

MB PhD Symposium: Summary of a meeting organised by the Academy of Medical Sciences, 8 March 2007

Welcoming participants, the symposium Chairman, **Professor Patrick Maxwell FMedSci** (Imperial College London and Registrar of the Academy) observed that it is now opportune to review the status of current MB PhD programmes in the UK with a view to identifying key issues for their potential expansion and funding.

Professor Mike Spyer FMedSci (University College London and Chairman of the MB PhD Working Group) described the remit of the Academy's Working Group, convened at an important time in the context of the broader considerations of the Modernising Medical Careers initiative and the renewed emphasis on training, recruiting and retaining clinical academics. The MB PhD programme allows a selected group of students to develop their science skills while completing their undergraduate medical education. Various expert bodies (for example, the reports from the Biosciences and Innovation Growth Team, 2003; Walport, 2005; Cooksey, 2006) have already indicated the importance of such programmes in maintaining the clinical research capacity of the UK as a global leader in translating basic science into healthcare innovation.

The objectives and initial analysis of the Academy's Working Group are described in a briefing paper (on www.acmedsci.ac.uk) circulated to participants. The purpose of the symposium is to stimulate further discussion to inform the development of the Working Group's outputs and to consider the operation of the specific MB PhD programmes within the broad environment of research training for clinicians, identifying where there are generic issues, for example for monitoring and mentoring.

Professor Tim Cox FMedSci (Cambridge) reviewed the UK MB PhD scheme, successes and challenges from the perspective of the longest running programme in Cambridge (started in 1990), emphasising the integrated nature of the programme such that clinical teaching is maintained during the PhD research period. Approximately 25% of the students have transferred from other UK medical schools and, of the current students, approximately half are women. Of those who have already completed the programme, a high proportion continue as clinical academics or are otherwise engaged in research. The Cambridge programme is judged a success in terms of the student competition for places and in the quality of graduate outputs with regard to scientific discovery and career development across a range of medical specialities.

Some of the special features of the programme contributing to this success include the continuity of mentorship that is provided, independent of the clinical training and research supervision, the integration of the research phase within the clinical course (including provision of an intensive preparatory clinical academic module), involvement of student representation on the programme management committee and the growing availability of a pool of dedicated research supervisors to provide critical mass at the clinical location. Taken together with an annual meeting for past

and present students, these features deliver support for the MB PhD students as a cohort. Professor Cox concluded that the MB PhD programmes are impressive flagship schemes despite their lack of general adoption in UK medical schools. Continuing challenges for the programme at the local level include the search for sustained funding and the need to cope with changing clinical examination structure. At the national level, increasing the success of the programme further requires integration within the new academic training pathways and core support via a national initiative.

Dr Rhys Roberts (Cambridge) provided a personal view as a MB PHD graduate pursuing a clinical academic career. His PhD study of intracellular myosin transport in eukaryotic cells has led to a continuing interest in cellular motor function and the regulation of protein complexes in a range of neurodegenerative disorders with consideration of the potential targets for therapeutic intervention.

The advantages of the integrated MB PhD programme from this graduate's perspective resided in the initial flexibility to choose from a range of research topics, in the subsequent opportunity for PhD research interests to be continued and, generally, in the introduction of the research training ('learning the research language') early on in a career when there is less distraction by other commitments. This personal perspective also provides an answer to some of the concerns about the programme raised by others (see background briefing paper on www.acmedsci.ac.uk). For example, even if the PhD research is not directly linked to subsequent career focus, this may matter less if the PhD is regarded as a generic training opportunity. Furthermore, while some may worry that it becomes relatively difficult to return to research after the gap for clinical training, there is a growing cohort who can demonstrate that they have been able to do so. Subsequent discussion reinforced the importance of mentoring schemes to allow the student continuing contact with the research environment while completing clinical competencies. Other concerns explored during discussion covered the potential time constraints on the duration of the PhD phase (not a problem for the majority of students) and the desirability of integrating MB PhD students with other PhD students during the research phase (generally successful).

Professor Robert Lechler FMedSci (King's College London) presented on the importance of ensuring a diversity of PhD training routes in the current clinical training environment. While the MB PhD integrated programmes are delivering impressive graduates, there is also a continuing need for flexibility in provision in the development of the clinician scientist. Arguably, the default option should be to schedule PhD training during the early part of the Specialist Training years, with postdoctoral research then scheduled towards the end of the Specialist Training years. Systematic mentoring provision is required to attract the best students to research and to help them navigate the research training options. As the generic option, this later introduction to PhD research might be assumed to be more cost-effective insofar as it invests in more mature, differentiated, students whose commitment to the clinician scientist track can be anticipated to be sustained. Moreover, later research training can be tailored to correspond to the chosen career speciality, with a continuum of research through to the first position as Principal Investigator so that, most importantly, there is reduced risk of de-skilling during research gaps.

