

# Culture of research and support for young scientists in medicine

Position paper issued by the  
Swiss Academy of Medical Sciences (SAMS)

 **SAMWASSM**

Schweizerische Akademie der Medizinischen Wissenschaften  
Académie Suisse des Sciences Médicales  
Accademia Svizzera delle Scienze Mediche  
Swiss Academy of Medical Sciences

## Information on the preparation of the position paper

The starting point for this position paper was an extraordinary meeting of the Senate of the SAMS held at the beginning of September 2014, focusing on the culture of research. A working group was then established to explore this topic in a series of meetings and to formulate recommendations. The members of the working group were as follows: Professor Beatrice Beck Schimmer, Zurich; Professor Mirjam Christ-Crain, Basel; Professor Philipp U. Heitz, Au; Professor Ulrich Hübscher, Bassersdorf; Professor Samia Hurst, Geneva; Professor Wolfgang Langhans, Schwerzenbach; Professor Peter Meier-Abt, Zurich; Professor Heini Murer, Beckenried; Professor Arnaud Perrier, Geneva; Professor Jean-Daniel Tissot, Lausanne; Professor Hanno Würbel, Bern; Professor Gregor Zünd, Zurich.

Based on this preliminary work, a small editorial group subsequently produced an initial draft of the position paper, which was submitted to the members of the working group and the Senate for comments.

On the basis of the feedback received, the document was revised and the final version was approved by the Executive Board of the SAMS at a meeting held on 30 June 2016.

Print versions of the position paper in French and German are available free of charge from the SAMS; electronic versions in English, French and German can be downloaded from [www.sams.ch/publications](http://www.sams.ch/publications)

# **Culture of research and support for young scientists in medicine**

Position paper issued by the  
Swiss Academy of Medical Sciences (SAMS)



Schweizerische Akademie der Medizinischen Wissenschaften  
Académie Suisse des Sciences Médicales  
Accademia Svizzera delle Scienze Mediche  
Swiss Academy of Medical Sciences

#### **Publisher**

Swiss Academy of Medical Sciences  
House of Academies  
Laupenstrasse 7, P.O. Box, 3001 Berne, Switzerland  
mail@samw.ch, www.samw.ch

#### **Design**

Howald Fosco Biberstein, Basel

#### **Printing**

Kreis Druck, Basel

1<sup>st</sup> Edition, 2016 (700 D, 300 F)

The positionpaper is available as hard copy in German or French: [order@samw.ch](mailto:order@samw.ch)



Copyright: ©2016 Swiss Academy of Medical Sciences

This is an open-access publication distributed under the terms of the Creative Commons attribution license (<http://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Recommended form of citation:

Swiss Academy of Medical Sciences (2016)  
Culture of research and support for young scientists in medicine.  
Swiss Academies Communications 11 (9).

ISSN 2297-8275 (Print)

ISSN 2297-184X (Online)

Executive Summary	5
1. Background	7
2. Culture of research in medicine	9
2.1 Research governance: implementation of and compliance with GRP, GCP and research ethics	10
2.2 Dissemination/publication of research results	11
2.3 Acquisition of third-party funding	12
2.4 Assessment of research outputs and researchers	12
2.5 Career development	13
3. Support for young scientists: from basic training to professorship	14
3.1 Basic training	14
3.2 Specialist training	15
3.3 Career development and transparent career paths	16
3.4 Professorial appointments	18
4. Organisational structures	20
5. Outlook	22
Literatur	23



## Executive Summary

For some years now, the quality of medical research has been called into question; at the same time, the shortage of young researchers in academic medicine is recognised as a growing problem. Since it can be assumed that there is a direct link between a research culture of integrity and trustworthiness and the motivation of young scientists to pursue a biomedical research career, the SAMS proposes a number of measures designed to improve both the culture of research and the situation of young scientists; as regards the culture of research, the following measures are proposed:

1. Research institutions should implement and ensure compliance with Good Research Practice and Good Clinical Practice guidelines, and establish independent bodies where possible violations can be reported and investigated.
2. Only results which have been validated within the research group should be more widely communicated; the individual contribution of each co-author must be specified. Access must be granted to original data, and negative research results are also to be made accessible to the public.
3. University hospitals in particular must, at an early stage, draw the attention of junior researchers to the fact that research activities must be financed independently of service provision and assist them in acquiring funding for research.
4. Publications must not be the only parameter used for the assessment of individual researchers; other factors to be taken into account are teaching activities, acquisition of third-party funding, innovative potential, career planning and possibly clinical skills, as well as compliance with scientific integrity guidelines, capacity for teamwork and family commitments.
5. Sustainable and gender-appropriate career development is seen as an essential component of a responsible culture of science, largely determining the attractiveness of a career in research.

