



Department of Business, Innovation and Skills Call for Evidence on the Postgraduate Review

The Academy of Medical Sciences welcomes the opportunity to contribute to this review of postgraduate provision within the UK. The Higher Education (HE) system underpins the UK's success in: drawing the brightest talent from across the world; producing a first class workforce; attracting business; driving knowledge creation and innovation; and enabling us to be a leader in an increasingly competitive and inter-connected global economy. Postgraduate training and research are a vital part of the HE sector.

We recognise that the income generated through postgraduate education is important for universities and the UK economy. However, beyond direct economic gain, the pursuit of higher learning and research endeavour provides an even greater return on investment in terms of societal advancement, furthering knowledge and, in the case of biomedical research, translating this knowledge into improvements in human health. This in turn sustains the pharmaceutical and biotechnology industries. We hope that this review will primarily focus on the longer-term rewards of postgraduate education, rather than the immediate gains to universities in terms of fees, particularly from overseas students.

One of the Academy's strategic goals is to develop the next generation of leading medical researchers by campaigning for the development, protection and promotion of careers for academics and encouraging good practice in training and development. This work is underpinned by the Academy's 944 Fellows, who represent the spectrum of biomedical sciences and clinical specialties, and who are drawn from the NHS, academic institutions, industry and public service. The Fellowship places the Academy in a unique position to take a broad overview of the challenges facing the sector and to offer a forum to discuss potential solutions.

The Academy's response therefore focuses on biomedical and clinical academic postgraduate training, including both taught and research programmes. However, many of the issues raised in our response are applicable to other disciplines.

Theme 1: International

How can the UK remain attractive place for postgraduate study?

- To remain attractive, UK universities must continue to be recognised globally as being of the highest quality, demonstrated through a high ranking in the international league tables for both research and teaching. Sustained funding from the Higher Education Funding Council for England (HEFCE) and the research councils, based on excellence in teaching and research, is required to underpin our previous investment and to ensure that UK universities remain globally competitive.
- Postgraduates are increasingly mobile and UK universities must ensure that courses are, and are perceived to be, compatible with those of other countries. The Bologna Process is of particular importance, given that 46 countries within Europe have signed up to this Process and many other countries are showing interest in aligning with the proposed Bologna HE structure. Differences in entrance requirements or course length between the UK and the rest of Europe could lead to misconceptions amongst students and employers about the quality or relevance of UK HE courses. For example, in contrast to most European universities, many UK students do not take, nor are required to take, a master's level qualification prior to commencing a doctoral degree. UK graduates wishing to study in Europe may be disadvantaged if a master's degree becomes a necessary entry criterion to undertake a doctoral programme throughout Europe. To ensure mobility, institutions within Europe should be encouraged to allow flexible entry onto PhD courses. However, there is a need for UK universities to assess, and if necessary to adapt, some of their courses and entrance requirements to ensure that the Bologna Process does not threaten their appeal to outstanding international applicants, nor risk the acceptability of our own

graduates at Bologna-compliant destinations. The Academy will shortly be publishing a report of a symposium entitled 'The Bologna Process: will it affect UK biomedicine and clinical science?' that considers these issues in more detail.¹

