

Training and Retaining Physician–Scientists in Dermatology: A United Kingdom Perspective

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JID Innovations (2022) 2, 100091; doi:10.1016/j.xjidi.2021.100091



Although dermatology in the United Kingdom (UK) remains a specialty with a high uptake of clinical academic (i.e., physician–scientist) posts, there has been an overall decline in clinical academics within the UK in recent decades, with a 4.2% decrease reported between 2010 and 2017 (Rimmer, 2017). Li et al. (2022) provide an insightful overview exploring the low uptake of academic dermatology posts in the United States (US). They emphasize the importance of physician–scientists in the field of dermatology and summarize key barriers and challenges faced by investigative dermatologists in the US. They gather the opinions of dermatology educators and directors on physician–scientist training and subsequently propose a structured research program to maximize physician–scientist productivity and facilitate the transition to independence. They highlight the key role of the department chair in implementing this program and summarize funding opportunities for dermatology physician–scientists.

We strongly agree with Li et al. (2022) that the importance of the physician–scientist cannot be

overstated. Physicians are uniquely placed to explore questions relevant to human disease and facilitate the circular feedback loop of the bench to bedside and back again—the concept underlying translational research. Indeed, translational research is strongly supported within the National Health Service (NHS), as shown throughout the COVID-19 pandemic, external hospital assessments conducted through the Care Quality Commission (CQC) and investment in infrastructure by the National Institute for Health Research (NIHR). Thus, for example, the CQC now emphasizes on integrating research into clinical practice within NHS trusts. Furthermore, physicians are equipped with skills to work within multidisciplinary teams—an essential requirement in today's research. The importance of clinical investigators is further supported by evidence that research-active hospitals in the UK have better outcomes. Patients not only have lower mortality rates (Ozdemir et al., 2015) but also have greater confidence in staff and feel more informed about their condition and treatment (Jonker et al., 2020).

Almost half of the clinical academics state that their interest in research began at medical school (IFF research, 2015), highlighting the importance of supporting academic careers from an early stage. Most medical schools in the UK recognize this, particularly as most UK medical students enter medicine directly from school rather than at the postgraduate level. Therefore, they encourage the undertaking of research projects as part of undergraduate medical training (e.g., BMedSci) and/or undertaking additional research during an intercalated degree (e.g., MMedSci), the latter comprising an extra year during medical training in which a science degree with a strong research component is completed.

In 2005, the Walport report commented on the perilous state of academic medicine and dentistry in the UK (UK Clinical Research Collaboration, 2005), leading to the conception of the NIHR's integrated academic training. This created a clear, amalgamated, and flexible pathway to provide trainees with salary-funded and protected academic time. In the UK, entry to dermatology training occurs after a minimum of 4 years of postgraduate general medicine training, and this applies to trainees following an academic track. The academic training scheme begins at the postgraduate entry-level (immediately after medical school), with competitive entry to the academic foundation program (2 years) funded by the UK Foundation Programme Office. During this period, academic trainees complete their early clinical training and the clinical competencies that need to be attained in their first 2 years as a medical doctor within five of six posts (each 4 months duration) and spend one of the six posts within an academic department. Depending on the trainee's career aspirations, they may subsequently apply through an independent competition for funded academic clinical fellow (ACF) posts (3 years) either immediately after the academic foundation year 2 or, in the case of many medical specialties, after an additional 2–3 years internal medical training. The

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Cite this article as: *JID Innovations* 2022;2:100091

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ACF is a clinical specialty training post that incorporates dedicated training blocks to develop academic skills, with 25% over 3 years, equating to 9 months in full-time research that can be taken as one block or in separate smaller blocks. This optimizes the chances of success in obtaining a clinical research training fellowship (CRTF) and a higher research degree (PhD or equivalent). Undertaking an ACF post, which allows the generation of pilot data, has been shown to increase the likelihood of obtaining external funding for a salary and consumables to undertake a PhD (Clough et al., 2017), and the NIHR has allocated funding for 250 ACFs nationally in 2022–23 across all specialties.