With regard to supporting young scientists, the SAMS considers the following measures to be necessary:

1. MD-PhD and Dr. sc. med. programmes offer ideal training for physician-scientists and should be supported with high priority via the allocation of national and local funding.
2. At university hospitals and cantonal hospitals with research capabilities, appropriately qualified junior doctors who are interested in research should increasingly be granted protected research time during their specialist training.
3. Medical Faculties should ensure that the Swiss National Science Foundation's coherent and logically structured career funding schemes are coordinated with specialist clinical training and become firmly established at university hospitals.
4. At university hospitals – in addition to the limited number of chief physician posts – attractive, desirable and family-friendly career options should be made available for physician-scientists. Specifically, for example, the Attending Physician system (well established in the US) could be adopted and/or, at least at regional hospitals, so-called dual leadership could be introduced – i.e. separate managerial functions responsible for care and research, interacting closely with each other and offering rotation options.
5. In appointment procedures, performance in supporting young scientists should be among the most important assessment criteria. A professorial candidate's clinical, research and teaching potential is demonstrated not least by the number and quality of researchers that he or she has successfully trained or supervised.

The SAMS will establish a working group to oversee and actively support the implementation of these measures.



## 1. Background

At present, much attention is focused on measures to address the shortage of physicians, and in particular on efforts to improve primary care. The shortage of young researchers in academic medicine is less widely discussed, although it has been recognised as a growing problem for some years. In a position paper on “Medicine as a science”, issued in 2009, the SAMS proposed concrete measures to increase the attractiveness of a research-oriented career in the biomedical sciences [1]. While the support provided for early-career researchers has since been improved at certain universities and university hospitals (e.g. through the introduction of protected research time during specialist training), the overall quality of biomedical research has increasingly been called into question in recent years [2]. Loudly and clearly, it has been and continues to be argued that there is a need both to increase the value of medical research and to reduce waste, e.g. from unusable studies. This necessitates a comprehensive scientific change programme, which – through more effective utilisation of existing knowledge and more careful planning and execution of research – helps in particular to avoid the waste of financial, institutional and human resources associated with studies of no scientific value [3]. Likewise, a number of possible measures have been proposed, at various levels of the scientific research process (investigators, institutions, funding bodies, publishers/reviewers/journals), to improve the reproducibility of research findings – including improvements in the quality of training for junior researchers [4].

Since it can be assumed that there is a direct link between a research culture of integrity and trustworthiness and the motivation of young scientists to pursue a biomedical research career, the SAMS decided to take up this issue once again, establishing a working group that was to focus in particular on the situation in Switzerland. The working group identified, above all, a need for further action to ensure support for young scientists across the entire spectrum of biomedical research – from basic through translational to primarily patient-oriented clinical research. Here, urgent measures are proposed to promote physician-scientists, “the newest endangered species” [5]. The present paper follows on from earlier publications, notably the position paper “Medicine as a science” [1], the report of the thematic group on the next generation of clinical researchers in Switzerland [6], and the “Recommendations for gender-appropriate academic career paths” recently published by the Swiss Academies of Arts and Sciences [7]. It updates

the recommendations to ensure effective support and career development for physician-scientists, emphasising in particular their importance for a reliable and sustainable biomedical research culture. In the course of the discussions, however, it also became clear that the fundamental problems of an inadequate research culture affect not only the biomedical sciences but also other academic disciplines. The topic has therefore been taken up for further consideration by the Swiss Academies of Arts and Sciences. As the SAMS believes the proposed reforms to be indispensable, it will actively support their implementation by the institutions responsible.

