial session in a system-based hybrid curriculum. Saudi Med J 2015; 36(3): 341–348.
10. Kong L-N, Qin B, Zhou Y, et al. The effectiveness of problem-based learning on development of nursing students’ critical thinking: a systematic review and meta-analysis. Int J Nurs Stud 2014; 51(3): 458–469.
11. Careers and Professional Activities of Graduates of the NIGMS Medical Scientist Training Program. National Institutes of Health, https://eric.ed.gov/?id=ED429501 (1998, accessed 7 August 2020).
12. Lee JS. MD-PhD students in the 1990s: finding a niche for the dual degree. JAMA 1995; 274(21): 1736–1737.
13. Kuehnle K, Winkler DT and Meier-Abt PJ. Swiss national MD-PhD-program: an outcome analysis. Swiss Med Wkly 2009; 139(37–38): 540–546.
14. Dos Santos Rocha A, Scherlinger M, Ostermann L, et al. Characteristics and opinions of MD-PhD students and
graduates from different European countries: a study from the European MD-PhD Association. *Swiss Med Wkly* 2020; 150: w20205.

15. Radhakrishnan R, Wasser T, Picon F, et al. Editorial training models for early-career psychiatrists. *Lancet Psychiatry* 2017; 4(7): 515–516.

16. Bernheim L and Balavoine J-F. Shortage of doctors in Switzerland: myth or reality? *Rev Med Suisse* 2016; 12(504): 280–281.

17. The Physician-Scientist Workforce Working Group. National Institutes of Health physician-scientist workforce group report, https://acd.od.nih.gov/documents/reports/PSW_Report_ACD_06042014.pdf (2014, accessed 6 June 2020).

18. Hirschtritt ME, Heaton PM and Insel TR. Preparing physician-scientists for an evolving research ecosystem. *JAMA* 2018; 320(1): 31–32.

19. Ansmann L, Flickinger TE, Barello S, et al. Career development for early career academics: benefits of networking and the role of professional societies. *Patient Educ Couns* 2014; 97(1): 132–134.

20. Kupfer DJ, Schatzberg AF, Dunn LO, et al. Career development institute with enhanced mentoring: a revisit. *Acad Psychiatry* 2016; 40(3): 424–428.

21. Compton MT, Frank E, Elton L, et al. Changes in U.S. medical students’ specialty interests over the course of medical school. *J Gen Intern Med* 2008; 23(7): 1095–1100.

22. Mahoney R, Katona C, Mcparland M, et al. Shortage specialties: changes in career intentions from medical student to newly qualified doctor. *Med Teach* 2004; 26(7): 650–654.

23. Faroqk, Lydall GJ, Malik A, et al. Why medical students choose psychiatry - a 20 country cross-sectional survey. *BMC Med Educ* 2014; 14(1): 12.

24. Katschnig H. Are psychiatrists an endangered species? Observations on internal and external challenges to the profession. *World Psychiatry* 2010; 9(1): 21–28.

25. Wenger N, Meun M, Castioni J, et al. Allocation of internal medicine resident time in a swiss hospital: a time and motion study of day and evening shifts. *Ann Intern Med* 2017; 166(8): 579–586.

26. Elliott DI, Young RS, Brice J, et al. Effect of hospitalist workload on the quality and efficiency of care. *JAMA Intern Med* 2014; 174(5): 786–793.

27. Strong EA, De Castro R, Sambuco D, et al. Work–life balance in academic medicine: narratives of physician-researchers and their mentors. *J Gen Intern Med* 2013; 28(12): 1596–1603.

28. Pfeiffer M, Fischer MR and Bauer D. Publication activities of German junior researchers in academic medicine: which factors impact factors? *BMC Med Educ* 2016; 16: 190.

29. Siemins DR, Punnen S, Wong J, et al. A survey on the attiudodes towards research in medical school. *BMC Med Educ* 2010; 10: 4.

30. Lowenstein SR, Fernandez G and Crane LA. Medical school faculty discontent: prevalence and predictors of intent to leave academic careers. *BMC Med Educ* 2007; 7: 37.

31. Langston JP, Kirby EW, Nielsen ME, et al. Economic impact of training and career decisions on urological surgery. *J Urol* 2014; 191(3): 755–760.

32. OFSP Oféderal de la santé publique. Revenus des médecins en Suisse. https://www.bag.admin.ch/bag/fr/home/zahlen-und-statistiken/statistiken-berufe-im-gesundheitswesen/statistiken-medizinalberufe1/statistiken-aerztinnen-aerzte/einkommen-aerztinnen-und-aerzte-in-der-schweiz.html (2018, accessed 8 August 2020).

33. Lévy D. Le métier de médecin aujourd’hui. *Rev Francaise Aff Soc* 2011; (2): 297–309.

34. Dusmesnil H, Serre BS, Régi J-C, et al. Professional burn-out of general practitioners in urban areas: prevalence and determinants. *Sante Publique* 2009; 21(4): 355–364.

35. Celebrating women in science. *Nat Cell Biol* 2018; 20(9): 993–993. DOI: 10.1038/s41556-018-0190-4.

36. Valantine HA, Grewal D, Ku MC, et al. The gender gap in academic medicine: comparing results from a multifaceted intervention for Stanford faculty to peer and national cohorts. *Acad Med J Assoc Am Med Coll* 2014; 89(6): 904–911.

37. Swiss Federation of Clinical Neuro-Societies. *Mentoring Program*, - SFCNS, https://www.sfcns.ch/mentoring.html (n.d., accessed 18 April 2020).