However, competition exists in various phases of ACF posts. First, although in the early years of the scheme, ACF posts were often allocated to individual specialties through a formula-based approach, more recently ACF posts are increasingly competition-allocated (with fewer formula-allocated) to regional training schemes around the country. Competition-allocated posts are based on specific NIHR research themes (such as mental health, platform science and bioinformatics, therapeutics or clinical pharmacology, older people and complex health needs, acute care, medical education, etc.), which do not always align with specific specialties, including dermatology. Second, in the early stages of a bid for NIHR funding, universities (academic training) in partnership with their respective deaneries (clinical training), seek expressions of interest from all medical specialties (including medical, surgical, psychiatry, primary care, etc.); to accommodate all interested specialties, individual ACF posts are often badged against a maximum of three separate specialties. Third, after the evaluation of the bids by NIHR, universities and deaneries are informed which ones have been successful. Fourth, interested trainees who apply for an ACF compete not only against trainees in the same specialty but also frequently against trainees in two other specialties; deciding the allocation of such posts can prove difficult, particularly if previous research experience is incomparable between candidates.

During and/or after the ACF role, trainees can apply for funding for salary and consumables to undertake a PhD from various funders (e.g., Medical Research Council [MRC], Cancer Research UK [CRUK], Wellcome Trust Training Programmes, etc.). Obtaining funding for research training can be more of a challenge for those who decide to pursue dermatological academia later in their career and for those who are unsuccessful in obtaining an ACF post. This has been recognized by the NIHR, which has created 20 Biomedical Research Centre—collaborations between universities and NHS organizations that offer 1-year pump-priming fellowship posts, intended to maximize opportunities for competitive PhD funding. In addition, opportunities to obtain pilot data for research applications exist from other bodies, such as the British Association of Dermatologists (BAD) and British Skin Foundation (BSF).

NIHR clinical lectureships (CLs) and intermediate fellowships (IFs) are available for all specialties after a higher research degree (MD or PhD). NIHR CLs can be competition-based or formula-based (as for the NIHR ACFs mentioned above) and allow trainees to continue to undertake research but requires at least 12 months of clinical specialty training remaining, which can be problematic for dermatology, with a specialty training length of only 4 years. Many NIHR CLs will subsequently apply for externally funded IFs (e.g., from NIHR, MRC, Wellcome Trust, CRUK, etc.), which allow physicians to develop into independent researchers. However, IFs are highly competitive and can be difficult to obtain yet are often considered a requirement for subsequent university-tenured senior research posts. Therefore, perhaps as an inevitable consequence of this, there has been a reduction in senior academics within medicine in recent times, particularly reader/senior lecturer positions, with an 11% reduction in numbers across specialties between 2014 and 2018 (MSC, 2018).

In addition to the challenges of balancing clinical and academic work, many individuals who undertake clinical academic training face further barriers such as loss of income, the uncertainty of career progression along

the academic route (which is dependent on project outputs/publications, grant income, etc.), and the challenges of maintaining a healthy work-life balance. All too often, potentially excellent academics/clinical researchers choose to focus on clinical medicine and family at the expense of academic medicine. It is also recognized that some academic trainees do not progress to senior academic levels, either because of a personal choice or the highly competitive-based nature of the academic pathway. Some may view this as a loss of academia, whereas others may view this as a benefit to the NHS, where consultant-level physicians have acquired experience in many of the transferrable skills incumbent in research training.

In 2018, 1,550 clinical academic awards were funded by the largest UK funding bodies: the British Heart Foundation, MRC, NIHR, and Wellcome Trust (Wellcome, 2018). The majority of these awards were ACF posts funded by the NIHR, possibly highlighting a mismatch between investment at the ACF level and available CRTFs. These figures also emphasized investment by large disease-specific charities and a focus on translational research, with significant NIHR investment in patient-facing research. As previously discussed, the BSF is a dermatology-specific charity with several funding opportunities for those seeking to carry out impactful dermatological research projects. Such funding awards include the BSF research award, the BSF fellowship award, and the BSF young investigator award. The BSF receives on average 100 applications for research funding each year.

Within research-active centers, funding opportunities exist to allow dermatology consultants to be involved in clinical research and trials; frequently resulting in important contributions to clinical care and improving evidence-based medicine. Funded research sessions may come from bodies such as the NIHR clinical research network. Increasingly, there are opportunities for interdisciplinary dermatological research particularly in areas such as systems biology, computer science, bioinformatics, and population-based science—which can involve machine learning and artificial intelligence

techniques. Such research opportunities can build on world-class resources based in the UK, including integrated GP/hospital electronic data (Clinical Practice Research Datalink, London, United Kingdom and UK Biobank, Stockport, United Kingdom), the BAD biologics and immunomodulator register (BADBIR; Manchester, United Kingdom), the Psoriasis Stratification to Optimise Relevant Therapy (Salford, United Kingdom) consortium, the Agency for Science, Technology and Research (A*STAR; Singapore, Singapore) eczema consortium, the UK Keratinocyte Cancer collaborative (UKKCC), and the Human Cell Atlas project.