## 2. Culture of research in medicine

An appropriate culture is crucial for high-quality scientific research. Only if there are recognised values and principles, endorsed by all researchers, can science as a communal enterprise generate robust and reliable knowledge. And only if there is a shared research culture can new studies build on earlier findings, thus permitting further advances. But the research system also involves a certain interdependence: to attract talented young scientists, there must be an appropriate culture; at the same time, this culture is shaped by the scientists themselves. If the culture of research is to be changed or improved, it is necessary to focus not only on the actors but also on the system, which exerts a decisive influence on the culture. While this applies to all disciplines, it is particularly important with regard to the improvements required in order to increase value and reduce waste in the biomedical sciences [2].

The core elements of the culture of research include all those factors which strengthen confidence among scientists in the results of their work [8]. Together, these factors add up to good research practice (GRP), which according to the UK Medical Research Council comprises various principles, such as research excellence and integrity, respect for ethical and legal requirements, honesty and transparency, openness and accountability, and active support for the training and development of young researchers [9].

Similar principles – though more specifically oriented towards clinical research – are specified in the good clinical practice (GCP) guidelines which have been an integral part of the Federal Act on Research involving Human Beings (Human Research Act, HRA) in Switzerland since 2014 [10]. Lastly, based on a recent survey of almost 1000 researchers working in bioscience or medicine, the UK-based Nuffield Council on Bioethics concluded that factors such as motivation, originality, accuracy, honesty, collaboration, multidisciplinary, openness/transparency and creativity are considered essential for high quality research [11].

In the current debate, increasingly numerous and vociferous critics argue that these goals are all too often neglected as a result of growing competitive pressures, and that they are not adequately supported by research institutions or the research system. Creativity in science, openness, fair collaboration and, more generally, readiness to comply with GRP principles are compromised by the pressure to publish in high-impact-factor journals, lack of time and the application of assessment criteria which are non-transparent, narrow or difficult to

comprehend. It is argued that, to improve the situation, a fundamental reform of the culture of research is needed [11]. Action is required at various levels of the research process, including research governance (implementation of and compliance with GRP, GCP and research ethics), the dissemination/publication of research results, the acquisition of third-party funding, the assessment of research outputs and researchers, and gender-appropriate and sustainable career development. Ultimately, the aim is to strengthen confidence among scientists, promote the sustainable development of teaching and research, and improve gender equity in science [8].

While the measures proposed in this position paper to improve the culture of research are based on the international recommendations cited above, particular consideration is also given to the situation in Switzerland.

## **2.1 Research governance: implementation of and compliance with GRP, GCP and research ethics**

Compliance with GRP and GCP guidelines is essential [9, 11], and responsibility for this rests with researchers and research institutions. The maxim must be “Quality before quantity”. Scientific integrity must be accorded top priority, with zero tolerance for scientific misconduct. Institutions are responsible for establishing independent bodies where suspected violations can be reported and investigated, and which can ensure that whistleblowers are not subject to any sanctions. Principles and procedures applicable for scientific integrity in Switzerland have been published by the Swiss Academies of Arts and Sciences [12, 13]

All research units should establish an error culture which makes it possible to prevent scientific misconduct and learn from mistakes. This includes structural measures such as the creation of a Critical Incident Reporting System for research, as well as human resources – i.e. reasonable research group sizes (a tutor can only supervise a limited number of doctoral students/postdocs) and external monitoring by experienced scientists.

The research culture must be characterised by respect, openness and transparency and facilitate team-oriented activities. Junior researchers must not be subjected to excessive publication pressures or be dependent on a single individual. They require a sympathetic and nurturing work environment, adequate research time, a transparent institutional framework, support in acquiring third-party funding, and predictable career paths.

In order to achieve the goals of GRP, the research system requires structures that provide financial and non-material support for researchers at all stages of their career in academic medicine. This calls for appropriate financial and human resources. Research institutions with high standards of GRP and research ethics should be recognised for their investment in these areas, e.g. via special certificates or labels; this should not, however, impose an additional administrative burden on these institutions.

## 2.2 Dissemination/publication of research results

Research within a group and an institution should be conducted with complete openness and transparency. Sharing of data between institutions is to be supported, and a nationally coordinated and structured system should be established for data archiving. Here, health related personal data must be anonymised in accordance with the requirements of the HRA.

Only results which have been validated within the research group should be more widely communicated, with particular care being paid to methodological details. Access to original data is to be granted in line with the BMJ Open Data campaign [14]. In addition, all results – including negative outcomes – should be made accessible to the public. The reporting of research results must be realistic, honest and non-sensationalist.

