

Summary

- The representation of women in academic STEM careers is poor, but improving. Although the number of females entering undergraduate and postgraduate courses is increasing, women are less likely than their male colleagues to reach senior positions on the academic career ladder. Diversity in the workforce is an asset and so understanding the reasons for this imbalance and developing strategies to counter this are essential. Therefore, the Academy welcomes this inquiry and the opportunity to contribute to this evidence base, particularly in academic medicine.
- A number of barriers faced by women within academic STEM careers have been identified. The insecurity of fixed term contracts, uncertainties about career flexibility and lack of female role models have been identified as barriers to women seeking to progress in their academic careers. Within academic medicine, women experience a 'glass ceiling' to progression at senior employment levels, where there is a greater drop in the number of women at senior employment levels compared to early career grades. Additional barriers including reduced award rates for women in academic medicine applying for funding at senior levels may contribute to this.
- Improving the representation of senior female STEM professionals will require broad cultural and structural changes across academic institutions. Intervention at both the undergraduate and postgraduate level could better inform students and medical trainees about academic careers and provide networking opportunities with excellent female academics. A number of initiatives have been set up to encourage the progression of women in academic STEM careers, including mentoring, retraining following career breaks and flexible working.
- The Academy aims to encourage medical students to engage in clinical research through our INSPIRE scheme. We also support early career clinical academic trainees through facilitating one-to-one mentoring, workshops and networking events.
- The Government should identify and encourage best practice in higher education institutions (HEIs) across the UK. It will be essential to monitor closely the representation of women in academic STEM careers over time to determine the effectiveness of different modes of intervention.
- The Academy would be happy to give oral evidence to the Committee.

Introduction

1. The Academy of Medical Sciences promotes the translation of medical science into benefits for society. Recognising and promoting excellence in medical science lies at the heart of all our work. Although the Academy supports the progression of women across all academic STEM careers, our strong clinical research base and previous work in this area has led us to focus on women in clinical academic medicine in this response. The Academy produced a Task Force Report in 2013 investigating the representation of women in our Fellowship and the wider UK academic science workforce. Other organisations, notably our partners in the Athena Forum, are better positioned to provide a detailed response regarding other academic STEM careers.
2. Over the past decade, reports from a number of organisations have highlighted that women are still less likely than their male colleagues to advance to senior positions in academia -

across science, engineering and technology disciplines - despite their growing numbers in undergraduate and postgraduate courses since the 1970s.¹ This has been likened to a 'leaky pipeline' with a gradual loss of women working at each career stage following postgraduate training, from Post-doc to Lecturer, Senior Lecturer and Professor.

3. More specifically, in academic medicine, the most recent figures from the UK Medical Schools Council (MSC) show that, as of July 2012, women clinical academics accounted for 43.7% of Clinical Lecturers, but only 32.0% of Senior Clinical Lecturers or Readers. There was then a greater drop off with women representing only 15.9% of Professors. This represents more of a 'glass ceiling' effect with the rate of attrition being higher in senior positions. Further, there is clear evidence of differences between the profiles of men and women by age and clinical academic grade, with men appearing to be more likely to achieve promotion to senior academic positions at an earlier age. Progress towards more balanced gender representation has been made in academic medicine. Since 2004, when gender data were first recorded, there has been a 41% increase in the number of female clinical academics overall, with a 54% increase in the number of female Lecturers, a 25% increase at Senior Lecturer grade, and a 70% increase at Professorial grade, although at senior levels these changes are modest in terms of absolute numbers.² Although progress is being made in increasing the proportion of female clinical academics, the current situation is still far from the gender equality to which we aspire.

Why do numbers of women in STEM academic careers decline further up the career ladder?

4. An understanding of the barriers faced by women on the academic career path is necessary in order to develop effective strategies and aid the progress of female representation in this field. The UK Resource Centre (UKRC), a company contracted by the Government from 2004-12 to increase opportunities for women in STEM and now under WISE (Women in Science, Engineering and Construction), highlighted some of the barriers to successful research careers for women, which are similar across all academic STEM disciplines:³
 - Women with families face a number of disincentives to pursuing a career in academic STEM.
 - The insecurity of fixed term contracts. Although the overall percentage of fixed-term contracts in academia has been declining, it remains fairly high in STEM disciplines. The majority of STEM postgraduates begin their careers as contractual research staff before being considered for more permanent posts of lecturers and independent fellows.
 - A 'long-hours culture' of work. Family obligations result in women often making a choice between family responsibilities and career progression. As a consequence, women are keen on part-time work despite the possible detrimental effects on their careers through reduced publications and output.
 - Lack of support. There is a general perception among researchers that it is difficult to take maternity leave whilst being funded by a research fellowship, and that there is a lack of support for women returning from maternity leave.

¹ Medical Schools Council, 2013. A Survey of Staffing Levels of Medical Clinical Academics in UK Medical Schools as at 31 July 2012.

http://www.medschools.ac.uk/News/Pages/2012_Clinical_Academic_Staff_Survey_published.aspx.