From this perspective, the principle of flexible provision requires prescribing of the timetable for the generic pathway because the finite resources for clinical scientist training must be invested effectively and because it is important to avoid biasing

academic Foundation Programme place provision against those who delay their research training. This concern received further attention during discussion. While the current annual output of MB PhD graduates (20-30) is relatively small compared to the total number of clinicians in research training (approximately 400), so that the potential for displacement of those clinicians who delay their PhD might seem small at the national level, there might be displacement at the local level. One other general issue raised in discussion appertaining to the flexibility of provision was the importance of introducing all medical students to research methods and opportunities. Although this issue is partly a general one for curriculum practical content, among the other research training options mentioned favourably were the MRes programme at Manchester medical school and developments in the intercalated BSc, if that can provide significant research experience.

Dr Mark Walport FMedSci (Wellcome Trust) reviewed the integration of the MB PhD programme in the new academic training pathway with regard to the overall objective of the Modernising Medical Careers initiative to shorten the duration of clinical training.

The development of the Integrated Academic training pathway is intended to tackle some critical previous weaknesses – the lack of clear route of entry and of transparent and integrated career pathway, the long clinical training period between PhD completion and return to research, and the lack of exit routes from the clinical training pipeline. The new pathways offer potential for MB PhD students to continue research while doing clinical training and it is anticipated that MB PhD programme graduates can compete well at every stage of the training pathway. Professor Walport agreed that flexibility in provision is crucially important because there is no single answer to the question of when is the best time to do a PhD or, indeed, for how long a PhD should last (the Wellcome Trust has demonstrated considerable value in its four year PhD programme).

Professor David Korn (The Association of American Medical Colleges) described the US experience of MD PhD programs that have attracted significant institutional support. In 2007, NIGMS funded 903 students on the Medical Scientist Training Program (MSTP), established 40 years ago with the objective to prepare students for translational and patient-oriented research. In addition there are other federally and non-federally funded MD PhD programs. The National Academies of Science report in 2005 concluded that “the MSTP program ...has been brilliantly successful at attracting outstanding physicians into basic biomedical research, much to the benefit of future health care” and recommended that the MSTP program funding be expanded by at least 20%.

The AAMC has evaluated performance of the MD PhD programs by analysis of success rates of NIH RO1 grant applications over the last four decades. In aggregate, there is evidence that MD PhD graduates outperform MD or PhD graduates. MSTP MD PhD graduates do better than their non-MSTP peers in terms of postdoctoral awards and faculty appointments in leading medical schools. Employment of MD PhD graduates in university faculties is not confined to the medical departments, but are proportionately comparably distributed in surgical and hospital departments, reflecting the growing interest of these departments in research.

There is no consolidated US national database on MD PhD career destinations (although there is some information at the individual medical school level, for example University of Pennsylvania), and there is little information on the number of

MD PhD graduates working in industry or on non-NIH funded research. Despite these limitations in the available data it is concluded that MD PhD programs have been very successful in accomplishing their objectives to attract and nurture medical students in scientific careers.

The panel discussion session brought together Patrick Maxwell, Tim Cox, Mark Walport and David Korn with Professor Sir John Tooke FMedSci (Peninsula Medical School and Chairman of CHMS) and Dr Richard Tiner (Association of the British Pharmaceutical Industry). Among the topics explored further were:

- Comparison of the US and UK systems. In the USA there are approximately 17,000 medical students entering each year with more than 1,000 funded on MD PhD programs. In the UK, of approximately 8,000 medical students per year, only about 30 enter MB PhD programmes, an order of magnitude less (although the corresponding numbers of those starting later on a PhD are not so easily ascertainable). Hence, based on US experience, there is a good case for expanding UK programmes, although the US programs are not necessarily directly equivalent, in terms of integration, because their students typically do not have significant clinical exposure during their PhD research. There is also concern for the future in the USA, because a changing medical curriculum (reducing the emphasis on basic science teaching in the first two years) may decrease the preparedness of students to embark on the early PhD.
 - The UK pharmaceutical and biotechnology industry sectors are supportive of the MB PhD programmes and larger companies fund studentships. The industry sector wants more trained clinical scientists – particularly in experimental medicine as well as in basic biology. There is also significant need to promote mobility between industry and academia, an issue currently being examined by the Academy’s Working Group on Careers in Industry. Among the options to build contact with industry R&D is a proposal to provide a three-month secondment during the F1F2 Foundation Programme to augment the other current schemes (for example industry-funded clinical pharmacology training) found to be effective.
 - Reinforcing points made earlier, shorter research training options (for example MRes, MPhil), as an intermediary step in developing skills, are proving popular and should be considered further. In the US there is currently much interest in developing integrated medical school programs that lead in 5 years to both the MD and an MS degree in Clinical Research. It is thought that such training, supplemented by rigorous postdoctoral research training (for example, a 5-year program beginning during the clinical fellowship) may provide a shorter path to independent careers in academic clinical research. However, an increasing array of options necessitates improved career advice for students on their appropriate paths to employability, highlighting a pervasive theme in the symposium, the importance of mentoring.
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