Despite the challenges faced by clinical academics in the UK, there continues to be an excellent output of high-quality dermatological research from a wide range of centers. The introduction of a clear academic training pathway and the financial support of many large funding bodies have undoubtedly facilitated dermatological clinical academic training. Increasing awareness of such opportunities, encouraging successful dermatological researchers to share their opinions and experiences at trainee conferences, and encouraging medical students to pursue dermatological research at the undergraduate level would further promote a career in dermatological research. We hope the field continues to grow, in particular at stages such as the IF, which may future proof the numbers of senior academics as some of the more senior academics retire.

The perspective of an ACF in dermatology in the UK:

Undertaking an intercalated degree during medical school was fundamental in my decision to pursue a career in academia. Exposure to scientific research at this early stage provided a good insight into an academic career and the opportunity to discuss the challenges and benefits with supervisors. I undertook this degree largely based on the advice from my family as my university provided little guidance on whether intercalation was in my interest. I believe that, for me, intercalation opened future 'research-doors', including obtaining the ACF post, and I would suggest that more could be done to encourage students at this stage. Although BAD

and BSF undergraduate grants exist, it could be helpful if such funding could be enhanced to promote dermatology undergraduate research projects.

I did not apply for an academic foundation post because I was concerned that I would not be as good a clinician if I had less time in clinical medicine—a concern that should be addressed and alleviated in students. I, therefore, attempted to pursue academia alongside full-time clinical medicine, without dedicated time, which proved difficult and compromised the size and significance of projects I could undertake. Consequently, I applied for the ACF post, which provided an excellent opportunity to carry out a sizeable research project in an area of interest. With the support of the Training Programme Director and my academic supervisor, 8 months of dedicated research time was made flexible and fitted well with my clinical training. I believe a supportive and enthusiastic supervisor is vital in retaining trainees within academia. Such supervisors attract and encourage trainees to pursue research opportunities and projects in their area of interest to build on both the trainee's strengths and weaknesses. I have been extremely fortunate to have such a supervisor.

As I come to apply for fellowships soon, there are certain concerns I undoubtedly have in common with other academic trainees. The financial implications of pursuing an academic career cannot be denied, particularly when at the stage of having a young family and mortgage. In addition, the time taken out of specialty training for fellowship years delays progression to a consultant post, with knock-on effects on pay progression over the subsequent 20+ years, and highlights the challenge of being a good academic as well as a good dermatologist, in what ideally ought to be a symbiotic relationship.

Despite these concerns, I am driven to pursue academic research that may positively impact clinical practice in dermatology, and by the intellectual stimulation and variety, it provides. I am optimistic that dermatological academia will continue to grow in the UK, greatly facilitated by the development of excellent UK-based resources such as BADBIR, A*STAR, UKKCC, and UK Biobank and many inspirational mentors in the field.

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ACKNOWLEDGMENTS

AH is supported by National Institute for Health Research (NIHR) through the Academic Clinical Fellowship (ACF) program. NJR is an NIHR senior investigator and is supported by the NIHR Newcastle Biomedical Research Centre and the NIHR Newcastle In Vitro Diagnostics Co-operative. EH has served as director of clinical academic training for the University of Southampton/Wessex Deanery for several years, obtaining NIHR funding for clinical academic training across all specialties at the ACF and clinical lectureship levels.

CONFLICT OF INTEREST

NJR has received research grant funding from Novartis, Psoriasis Stratification to Optimise Relevant Therapy partners (www.PSORT.org.uk). EH and NJR have supervised clinical academic trainees at Academic Foundation Year-2 (funded by the UK Foundation Programme), Academic Clinical Fellow (funded by National Institute for Health Research [NIHR]), Clinical Research Training Fellows (funded by the Wellcome Trust, Medical Research Council, including one with partial funding from AstraZeneca [EH] and GSK [NJR]), Action Medical Research, NIHR, and British Skin Foundation), and Clinical Lecturer levels (funded by NIHR).

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