² *Ibid.*

³ UKRC, 2009. Female Attrition, Retention and Barriers to Careers in SET Academic Research. Royal Society of Edinburgh, 2012. Tapping all our talents. NAS, 2010. Gender Differences at Critical Transitions in the Careers of Science, Engineering, and Mathematics Faculty.

- Reduced mobility. A reduced mobility for women with families that have settled in a single location diminishes the capacity to move to the best universities/institutes in their research field and to establish networks and collaborations in pursuing their academic interests.
 - Lack of female role models. The lack of visibility of successful women in senior academic positions results in reduced attraction and retention of young women in STEM professions.
 - Fewer opportunities for networking with a masculine culture in STEM disciplines, particularly in engineering and computer science, with the UKRC reporting that many women often felt that they needed to blend in with the culture.
 - Poor supervision and encouragement from PIs. Female PhD students and post-docs interviewed in the UKRC Report in particular stated they often feel powerless to resolve supervision issues and feel a lack of integration with their research groups.
5. As stated earlier, in this response we focus on academic medical careers: many of these issues are familiar to academic medicine and have also been raised from our discussions with female clinical academics.

Attrition in academic medicine

6. It is important to note differences in the patterns of attrition between academic STEM careers. Although the 'leaky pipeline' pattern of attrition holds true in the life sciences, a 'glass-ceiling' effect is apparent for the progression of women in academic medicine. The Research Councils UK (RCUK) 2009 Annual Report highlighted that while most subject disciplines demonstrate a gradual drop in representation of women across career grades, academic medicine demonstrates a marked loss moving from earlier career grades to Senior Lecturer and Professor positions.⁴ Therefore, it is important to identify whether the reasons for attrition within academic medicine are similar to those of other disciplines or whether there are additional barriers to progression faced by women in academic medicine at these senior levels.
7. The Academy investigated this and found that gender differences in the number of women applying for and attaining more senior levels of Fellowship awards may contribute to the 'glass ceiling' effect in clinical academia. These awards provide researchers based in universities and other institutions with funding for a long term project (3-6 years) in order to establish or further develop an independent research group. Our Task Force investigation into the representation of women in senior academic research positions revealed that for both non-clinical and clinical research the proportion of men and women applying for and attaining Fellowship awards was broadly equivalent at the junior level. While there was notable attrition in the proportion of women applying for the awards at the intermediate and senior level for both types of research, the award rate for women was markedly decreased at senior levels within clinical academia.⁵ It is essential to corroborate these findings with a larger cohort of funding schemes and consider the causes of this bias at senior academic levels in order to develop strategies to address this.
8. Academic clinicians are required to complete clinical training in their chosen speciality in addition to developing a research portfolio. Clinical training programmes have demanding and specific requirements and have to be completed by specified dates. This, when combined with

⁴ RCUK Annual Report (2009): Sustainability of the UK Research Workforce

<http://www.rcuk.ac.uk/documents/researchcareers/SustainabilityoftheUKResearchWorkforce.pdf>

⁵ The Academy of Medical Sciences (2013): The Representation of Women within the Academy's Fellowship
<http://www.acmedsci.ac.uk/index.php?pid=291>

family/other commitments, may leave little opportunity for women to progress their research career.

9. The relative insecurity of fixed term contracts for clinical academic trainees contrasts with the relative job security for trainees and consultants in full-time NHS clinical posts.

What should universities and the higher education sector do to retain women graduates and PhD students in academic careers? Are there examples of good practice?

10. A number of activities have been initiated that aim to address the attrition of women along the academic medicine career pipeline.

Better informing medical students about academic careers

11. Clinical academic researchers are individuals who are medically qualified and train as academic researchers following registration. They undertake research and teaching responsibilities within UK medical schools as well as dedicating time to clinical work. A survey conducted by the MSC on both male and female medical students reports that students were confused about the meaning of the term 'clinical academic', most thinking clinical academics taught and did research without understanding the clinical commitment. There was general anxiety that they would lose patient contact and clinical skills in an academic role. Female students specifically highlighted the very few senior role models in academic medicine.⁶ Therefore, schemes to better inform medical students' perceptions of a career in clinical academic medicine may have a beneficial role in attracting the future generations of clinical academics, particularly women.
12. The Academy runs a number of schemes that focus on promoting academic medicine as an attractive career pathway to medical students and Foundation Year doctors. These are a key component in the Academy's drive to attract and develop the brightest individuals to careers in biomedical science. For example, INSPIRE grants are awarded to medical and dental schools for organising research studentships, medical science fairs and other activities promoting a research career to undergraduates. This provides an opportunity for medical students to engage with successful female academics as an inspiration to explore academic medicine. We plan to monitor student research activities across different medical schools over the course of the scheme, to aid evaluation of progress on research activities.