To ensure appropriate publication of research results, various reporting guidelines (e.g. STROBE, CONSORT and ARRIVE) may be consulted.

Authorship and co-authorship must be fairly assigned, in accordance with the principles defined at the national and international level [12, 13, 15]. Only individuals who have actively contributed to a research project should appear as co-authors; this is all the more true for first and last authors. A managerial position at a research institution is not in itself a sufficient justification for (co-) authorship. The individual contribution of each co-author must be specified. Publications must be written by the researchers themselves, and ghostwriting is to be strictly prohibited. In addition, any competing interests are to be declared.

At all public and private research establishments, including hospitals, funding should be made available to permit open access publication.

## 2.3 Acquisition of third-party funding

The acquisition of financial support for research is an important part of scientific activities. Researchers are to be encouraged to apply for third-party funding early in their career, familiarised with the relevant guidelines and offered support in preparing applications. This means, however, that junior researchers need to be accorded a degree of independence from their mentor at an early stage.

Funding bodies should communicate the criteria for the submission of applications and the evaluation procedure in a transparent and comprehensible manner. They should increasingly also support projects involving risk and collaborative research, with support being provided even for entire research groups.

University hospitals in particular must, at an early stage, draw the attention of junior researchers to the fact that research activities must be financed independently of service provision and assist them in acquiring funding for research. Providing information early on can help to prevent misunderstandings and unnecessary delays in career planning. Third party funding acquired for independent research projects must actually be made available to the junior researchers concerned.

If submissions are evaluated in a peer review process, the reviewers engaged must, as far as possible, be independent, and “old boys’ networks” are to be avoided. The quality of evaluations carried out by foundation boards should be periodically assessed by independent expert groups.

## 2.4 Assessment of research outputs and researchers

In recent years, there has been a growing consensus that, in assessing the performance of researchers, the importance attached to journal impact factors needs to be limited. Accordingly, the SAMS, the Swiss National Science Foundation (SNSF) and various Swiss higher education institutions have signed the San Francisco Declaration on Research Assessment (DORA) [16]. For the assessment of individuals’ research output, DORA supports the use of qualitative factors such as the scientific content of articles, the originality of research and citation usage. DORA explicitly warns against uncritical reliance on bibliometric indicators. The following should also be seen as important criteria for evaluating

research outputs: the influence of an article in a research field (new ideas, as opposed to more of the same), the reproducibility of published results and the quality of the five most important articles.

In addition, publications are only one parameter for the assessment of individual researchers; other factors which should be taken into account are teaching activities, acquisition of third party funding, innovative potential, career planning and possibly clinical skills, as well as compliance with scientific integrity guidelines, capacity for teamwork and family commitments. For established researchers, perhaps the most important evaluation criterion is the number of young trainees with a successful scientific career of their own (cf. 3.4).

## 2.5 Career development

Sustainable and gender-appropriate career development is seen as an essential component of a responsible culture of science [5–7], largely determining the attractiveness of a career in research. Physician-scientists must be informed about academic career paths at an early stage. They require continuous, expert scientific mentoring. They must be fully integrated members of research teams, and appropriate supervision should be provided by the research group leader. Responsibilities within the research group need to be clearly defined.

The independence of junior researchers must be fostered at an early stage. This entails compliance with GRP guidelines, including scientific integrity, a “lived” error culture, responsibility for laboratory record keeping/study protocols, sharing of data between team members, regular presentations at local team meetings and at national or international conferences, and preparation of publications and applications for third-party funding. All of this necessitates adequate supervision, which can only be assured if research groups are not too large.

Finally, physician-scientists require understanding and appreciation of their research activities in the clinical environment. In spite of economic pressures in the healthcare sector, university hospitals must make sufficient time available for research activities. Working conditions need to be designed so as to ensure that individual career planning is not adversely affected by gender-specific situations such as pregnancy and maternity leave.

### 3. Support for young scientists: from basic training to professorship

Physician-scientists, in addition to full basic and specialist clinical training, require scientific training encompassing both theory and practice. The research orientation should therefore begin at an early stage, and the entire basic and specialist training period should be accompanied by continuous, expert scientific mentoring. Physician-scientists with extensive training and experience in GRP, GCP and research ethics will be better placed to thrive in a competitive research environment and to make a positive contribution to the culture of research.