- To tackle the issues arising from the Bologna Process, Higher Education Institutes (HEIs) and research funders must work together. At present there is very limited funding for second tier (master's level) courses, yet it is likely that the Bologna Process will raise the demand for training between the undergraduate stage and the conventional three-year doctoral stage. The Bologna Process will thus generate a new funding gap, because training and funding policies have not been developed in synchrony. This new funding gap needs attention: without resources for training at this level the UK university system risks losing its international competitiveness. One option may be to promote the four-year PhD programmes being supported by funders such as the Wellcome Trust. The four-year course provides a formal taught component of relevant science and generic skills, with the possibility of gaining a master's degree at the end of the first year. We have received anecdotal evidence that the four-year programmes attract higher quality candidates and deliver a higher standard of postgraduate education.
- Future employment prospects, for instance through vibrant pharmaceutical and biotechnology sectors, may attract individuals to study within the UK. This is a virtuous circle: acquisition of global student talent contributes to a thriving workforce that retains businesses in the UK, further attracts new investment, and fosters cross-sector innovation. Exciting collaborations between industry, academia and the NHS were showcased at the Academy's symposium on 'Academia, industry and the NHS: collaboration and innovation' in November 2009.² The report of this event will be available on our website shortly. Some of the benefits to postgraduate students working in these ventures are highlighted in subsequent sections of this document.
- Careful consideration must be given to UK immigration laws. It is important that they do not create a real or perceived barrier to attracting and retaining first class individuals within the education system or workforce. Examples where concern has been highlighted include: (i) international applicants being able to attend UK interviews; (ii) short-term vacation studentships for international students appear harder to arrange, yet they are an excellent way to recruit international students; and (iii) restricted entry of international students onto postgraduate medical training.

How can UK trained students be competitive in the international marketplace?

- The UK must equip students with the knowledge, skills and aptitudes to hold their own with the best in the world. A HE qualification gained from a UK institution must confer quality and prestige. As highlighted above, this depends on UK universities retaining their high international standing and an awareness/ compatibility with any moves to align the European HE sector.
- Universities need to be aware of trends in the attributes valued by employers across the globe. Providing a rigorous grounding in a discipline together with key transferable skills is vital. Exposure to related employment sectors is particularly valued. Links between academia and the private and public sectors provide a useful platform to develop applied courses, for example, the joint academic-industry Collaborative Awards in Science and Engineering (CASE) Awards for MSc and PhD students. More partnership courses of this nature could be developed.

Does the proportion of UK domiciled students in the UK postgraduate population matter?

- Diversity, in terms of nationality, is valuable both in academia and in the workplace. Whilst we hope that many non-UK students will remain within the UK after graduation as part of the workforce, the benefits of training overseas students who later return to their home country should also be acknowledged. A global alumni, who have studied in the UK, brings opportunities for collaboration, partnership and innovation. Schemes such as the Newton International Fellowships that train the very best international post-doctoral researchers

¹Further information is available from: <http://www.acmedsci.ac.uk/p44evid111.html>

² Further information is available from: <http://www.acmedsci.ac.uk/p44evid143.html>

with the aim of creating a global pool of research leaders that forge long-term collaborations with the UK should be encouraged.³

- At present the rules for UK Research Council studentships provide EU research students with fees-only awards; stipends are not included. One simple way in which the UK could increase its attractiveness to EU students would be to permit the payment of stipends to these students. This may lead to a decrease in the number of funded UK students and therefore it would be important to ensure reciprocal arrangements are put in place with other EU countries.
- The UK has been an attractive destination for overseas students; however, we cannot rely on this continuing to be the case. Countries such as China have increased provision of postgraduate courses and provide attractive employment opportunities for their nationals. The UK will become vulnerable to skills shortages if low numbers of UK-domiciled students study particular subjects, and if the number of non-UK domiciled students falls, or if they leave the UK after their studies. This is of particular concern in the science, technology, engineering and mathematics (STEM) sector. STEM subjects have traditionally attracted overseas students who have then been recruited into STEM-based industries. Changes in the composition of postgraduate students must be monitored to provide early warning of potential skills shortages.
- The UK has a duty to invest in and train UK students, equipping them to compete with their peers globally. Senior academics have raised concerns that UK students applying in open competition for PhD places are below the standard of their EU counterparts in some subjects. This should be investigated to ensure that UK students are receiving the standard of school education and undergraduate training they require to be internationally competitive.

Theme 2: Value of Postgraduates

What are the benefits of postgraduate education to the individual, to HEIs, to business and to the wider economy and society?