Promoting institutional cultural change

13. Improving the representation of women at senior levels of academic STEM careers will require broad cultural and structural changes across a wide variety of institutions. The Athena SWAN Charter, launched in 2005, seeks to address this by recognising universities that are committed to increasing the representation of women in their institutes at all levels of their careers. 76 universities and research institutes are now members of the Charter and 105 awards were made in the last round of applications in 2011.
14. In 2011, the Chief Medical Officer and Head of the National Institute of Health Research (NIHR), Dame Sally Davies' FMedSci announcement that all host institutions of biomedical research centres and units wishing to reapply for NIHR funding would need to achieve silver status Athena SWAN awards sent an important signal about the importance of supporting

⁶ Medical Schools Council 2007. Women in Clinical Academia: Attracting and Developing the Medical and Dental Workforce of the Future.

female researchers in STEM careers. The 2011 Athena SWAN report of the impact of these awards identified that they have had a positive impact in terms of organisational structure and culture change, with increases in the proportion of female STEM students and academics, better representation of women on decision-making senior management committees, improvements in women's transition from postdoctoral researcher to first academic post, improved working practices, such as flexible working, to support career progression and growth in women's networking across HEIs.⁷

Mentoring

15. Studies into the poor representation of women at senior levels of clinical academia have highlighted lack of effective mentoring as a key barrier to career progression. Mentoring is reported to have a variety of benefits for participants; including job satisfaction, career advancement and success, as well as to organisations; by improving retention and organisational success.⁸ The limited but robust literature also highlights that mentoring needs vary by career stage depending on the support skills required at each stage, thus the nature of mentoring relationships may evolve over time.⁹ Embedding mentoring in a multi-component intervention, including networking opportunities and development workshops, can also be more effective.
16. This is reflected by the Academy's experience. The Academy provides a one-to-one mentoring programme by Academy Fellows for postdoctoral clinical academic trainees, which includes the opportunity to attend events and workshops in order to maximise their mentoring experience and build personal networks. A review of our scheme has highlighted the importance of mentoring for aspiring clinical academics. The evaluation found 82% satisfaction with the scheme, with 53% believing that the mentoring scheme helped them to stay in academic medicine rather than return to clinical practice alone. The Academy is currently seeking to increase the diversity of our Fellowship and address female representation. This would increase the diversity of academic scientists who could act as mentors.
17. We would like all HEIs to have mentoring schemes in place, and ensure that they identify the needs of women at different stages in their career and tailor their schemes accordingly.

Flexible Fellowships

18. There are a number of award schemes designed to support women at early stages in their scientific careers and also the re-entry of women and men into the workplace following a career break. However, quantitative evidence of their impact on career progression is currently limited, given their relative youth and small number of awards compared to the academic STEM workforce:
 - L'Oreal Women in Science Fellowships, launched in 2007 for outstanding female postdoctoral researchers, has awarded four Fellowships every year that intend to provide flexible support for women to pursue their research careers within the UK and Ireland. Women can choose to spend their fellowships in any way to aid their research, from paying for childcare to travel costs or buying scientific equipment.

⁷ Athena SWAN: Measuring Success 2011

<http://www.athenaswan.org.uk/sites/default/files/Athena%20SWAN%20Impact%20Report%202011.pdf>

⁸ Equality Challenge Unit, 2010. Mentoring: progressing women's careers in higher education.

⁹ Balmer, D. *et al.*, 2011. How Mentoring Relationships Evolve: A Longitudinal Study of Academic Pediatricians in a Physician Educator Faculty Development Program: *Journal of Continuing Education in the Health Professions*, v. 31, p. 81-86.

- Daphne Jackson Trust Fellowships are designed to retrain and update skills of returning scientists through a two-year tailored skills and research programme. They have a 96% success rate of returning awarded Fellows to STEM careers.
- The Wellcome Trust Career Re-entry Fellowships offer research funding to enable academics to continue research in flexible manner.
- The Royal Society's Dorothy Hodgkin Fellowships are for outstanding early stage researchers requiring flexible working patterns. They cover research expenses and indirect costs for a maximum of five years.

19. With regard to medicine, the NIHR integrated academic training pathway has brought clarity and resource to the training of clinical academics. Nonetheless, consideration could be given to increasing the duration and flexibility of appointments and to continuing support into and beyond the postdoctoral research stage. This would help all trainees, but particularly women, to become competitive for substantive academic posts.

What role should the Government have in encouraging the retention of women in academic STEM careers?

20. The Government should continue to encourage and support schemes that promote women in academic STEM careers and encourage the good practice to continue. The Government should ensure that comprehensive data on the representation of women in academic STEM careers is collected and monitored across various institutions in order to identify effective practices.

This response was informed by Fellows, and approved by the Registrar, of the Academy of Medical Sciences. This response was prepared by Maria Alfaradhi (Policy Intern). For further information, please contact Dr Simon Vincent (simon.vincent@acmedsci.ac.uk; +44(0)20 3176 2157).

The Academy of Medical Sciences

The Academy of Medical Sciences promotes advances in medical science and campaigns to ensure these are converted into healthcare benefits for society. Our Fellows are the UK's leading medical scientists from hospitals and general practice, academia, industry and the public service.

The Academy seeks to play a pivotal role in determining the future of medical science in the UK, and the benefits that society will enjoy in years to come. We champion the UK's strengths in medical science, promote careers and capacity building, encourage the implementation of new ideas and solutions – often through novel partnerships – and help to remove barriers to progress.

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