#### 3.1 Basic training

Of crucial importance is the early identification of medical students interested in research (cf. [1], Section 2.1b). They should, at an early stage, be informed of the specialist training and career options available for physician-scientists in Switzerland and be encouraged to address concrete research questions; a research-oriented Master's thesis provides a good opportunity to enter the field.

The Master's phase of the medical course should be structured so as to prepare the way for specific career tracks and professional orientations, such as primary care (GP), specialist (practice, hospital), or scientific/academic medicine (biomedical foundations, clinical research, health services/public health research).

Instruction should be provided in the principles of GRP and GCP and the rules of scientific integrity. Having completed their studies, medical students interested in research should be familiar with the legal requirements for research involving humans and be able to plan straightforward HRA-related research projects correctly and submit applications to the responsible ethics committee.

MD-PhD and Dr. sc. med. programmes offer ideal training for physician-scientists and should be supported with high priority via the allocation of national and local funding.

Special achievements must be recorded and recognised through appropriately structured reward systems, e.g. qualifications or certificates.



### 3.2 Specialist training

During their specialist training, appropriately qualified junior doctors who are interested in research must increasingly be granted protected research time. They should be integrated into reasonably sized research groups, receive active support to facilitate their induction into the science community, and be able to develop their own identity as researchers at an early stage; this includes assignment of responsibility for projects, first or senior authorship for publications, independent acquisition of funding, etc.

The centres responsible for specialist training must promote a high-quality culture of research. Further courses in GRP and GCP should be offered during specialist training. Planning and implementation of HRA-compliant human research projects must be made mandatory components of specialist training.

The recommendations for gender-appropriate academic career paths [7] must also be put into effect in the area of academic medicine and biomedical sciences. In particular, Medical Faculties should ensure that the Swiss National Science Foundation's coherent and logically structured career funding schemes [17] are coordinated with specialist clinical training and become firmly established at university hospitals.

Providing support for young scientists is also one of the most important tasks for teachers at higher education institutions. High-quality support should be recognised, e.g. through accreditation of research institutions and/or awards for special efforts on the part of research leaders.

Mobility should generally be encouraged, i.e. doctoral and postdoctoral research should not be conducted within the same group, and specialist training should take place in at least two different hospitals. The mobility requirements specified for SNSF funding programmes should be taken into account for the benefit of independent career planning. It is also worthwhile to undergo part of one's specialist training abroad. However, "compulsory mobility" must not be allowed to interfere with reasonable family planning, or adversely affect women or men; it should therefore be possible to be exempted from this requirement on submission of a reasoned request (including an appropriate alternative) and to include the dispensation in the CV.

Physician-scientists should ideally obtain a specialist title, but must have completed at least three years of specialist clinical training in order to qualify for an advanced SNSF career funding programme (including a fellowship for a stay abroad). It should be possible for patient-oriented clinical research within a specific discipline to be fully taken into account for the relevant specialist title – e.g. 50 per cent clinical research in the discipline plus 50 per cent patient care would count as 100 per cent for the specialist title. This would necessitate the specification of different requirements for specialist titles for academic medicine and for practical care. In some cases, this in turn would require a more research friendly approach on the part of specialist medical associations.

### 3.3 Career development and transparent career paths

Physician-scientists still require active support after they have successfully completed their basic and specialist training, and clinical training should be combined with research oriented activities. The aim is to enable young scientists to become fully fledged principal investigators. This career phase makes special demands both on physician-scientists and on their superiors. The former need to reconcile independent research, acquisition of third party funding and time spent abroad with family planning. The latter – chief or senior physicians – must not only delegate responsibility but also enable young scientists to develop and establish themselves independently, according them respect and recognition. Superiors should be rewarded for supervisory activities, and the quality of supervision provided for young scientists must be integrated into the portfolio of research institutions and be an important criterion in the assessment of academic CVs.

Commitment to career development is a hallmark of the culture of research. Transparent career paths need to be created for research-oriented physicians so that – in addition to the limited number of chief physician posts – attractive, desirable and family-friendly career options are available for physician-scientists at university hospitals. Specifically, for example, the Attending Physician system (well established in the US) could be adopted and/or, at least at specialist clinics, so-called dual leadership could be introduced [1] – i.e. separate managerial functions responsible for care and research, interacting closely with each other and offering rotation options.