- Individuals should gain a number of benefits from a postgraduate education. They should gain the skills required to compete for employment in a global market. They will often attract a higher salary than those who have spent the equivalent time in employment. They have the opportunity to explore a discipline in greater detail and often to gain insights into the type of careers open to them. It is important not to underestimate the associated benefits to students of exposure to different activities and people. Research training is itself a transferable skill, over and above the discipline-specific skills on which any particular course will focus.
- A major added value of postgraduate education is the highly transferable skill of problem solving. Learning how to solve problems and how to find and evaluate information from a range of sources is a skill that is valuable to the individual, to HEIs, business and the wider economy.
- In addition to an income stream and a pool of national and international alumni, postgraduate students can make an important contribution to the research base of an HEI and build links with other sectors, for example, via joint studentships. A proportion of postgraduates will not have come directly from a taught course and will bring previous skills, knowledge and experience to their fellow students and to the department. This is particularly true of master's courses set up in association with industry.
- The excellence of the UK's HE system is a key factor in attracting life science businesses to the UK and retaining them. It also supports the public sector where the benefits of efficiency savings through innovation should not be underestimated.
- Overall, an HE sector that instils a spirit of inquiry and inspires students to pursue fulfilling careers in research or any other discipline is of immeasurable value to the UK.

³ <http://www.newtonfellowships.org/index.html>

- To understand the benefits of postgraduate education and training UK HEIs should develop and implement a simple system of tracking postgraduates. New initiatives from the Higher Education Statistics Agency (HESA) and the Futuretrack project are encouraging, but we emphasise the need to gather robust data on the long-term career destinations of postgraduates.^{4,5}

Is there an optimal number of taught research postgraduates studying in the UK?

- The quality of UK students and the quality of postgraduate education they receive should be a priority over expansion in the numbers of courses and student places.
- As highlighted above it is important to consider whether the UK is training (and attracting and/or retaining) sufficient individuals in the right disciplines and with the right skills for the future. For example, successive inquiries have raised concerns about the supply of skills needed by UK pharmaceutical and biotechnology companies. A survey of pharmaceutical companies by the Association of the British Pharmaceutical Industry (ABPI) identified current skill shortages predominantly in the *in vivo* science disciplines (e.g. physiology, pharmacology and clinical pharmacology, toxicology and pathology) and chemistry.⁶ Skills gaps need to be addressed through both education and training within academic settings and through partnership between HEIs and other sectors. For example, recent steps have been taken to encourage partnerships between HEIs and the pharmaceutical industry to address capacity and competency issues in the drug development pipeline. Examples include:
 - Pfizer and the University College London Institute of Ophthalmology have developed a collaboration to advance the development of stem cell based therapies.⁷
 - AstraZeneca and the University of Manchester have developed a collaboration to deliver safe and effective medicines to patients.⁸
 - GlaxoSmithKline, Imperial College London and the Medical Research Council (MRC) have established a Clinical Imaging Centre.⁹
 - The Division of Signal Transduction Therapy (DSTT): a unique collaboration between scientists in the MRC Protein Phosphorylation Unit and the College of Life Sciences at the University of Dundee and AstraZeneca, Boehringer Ingelheim, GlaxoSmithKline, Merck-Serono and Pfizer.¹⁰
- It would be timely to review the infrastructure required to deliver UK postgraduate education. Consideration should be given to the number of postgraduate training centres needed within the UK and whether it is appropriate and sustainable for all HEIs to offer postgraduate programmes. Funders such as The Wellcome Trust and MRC are beginning to focus resource in institutions showing research strength coupled with a commitment to providing high quality training programmes.

Theme 3: Business, Employment and Skills

Are postgraduates equipped with the right skills, experience and knowledge to progress in employment or further study and get significant value from the investment from the investment in their education?

