

## RESEARCH TRAINING AND THE YOUNG CLINICIAN\*

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## SUMMARY

The symposium on Research Training and the Young Clinician aimed to provide junior doctors with information and advice concerning the practicalities of planning, funding and undertaking a period of research training. Specialist registrars (SpRs), senior house officers (SHOs), general practitioners (GPs) and research fellows, representing a broad range of medical and surgical specialities from around the country, attended the meeting.

## INTRODUCTION

A period of postgraduate research training is becoming an increasingly valuable and, some would argue, essential part of most clinicians' careers. However, the best timing for undergoing research training, the length and type of higher degree to be aimed for, the sources of funding and the likely career prospects for those who choose to spend time in academic investigative medicine are less clear. This meeting aimed to answer such questions. The invited panel of speakers comprised those currently involved within academic medicine, representatives from the major funding charities and key figures from working parties on postgraduate medical education; they gave their views on how to make research training a successful and valuable period away from clinical medicine.

## REALITIES OF THE SPECIALIST REGISTRAR GRADE

In Britain, most clinicians having completed general professional training will face the next major hurdle in their careers – namely, obtaining a National Training Number (NTN) in one of the specialities and commencing a five or six year SpR training programme. In 1995, when the Calman reforms were first introduced, 12,500 doctors entered higher specialist training. Since then, 8,000 CCSTs have been awarded to graduates of this programme. Professor John Temple, who implemented the SpR training programme and who now leads the initiative to modernise the SHO grade, spoke of the current realities of the SpR training grade. He detailed how, for the first time, all clinicians entering higher specialist training can now expect order, process and regulation of their training. As a direct result of this, the public can be assured of a minimum national standard of competency. This is in contrast to methods of training available prior to Calmanisation, which often had no defined curricula, structure or defined measures of progress.

A number of difficulties still persist with the current programme. Perhaps the most important is the difficulty in obtaining a NTN immediately after completion of general professional training. This has arisen from a number

of factors which include an increase in the number of medical students graduating and a decrease in the number of SpR posts available, following a failure of the promised national expansion of consultant numbers in certain specialities. A bottleneck at the level of the SHO is the net result. Market forces appear to dictate to many clinicians that they must undertake a period of research, if for no other reason but to be competitive at interview for SpR posts. This was never the intention of the Calman programme, which envisaged that research should be encouraged for reasons of ensuring a more rounded postgraduate education and facilitated from the secure position of a 'numbered post', ideally after two or three years of clinical training. This would ensure that the clinician branching into research has a solid basic understanding of his or her medical speciality, has acquired an idea of relevant research of interest to them, and would be sufficiently close to completion of their CCST to facilitate a smooth transition into academic medicine, should they so desire. This idealised, but perhaps largely unrealised, career plan is reflected in the structure of many of the intermediate fellowships that funding charities offer.

Assessment of progress through the course of postgraduate training is also still less than ideal. New non-judgemental, informal appraisal mechanisms have to be implemented at the end of each training module to better advise trainees as to their progress and to help identify any problems at an early stage (many of which are currently being missed). Ongoing formal assessment through the scrutiny of the record of in-training assessment process currently only identifies three per cent of trainees who are judged not to have progressed satisfactorily. Professor Temple suggested that our current assessment process is not sufficiently objective and robust, and this has promoted a situation in which judgements of progress can be challenged by the trainee, and these can be both time-consuming and costly.

The good news is that trainees achieving their CCSTs feel that they have achieved the necessary knowledge base and are well prepared for independent practice. Most, however, still feel unprepared for many of the additional responsibilities of the consultant grade, such as managerial roles, budget planning and disciplinary procedures. This view is echoed by consultants asked to assess newly qualified colleagues, who also have some reservations about the readiness of their newly appointed colleagues for independent practice – a case of the old judging the new using their own current competence as a reference point? Fortunately, such crude measures of competence as the number of suspensions and other disciplinary action against consultants have not shown a disproportionate rise amongst those having qualified since implementation of the Calman scheme.