Structured programmes running for several years ensure that specialist clinical training can be meaningfully combined with research-oriented activities or the conduct of research projects. This would require existing training programmes to be expanded; in some cases, a greater focus on clinical research would also be needed (e.g. the MD-PhD programme).

Institutionalised independent supervisory committees, similar to doctoral committees, can ensure that the advanced career development of physician-scientists (e.g. postdoctoral fellowships, assistant professorships) does not depend on a single individual; the supervisory committee would also ensure that transparent evaluation criteria are applied for clinical practice and research, as well as being responsible for regular monitoring of the performance of young researchers.

Working and employment conditions must also make it possible for physician-scientists to balance professional and family life. Performance pressures can be reduced by granting sequential protected research time; appropriate consideration should be given to pregnancy and maternity leave in performance assessments – they must not be grounds for the suspension of employment or the termination of a scientific career [7]. The same applies for men working part-time for family reasons.

To finance research posts at university hospitals, research funding pools with transparent, performance-related allocation mechanisms should increasingly be established. The resources required for this purpose could be generated by, for example, levies on private fees and/or donations from patients. Young scientists should be supported in the use of existing funding options and be introduced, in particular, to the advanced funding programmes of the SNSF.

Tenure-track assistant professorships should increasingly also be established at university hospitals. At academic medical institutions, in addition to chief physicians responsible for patient care, there should also be full-time managerial posts for basic, translational and/or clinical research.

Physician-scientists fully trained in clinical care and research generally have excellent and diverse professional opportunities, not only in clinical medicine (hospital or practice), research-oriented academic medicine (including health services and public health research) and the public healthcare system, but also in the private health sector (e.g. pharmaceutical industry, medtech, IT/big data).

Providing detailed information about future prospects will help to motivate young researchers beginning their career as physician-scientists. This is demonstrated, not least, by the success of the International BioCamp held each year by Novartis, where up to seventy selected young scientists learn about career options in the pharmaceutical industry [18].

Events of this kind should also take place regularly at universities and university hospitals. Transparent and reliable presentations of the career opportunities available for physician scientists in academic medicine will reduce the risks of frustration and “dropping out” early on.

Another powerful motivator for researchers is the potential opportunity to create intellectual property and to commercialise innovations through spin-offs or start-ups. The interests of the funding institutions can be safeguarded by technology transfer organisations such as Unitectra. Examples of spin-offs and start-ups of this kind can be found not only at the federal (CTI, ETH) but also at the cantonal level (university hospitals), and additional support should be provided for such ventures.

The leaders of Graduate Campus organisations and clinical research departments should regularly inform young scientists about existing and newly established career paths in academic medicine. As it would be desirable to have a Graduate Campus specifically designed to meet the needs of Medical Faculties, it should be investigated whether a Medical Graduate Campus could be jointly developed and operated by several Medical Faculties in Switzerland.

### **3.4 Professorial appointments**

From the outset, young scientists should be aware of the requirements that have to be met for a professorship and the criteria used for appointments; this also applies for tenure track assistant professorships. The requirements and criteria for professorial appointments should therefore be communicated fully and openly. When appointments are made, any deviations from the published set of requirements must be justified in a transparent manner.

Recommendations for choosing an academic chair – elaborated at a “chair4medicine” workshop at Zurich University – were published in Nature in 2015 [19]; these should now be established and implemented over the long term, with particular attention being paid to gender equity.

In appointment procedures, performance in supporting young scientists should be among the most important assessment criteria. A professorial candidate’s clinical, research and teaching potential is demonstrated not least by the number and quality of researchers that he or she has successfully trained or supervised.

In other words, what counts are not just publications with senior authorship but, equally, independent publications by junior researchers and the number of successful research careers that a university teacher has launched. This in turn means that the institution or organisation must itself offer an environment in which young scientists can be supported. Accordingly, continuous evaluation of institutions (e.g. hospitals and departments of university hospitals) and of medical professorships should be an integral part of the culture of research in academic medicine, with particular attention being paid to the support provided for young scientists. At the same time, evaluations of performance are only worthwhile if they are associated with appropriate consequences.

## 4. Organisational structures

Academic medicine is shaped not only by people and their culture, but also by the structures in which it is pursued. Accordingly, the prerequisites and measures described in Sections 2 and 3 for promoting the culture of research and supporting young scientists must also be reflected in institutions' organisational structures.