- High quality teaching is imperative in equipping postgraduates with the right skills, experience and knowledge to progress in further study or employment. Education and training delivered by research-active academics must be highly valued, retained and encouraged. The Academy believes that education and training delivered by academics who also undertake research is the most beneficial model for students. The Academy will shortly publish a review of the status of teaching and research within biomedical science

⁴ <http://www.hesa.ac.uk/>

⁵ http://www.hecsu.ac.uk/hecsu.rd/documents/Reports/futuretrack_stage1_singlesummary.pdf

⁶ ABPI (2008). *Skills needs for biomedical research. Creating the pools of talent to win the innovation race.*

<http://www.abpi.org.uk/publications/pdfs/2008-10STEMSkillsReviewReportFINALamended2.pdf>

⁷ Further information is available from: <http://www.ucl.ac.uk/iio/news090424.php>

⁸ Further information is available from: <http://www.manchester.ac.uk/business/working/astrazeneca/>

⁹ Further information is available from: <http://cic.gsk.co.uk/>

¹⁰ Further information is available from: <http://www.lifesci.dundee.ac.uk/dstt/>

departments.¹¹ This report will help to define how teaching should best be organised in terms of optimal delivery. Much of the report will be applicable to other disciplines.

- Teachers should ideally have experience/awareness of life outside the academic sector, for example, from having worked in or with industry or the public sector. Alternatively, exposing students to outside influence via guest lecturers, visiting fellows, and external dissertation topics would be very valuable to all concerned.
- The increasing use of lectures for PhD students should be encouraged to broaden their education beyond their research subject. These should include generic transferable skills as well as more specialised topics.

How can postgraduate provision in the UK better respond to the needs of business, especially new and emerging industries?

- Understanding the needs of businesses is vital. Organisations such as the ABPI, Confederation of British Industry (CBI) and the Technology Strategy Board (TSB) can help in identifying gaps in skills and lack of capacity in particular disciplines. Industry should be proactive in identifying the skills they require, but also need to be realistic about what can be gained within the relatively short postgraduate training period. As discussed previously, academic-industry CASE studentships can help to bridge skills and knowledge gaps and industry should seek opportunities to participate in these where possible.
- Cross-fertilisation of traditional biomedical disciplines with a wider range of research areas is leading to the development of a cadre of individuals equipped to lead innovation. For example, training schemes developed by institutions such as Imperial College, London and others, which provide links between young clinicians undertaking research and disciplines such as engineering, bioinformatics and computing, show promise and should be encouraged.
- This review should not simply focus on the private sector. Postgraduate provision should also meet the needs of the public sector. For example, the NHS is the UK's largest employer and spends 8.5% of GDP (07/08 figure). Meeting future health challenges such as an ageing population will require the NHS to have a highly skilled and innovative workforce. It is important that proposed organisational and budgetary changes in the provision of postgraduate medical and multi-professional training in the NHS do not compromise educational quality. The currently proposed Health Innovation and Education Clusters (HIECs), if appropriately configured, could offer a fresh opportunity to provide high quality university based postgraduate education, with relevant industry links, to the benefit of the NHS.

Theme 5: Fees and funding

Are there models of providing postgraduate financial support that would be more efficient and productive?

- The differing funding levels for PhD studentships offered by various funding bodies should be reviewed to ensure consistency and sustainability. In contrast to the PhD studentships offered by funders such as The Wellcome Trust and MRC, UK Graduate Research Studentships are not supported by research funds. The sustainability of providing studentships without any funds for research consumables needs to be reviewed, particularly in light of the current funding pressure on HEIs. It is important that this period of research training is fully resourced.
- Masters and doctoral training must take place in the very best and most stimulating research environments. The Graduate School concept has been helpful in establishing quality training environments. A number of funding bodies do take into account the quality of the research environment and the proposed postgraduate training programme when awarding studentships. However, some doctoral studentships are awarded as part of a larger grant, allocated using metrics such as publication and grant record, rather than consideration of the training arrangements and support available to the student. The

¹¹ Further information is available from: <http://www.acmedsci.ac.uk/index.php?pid=47&prid=59>

Academy has developed a set of broad principles for funders and HEIs to use when deciding how funding should be awarded; the guidelines are primarily aimed at clinical academic specialties but are generally applicable across disciplines.¹²

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.

The Academy's Officers are:

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¹² Academy of Medical Sciences (2009). *Building clinical academic capacity and the allocation of resources across academic specialties*. <http://www.acmedsci.ac.uk/p99puid150.html>