\* From a symposium held at the Royal College of Physicians of Edinburgh on 26 April 2001

## TENURE TRACK CLINICIAN SCIENTISTS

Perhaps one of the most interesting developments in recent years for those interested in a career in academic medicine has been the publication of proposals by the Academy of Medical Sciences to establish a Tenure Track Clinician Scientist scheme.<sup>1</sup> Professor Jon Savill chaired the working party that produced this report and he gave his views on the details of its plans and the progress made towards its implementation. It was stressed that clinical academics fulfil a vital role by carrying out research that eventually leads to new and better practice. Hence they are crucial for shaping the future of the NHS. However, clinical academic training is currently at a crossroads. On the one hand, there have never been more applications to clinical training fellowships, but on the other, there has never been as much difficulty encountered in recruiting clinical professors. Clearly, major reasons must arise that act as disincentives to doctors to continue a career within academic medicine. Talented clinicians interested and experienced in research are leaving the academic pathway and returning to NHS posts.

The report identified three key generic disincentives to an academic career, namely: a lack of a clear career structure in academic medicine; insufficient flexibility for those trying to combine post-doctoral research training and higher specialist training; and the prolonged training required before obtaining a secure senior position. In addition, some disciplines were found to have only limited opportunities for research training, whilst in oversubscribed or blocked specialities, many have to enter research prior to securing a SpR post. The subsequent prolonged period spent with no access to research whilst they then complete higher specialist training often leads to a waning of interest in research. Finally, the 'craft' specialities, which require persistent patient contact to maintain practical skills, are often insufficiently flexible in their training methods and measures of competency, to permit significant combinations of research and clinical training.

To address these disincentives the Academy has proposed a new Tenure Track Clinician Scientist scheme. This begins with an initial three year phase of doctoral training, funding for which would usually be obtained by competitive application to a training fellowship scheme. For those 'bitten by the research bug' the new Tenure Track programme would then be the ideal next step on the academic ladder. This programme would allow nationally coordinated, prospective planning of higher specialist training in combination with up to two years of protected post-doctoral research. Ensuring that these posts are supernumerary to existing SpR rotations would facilitate flexibility of clinical training. In addition, close coordination with the appropriate speciality advisory committee will ensure that clinical training requirements are met and standards maintained. This may entail a move away from time-based to competence-based assessments of progress.

Similar to the original Calman proposals, the initial doctoral phase would be undertaken during higher specialist training. However, flexibility is the buzzword of the Academy's proposals, and trainees in blocked specialities would also be eligible to enter such a scheme directly from completion of general professional training. For those who have achieved outstanding success in their doctoral phase, there would be direct access to the post-doctoral phase through the creation of 50 numbered clinician

scientist posts. Similarly, those already in possession of an NTN could transfer their training number to this scheme. The end of the programme would see the award of a conventional CCST in the trainee's speciality.

What does tenure track status really imply? Essentially, this proposal should ensure that individuals who progress satisfactorily within the clinician scientist programme should reasonably expect to be offered a senior clinical academic position in their host medical school upon completion of their programme. By this method it is hoped that the clinical academic career pathway will be as attractive and secure as that currently offered by purely clinical programmes.

Progress has already been made in the establishment of the tenure track clinician scientist programme. Widespread vocal support is now being followed by affirmative action. The NHS Research and Development sector is shortly expected to announce the funding of a clinician scientist research post for every region per year for the next five years. The Medical Research Council (MRC) has also announced plans to jointly fund tenure track positions and other major funding charities may soon follow suit. In summary, opportunities to pursue research as a clinician have never been greater, and with these new proposals it is hoped that a cadre of research-led clinical academics can be nurtured who will be capable of leading the revival and/or further development of research in their discipline.

## WHAT ROUTES ARE ALREADY AVAILABLE FOR TRAINEES?

The second session of the day addressed the practicalities of obtaining funding for research. The major charities were represented by Dr Margaret Bryant, head of career research awards with the MRC and Professor David Gordon, currently Dean of Manchester Medical School, but formerly with the Wellcome Trust. Dr Bryant outlined many of the clinical research fellowships that are currently available from the MRC. These schemes are purely for clinicians (and hence clinicians do not compete for funding with full-time scientists) and aim to span a complete academic career from PhD to professorship. Perhaps the most relevant for the majority of the audience was the Clinical Research Fellowship scheme, a three year programme aimed at supporting those studying for a PhD. Currently, 141 MRC fellows are funded by the MRC, with 55 new awards made per year. The grant covers the salary, which is paid on the specialist registrar grade, up to £4,500 of consumables and a travel grant of £450. Applications for these fellowships are invited twice a year and follow a similar pattern to that for most subsequent awards, i.e. submission of a written research plan (usually written in close collaboration with one's supervisor) which is then distributed for peer review.