In university hospitals, there is a risk that the culture of research will be marginalised as a result of economic constraints. If the university hospitals wish to fulfil their leadership role in tertiary medicine, the university research and teaching mission must be reflected in the organisational management structures.

University hospitals should be led by academics with broad clinical, research and managerial experience. The organisation should ensure an appropriate division of care, research, teaching and management responsibilities. In particular, specialist clinics should have separate leaders – working closely together – responsible for research and care provision, in accordance with the above-mentioned dual leadership principle.

Medical service provision and scientific activities are to be recognised as of equal status and should interact as closely as possible in the interests of translational research. Especially in the era of Big Data/Big Health, there is a need for interhospital and interdepartmental research structures permitting higher-level access to hospital information systems, research databases and biobanks.

Because research, including research posts, must not be cross-financed by the service provision sector, university hospitals are dependent on an appreciation of their complex challenges and on special support from the universities.

The Medical Faculties must ensure that appropriate research structures are in place at the university hospitals, where a high-quality research culture can be “lived”. This includes the elements discussed above, such as compliance with the principles of GRP and GCP, scientific integrity, a lived error culture, teamwork, openness and trust, gender-appropriate career development, and equal recognition of clinical practice and research during specialist training.

The universities should support the university hospitals in establishing specialist clinical training posts where protected research time is included in the job description. Together with the SNSF, they should plan realistic career paths that allow physician-scientists to balance the competing demands of clinical practice, research and family as successfully as possible, and to remain eligible in the long term for senior positions in academic medicine.

Career paths at the university hospitals should be made more flexible and multi-dimensional in accordance with Anglo-American models, e.g. by introducing the Attending Physician system or preclinical professorships with clinical responsibility in certain areas of specialisation.

To promote the establishment of appropriate organisational structures, institutions (hospitals, departments, research groups) with an excellent culture of research and support for young scientists should receive special recognition or accreditation. For this, the requisite resources could be made available, for example, by the SNSF, the SAMS, the Swiss Association of University Medicine or another academic organisation.

## 5. Outlook

This position paper reflects the long-standing commitment of the SAMS to improve the culture of research and support for young scientists in academic medicine [1,6,13,15]. It assumes that there is a link between deficiencies in the culture of biomedical research – widely discussed internationally – and the all too evident decline in the motivation of young physicians to pursue a scientific career. Added to this are the multiple and cumulative challenges posed by clinical practice, research and family, which make it extremely difficult for physician-scientists to achieve a reasonable work-life balance.

The existing shortage of young scientists in all branches of biomedical research (basic, translational and clinical) will certainly become more acute unless effective measures are taken to increase the attractiveness of a career as a physician-scientist. This has now been recognised both at the national and the international level. For example, under the EU Horizon 2020 programme, great importance is attached to promoting the attractiveness of scientific careers and gender balance in research activities [20]. In Switzerland, support for young scientists in biomedical and especially clinical research has been placed on the political agenda [21], partly as a result of a report on the future of medical education co authored by the SAMS [6] and in response to pressure from the pharmaceutical industry.

This position paper shows that, in order to improve the situation, effective action is needed at various levels of the biomedical research system. What is required is a scientific change programme, promoting, inter alia, a credible research culture, more flexible supervision and specialist training models, changes of approach among senior managers, flatter hierarchies, more transparent career paths and more appropriate research structures at university hospitals. The implementation of these multidimensional measures poses challenges not only for policymakers but also for all institutions within the Swiss education and health system. The SAMS is also prepared to address these challenges and to make an active contribution to achieving the necessary improvements in the culture of research, support for young scientists and organisational structures in academic medicine; it will establish a working group to oversee and actively support the implementation of the proposed measures.