Approximately half of such applications reach a final interview stage, at which the applicant is invited to further outline his or her research and career plans. Data from 1997 suggest that, in contrast to the experience of many of the audience, 80% of applications came from doctors already on SpR training schemes. However, the MRC was keen to stress that applications from clinicians without NTNs were equally acceptable. Dr Bryant also emphasised that it is not always necessary for applicants to have prior experience of research. A strong academic record at medical school and a demonstrable willingness to publish, including case reports and other articles, would also be looked on

favourably. Of those clinicians completing clinical training fellowships in 1997, 11% went on to gain clinician scientist fellowships with the MRC, 40% remained in academic medicine with funding from other charitable bodies, and the remainder returned to further clinical training. However, subsequent analysis of the latter group revealed that many later returned to academic medicine. The overriding message is that a clinical training fellowship represents a sound basis from which to establish a career in academic medicine.

The MRC also offers a number of clinical research fellowships that are funded in conjunction with specialities that have traditionally lacked a strong research track record. In addition, they will be part-funding a number of Tenure Track Clinician Scientist fellowships in conjunction with the Academy of Medical Sciences. Full details of all the schemes provided by the MRC, Wellcome Trust and Association of Medical Research Charities are available on their respective websites.<sup>2-4</sup> For those successfully completing a clinical research fellowship, the next step on the MRC's career development ladder is a clinician scientist fellowship, of which 12 are awarded annually. This provides funding for four years, including personal salary, technician support and funding for equipment. A typical award is for £450,000 spread over four years. These awards are flexible in that they provide for up to 20% of time to be dedicated to clinical work; awards may be suspended for up to a year in order to complete clinical training, and one year may be spent abroad or in a second UK research establishment. Similar programmes are available for patient-orientated research for which up to 40% of time may be dedicated to clinical work. Of those completing clinician scientist fellowships, 25% go on to compete successfully for senior MRC fellowships, 25% secure permanent academic appointments within the UK and 30% are appointed to fixed-term academic positions. The final rung on the career development ladder is the MRC senior fellowship. Fellows receive awards of up to £850K over a period of five years that may be renewed in open competition for a further five years. As with all other MRC awards, no age limits are set for applicants; applications are invited from those returning from career breaks and flexible awards are available for those wishing to work part-time because of domestic commitments.

With such a plethora of research fellowships available from the major funding charities, there has never been a better time to apply for funding. But how does one make sure that an application will be as competitive as possible? The question of how to apply and those features of an application that make it more likely to succeed was addressed by Professor David Gordon. His advice to budding applicants was simple: sit down first and consider the following points. First, consider whether you have chosen a worthwhile problem to address. If the project chosen is intrinsically interesting, it is far more likely to attract the attention of the reviewer. This question should then be followed with an assessment of whether you have chosen the best approach to address the question that you have proposed, including not only the most appropriate techniques, but also the most appropriate location and the best people to work with. Finally, if you have already made progress towards answering your chosen question, the data obtained from the pilot studies will support your application, and this will usually

strengthen your chances, particularly if you have already published in the field.

Many clinicians considering applying for their first research fellowship will quite naturally still find this to be a very difficult, and hence daunting, process. It is important to remember that most first time applications are written in close collaboration with one's supervisor. Hence, it is vital to have chosen a good academic environment in which to work so as to maximise the quality of assistance and supervision that you will receive. It is also important to ensure that you are applying for funding from the most appropriate body: those funding organisations with an interest in your field of research are more likely to look favourably on your request.

Practical aspects should not be ignored. It is vital to be aware of the deadline for submission of grant proposals and to prepare your application as thoroughly as possible. In addition, some granting bodies may require a detailed breakdown of research costs, which will have to be included and may take time to prepare. Should you be fortunate enough to be invited for interview, make sure that you are as well prepared for this as you were for the written grant application itself. This may involve having practice interviews with your own supervisors or other senior academics who will have been through this process themselves. Should you succeed in having your application funded, allow yourself some time before taking up the grant. This will afford you a valuable opportunity to finalise the fine details of your plan of work and to prepare all that you require to make your research a success.

#### THE VIEW FROM THE INSIDE

An insider's view into the realities of research training was provided by Dr Alan Bagnall, a clinical research fellow funded by the Wellcome Trust as part of the Cardiovascular Research Initiative in Edinburgh. Dr Bagnall is currently working for a PhD; he gave direct insight into how one should approach choosing a research project. He stressed the importance of talking to as many different people as possible prior to making your choice. In particular, he highlighted the fact that the choice of people also involved in the project and the strength of the surrounding scientific environment should always be the prime concerns when making your choice. Dr Bagnall indicated that he had chosen a basic science project which involved determining the physiological role of the endothelin B receptor in different mouse tissues by producing a panel of tissue-specific knockout mice. He discussed some of the highs and lows of a clinician undertaking a basic science project. Many clinicians feel completely out of their depth when they enter the unfamiliar environment of a laboratory for the first time; they are faced with an array of practical bench tasks for which they have little or no prior training. The change in working pattern from fire-fighting other people's clinical problems to self-motivated, self-structured days of working on one's own can also be problematic for some. All of these and other hurdles can be quickly overcome and many clinicians derive a great deal of satisfaction and fun from this type of work.

In addition to learning a whole new array of technique-based skills, a period of research training is also an opportunity to learn new life skills such as public speaking and scientific writing in terms of presentation of the results of the research. Students are also taught how to approach

problems from a scientific viewpoint, analysing and studying a subject in terms of the quality of what is known, and how to test a hypotheses about what is unknown. But what was perhaps most exciting for those experiencing their first taste of research was the possibility of developing a career in academic medicine – a career very different from that envisaged on their first day on the wards.

#### THE VIEW FROM HEADQUARTERS

Professor Brian Walker, a British Heart Foundation Senior Clinical Research Fellow also from Edinburgh, gave a description of how he developed his own research career and gave an insight into the daily life of a senior academic. A combination of domestic commitments, a shaky hand and good fortune prompted his entrance into academic medicine, where his interests were initially concerned with steroid hormones and the enzyme 11- $\beta$  hydroxysteroid dehydrogenase. His rapid success in this field has led to a blossoming of interests that now encompass the role of glucocorticoids from cloning to clinic. Such diversification of techniques and interests is an important step in the professional development of research fellows. Ultimately, fellows should be able to look at the overall question and address this with the most appropriate techniques available.

In contrast to the life of a senior lecturer, Dr Walker emphasised the apparent lack of formal structure to a working senior Fellow's week, with only a limited timetable of NHS or teaching work. The majority of his or her time is spent writing new grant applications and developing new collaborations. This can be a hard fought process, with charities funding only, on average, around 20% of all applications. In practical terms, this means that you have to write up to five grants for every one that is eventually funded. With no university infrastructural funding, this also means that one's entire group is dependent on the success of grant writing for their future employment. These stresses are balanced by the personal and professional satisfaction of establishing one's own research group. Within such a group he or she is able to nurture talented individuals so that they themselves are able to fund their own work and, eventually, to lead their own research groups. Rewards are also found in the form of the positive feedback that one receives about your research at international meetings. But in a time of decreasing professional freedom within clinical medicine, a senior fellowship also offers perhaps one of the few opportunities left for true self-determination and direct control over the direction of one's career.

#### GROUP DISCUSSIONS

The afternoon session saw the audience divided into small workshop groups to discuss particular aspects of research training. Each group was assigned a facilitator whose role was to report back to the whole meeting with a summary of their individual group discussion. This format allowed discussion of a broad range of topics and afforded an opportunity for the audience, many of whom were about to enter into research themselves, to voice their opinions. Perhaps one of the most popular choices was the workshop examining the possibility of research training abroad. This was seen as an opportunity to learn new skills, establish international collaborations and to cultivate the personal skills that would enable the researcher to become a confident future group leader. A number of obstacles to this progress still remain, not least the relative inflexibility

of SpR training. In addition, it was felt that there simply was not enough information and encouragement currently provided by the major funding bodies about travelling abroad to fire the enthusiasm of researchers. A similar criticism was levelled at the promotion of opportunities for flexible training. However, most of the major funding bodies are in fact very supportive of those applicants who wish to train flexibly from the outset; this was seen as a way to both recruit and retain talented individuals within academic medicine. In particular, the charities were keen to redress the gender imbalance within academic medicine, as women comprise only 10–20% of the current academic workforce.

#### MD OR PHD?

Perhaps one of the most difficult decisions to make when deciding to embark on the first period of research is what represents the most suitable and useful higher postgraduate degree to aim for – an MD or a PhD? – and where one should look for funding. Professor David Webb, who jointly organised this meeting with the Royal College, chaired this session. An MD thesis is usually written over a two year period and hence may be more attractive to those unsure as to whether research is really for them. In this respect, a MD is also easier to fund with 'soft' money. However, the current provision for the supervision and assessment of MDs in most universities is poor, particularly when compared to the very standardised procedure for the supervision, in-post review and examination of a PhD thesis. This has led to a wide variation in the quality of some MD theses, with an inevitable devaluation of the MD as a higher degree. Whilst the PhD has a number of advantages over the MD in this respect, these must be balanced by the requirement of a much longer period of commitment, relative inflexibility and the need to study in a major centre. A well planned MD, with regular supervision and assessment, may be a credible and acceptable alternative to a PhD, then, but at present, such opportunities are relatively few and far between.