## Literatur

- [1] **Medicine as a science.** Position paper of the Swiss Academy of Medical Sciences, 2009
- [2] **Research: increasing value, reducing waste.** The Lancet, January 2014, [www.thelancet.com/series/research](http://www.thelancet.com/series/research)
- [3] **G. Antes: Big Data, Innovation, Personalisierte Medizin und Co. – Sind dies die Markenzeichen einer neuen Wissenschaft(-lichkeit) in der Medizin?** Laborjournal 22(10): 28–32, 2015.
- [4] **C. G. Begley, J. P. A. Ioannidis: Reproducibility in science: improving the standard for basic and preclinical research.** Circ. Res. 116(1); 116–26, 2015.
- [5] **J. Rehman: The Newest Endangered Species: Physician-Scientists.** Scientific American, July 5, 2014. <http://blogs.scientificamerican.com/guest-blog/the-newest-endangered-species-physician-scientists>
- [6] Bericht der Themengruppe **“Nachwuchs für die Klinische Forschung in der Schweiz”/ Rapport du groupe thématique “Relève pour la recherche clinique en Suisse”,** SAMS and FOPH, November 2014
- [7] **Recommendations for gender appropriate academic career paths.** In: P. Felber: Einschätzung der Karrieresituation von Nachwuchswissenschaftlerinnen in der Schweiz. Swiss Academies Communications Vol. 11, No. 2, 2016.
- [8] **J. Hacker, S. Wittig and St. Artmann: Wissenschaftskultur: Wo liegt das Problem?** Conference “Is a new science culture needed?”, 7 July 2014, Zurich
- [9] **Good research practice: principles and guidelines.** Medical Research Council (MRC) UK, 2014. [www.mrc.ac.uk/publications/browse/good-research-practice-principles-and-guidelines](http://www.mrc.ac.uk/publications/browse/good-research-practice-principles-and-guidelines)
- [10] **Federal Act on Research involving Human Beings (Human Research Act, HRA).** [www.admin.ch/opc/en/classified-compilation/20061313/index.html](http://www.admin.ch/opc/en/classified-compilation/20061313/index.html)
- [11] **C. Joynton, O. Leyser: The culture of scientific research.** F1000 Res 4; 66, 2015. <http://f1000research.com/articles/4-66/v1>
- [12] **Authorship in scientific publications: analysis and recommendations.** [www.akademien-schweiz.ch/en/dms/E/Publications/Guidelines-and-Recommendations/integrity/Academies\\_Authorship.pdf](http://www.akademien-schweiz.ch/en/dms/E/Publications/Guidelines-and-Recommendations/integrity/Academies_Authorship.pdf)
- [13] **Integrity in scientific research: principles and procedures.** Swiss Academies of Arts and Sciences, 2008 [www.akademien-schweiz.ch/en/dms/E/Publications/Guidelines-and-Recommendations/e\\_Integrity.pdf](http://www.akademien-schweiz.ch/en/dms/E/Publications/Guidelines-and-Recommendations/e_Integrity.pdf)
- [14] **BMJ Open Data campaign .** [www.bmj.com/open-data](http://www.bmj.com/open-data)
- [15] **Defining the Role of Authors and Contributors.** International Committee of Medical Journal Editors (ICMJE). [www.icmje.org/recommendations/browse/roles-and-responsibilities/defining-the-role-of-authors-and-contributors.html](http://www.icmje.org/recommendations/browse/roles-and-responsibilities/defining-the-role-of-authors-and-contributors.html)
- [16] **San Francisco Declaration on Research Assessment (DORA),** 2013. [www.ascb.org/dora](http://www.ascb.org/dora)
- [17] **M. Vetterli, U. Frey. Akademische Medizin: Förderinstrumente des Schweizerischen Nationalfonds/Médecine académique: Instruments d’encouragement du Fonds National Suisse.** SAMW Bulletin/Bulletin ASSM 2/2016, 1–4.
- [18] **Novartis International BioCamp.** [www.novartis.ch/de/ueber-uns/unsere-engagement/learn-life/international-biocamp](http://www.novartis.ch/de/ueber-uns/unsere-engagement/learn-life/international-biocamp)
- [19] **P. A. Clavien, J. Deiss. Leadership: Ten tips for choosing an academic chair.** Nature 519; 286–7, 2015.

- [20] Promoting Youth Scientific Career Awareness and its Attractiveness through Multi-stakeholder Co-operation (MultiCO). [http://cordis.europa.eu/project/rcn/198080\\_en.html](http://cordis.europa.eu/project/rcn/198080_en.html)  
Leading innovative measures to reach gender balance in research activities. [http://cordis.europa.eu/project/rcn/197300\\_en.html](http://cordis.europa.eu/project/rcn/197300_en.html)
- [21] S. Hehli, Jungärzte scheuen klinische Forschung. Work-Life-Balance statt Pillentests. Neue Zürcher Zeitung, 30.4.2016.