Funding for most PhDs will come from one of the major charities and can be perceived as being relatively difficult to secure. For those unable to fund their research by this route, soft money may be an attractive alternative, although there are pitfalls to be wary of when looking at this latter funding option. Certainly, one should be careful of relying on funding that comes from the financing of early drug development studies. These may often be terminated unexpectedly should the pharmaceutical company decide not to continue development of the compound. Similarly, researchers whose projects are part of large, multicentre drug trials may find it difficult to achieve recognition of their input in publications. Again, as with all projects, careful consideration should be given, before taking up the post, as to the people that you will be collaborating with, the location of the project and the nature of the project itself.

#### RESEARCH FOR ALL?

The final session of the afternoon took the form of a debate, with Professor Graham Catto, Dean of Guy's medical school, proposing the motion that undertaking research is an essential part of clinical training. Opposing the motion was Professor Chris Haslett, head of the MRC Centre for Inflammation Research in Edinburgh. Professor

Catto proposed that undertaking one's own original piece of research was the best training in how to evaluate the research of others. Without the necessary skills to critically evaluate the quality of research, it is hard to implement good quality evidence-based medicine. It is also important for those at the front line of care delivery to be involved in looking for the answers to the unknown. Only by being involved in research can research be directed towards those areas of most pressing clinical need. Actually performing the research oneself is perhaps the best way of understanding the nature and extent of the problems – and the fun that can be derived from solving them. The scope of such an undertaking is ultimately to benefit patients through the implementation of high quality care and the development of new therapeutic strategies. This may only be achieved through research projects that prize quality over quantity, and is based upon the provision of good quality mentoring for new clinician researchers. The dangers of ignoring research and turning away from evidence-based medicine were also highlighted. Citing the case of the recent foot and mouth outbreak, for which no good evidence for best practice has been established, there is an increasing danger that politicians and political agendas will determine practice to a greater extent than solid evidence-based opinion.

The choice of Professor Haslett to oppose the motion was surprising, not least to Professor Haslett himself, given his substantial commitment to basic science research. However, in the spirit of debate, he argued that actually *doing* research was not absolutely necessary to be able to understand and evaluate research. Other methods, such as undergraduate and postgraduate courses in the evaluation of research papers, may be useful for encouraging research awareness amongst clinicians. Undoubtedly, the perception of the value of research by clinicians has been undermined by the poor quality of many research projects. Up to 50% of research papers are never cited, even by their own authors. At a cost of up to £30,000 per paper, one can question the value for money of clinicians who only 'dabble' in research. These are not arguments against clinicians performing research, rather arguments against clinicians continuing to engage in *poor quality* research. For this to change, fundamental changes in the way that research is planned, funded, supervised and evaluated may be required. In particular, the perceived requirement for research involvement, whatever its quality, by appointment selection committees, was considered to be an undesirable trend. Some members of the audience who felt pressurised to do research simply to be competitive at interview echoed this feeling. Indeed, engaging in research for such ends often resulted in poor quality research and, perhaps more worryingly, had a negative impact on their future view of the value of research in clinical practice.

#### CONCLUSION

A straw poll of audience members confirmed the proposal that research and development were necessary both for the future of medicine as a profession and for the future of the NHS. Clinical academics have a central role to play in the delivery of new therapies and, as such, should be valued, supported and encouraged. Time spent in research was felt to be extremely valuable for nurturing research awareness amongst clinicians – a vital skill if they are to deliver high quality evidence-based care to patients.

#### REFERENCES

- <sup>1</sup> Report of the Academy Working Group on Academic Careers. *The tenure-track clinician scientist: a new career pathway to promote recruitment into clinical academic medicine*. London: Academy of Medical Sciences (see: [www.acmedsci.ac.uk](http://www.acmedsci.ac.uk)); 2000.
- <sup>2</sup> [www.mrc.ac.uk](http://www.mrc.ac.uk)
- <sup>3</sup> [www.wellcome.ac.uk](http://www.wellcome.ac.uk)
- <sup>4</sup> [www.amrc.org.uk](http://www.amrc.org.uk)