

**SHELFORD GROUP SCIENTISTS RESPONSE TO THE SCIENCE AND TECHNOLOGY SELECT COMMITTEE
INQUIRY – LEAVING THE EU: IMPLICATIONS AND OPPORTUNITIES FOR SCIENCE AND RESEARCH**

Background to the Shelford Group

The Shelford Group comprises ten of the leading NHS multispecialty academic healthcare centres in England. The following briefing paper is written on behalf of all of the Shelford Group members, as listed below:

- Cambridge University Hospitals NHS Foundation Trust
- Central Manchester University Hospitals NHS Foundation Trust
- Guy's and St Thomas' NHS Foundation Trust
- Imperial College Healthcare NHS Trust
- King's College London Hospital NHS Foundation Trust
- Newcastle-upon-Tyne Hospitals NHS Foundation Trust
- Oxford University Hospitals NHS Foundation Trust
- Sheffield Teaching Hospitals NHS Foundation Trust
- University College Hospitals NHS Foundation Trust
- University Hospitals Birmingham NHS Foundation Trust

Collectively, the Shelford Group trusts employ over 100,000 people, delivering services worth over £10bn, which is around 10% of the total NHS England budget and over 13% of the NHS provider sector.

We have a track record of delivering excellent patient care, clinical research and education. Five of the world's top ten clinical research universities¹ and six of the country's eleven Biomedical Research Centres² are partnered with Shelford trusts.

Shelford Group Response

1. There is considerable uncertainty about the impact of Brexit on the future for science and technology in the UK overall, but especially for the NHS and healthcare sector.
2. The Shelford Group has attempted to respond in the context of the information available, to highlight concerns as we see them now, but we accept that this is a fast moving picture.
3. Other significant implications will emerge over time as potential models for future UK involvement with the EU develop. The Shelford Group would wish to remain engaged with the Committee in identifying and raising matters of concern and opportunity for national policy for the NHS in England and the UK more broadly.

We respond to the specific points raised in the consultation request in each of the sections overleaf.

¹ *The Times Higher Education* rankings 2015/16.

² <http://www.nihr.ac.uk/about/biomedical-research-centres.htm>

Effect of the various models available for the UK's future relationship with the EU on UK science and research, in terms of: collaboration; free movement of researchers and students; access to funding; access to EU-funded research facilities; and intellectual property and commercialisation of research.

4. Scientists and clinicians from the EU regularly visit laboratories and clinical departments within the Shelford Group hospitals to exchange information and generate new techniques, and to learn and develop laboratory and clinical skills and practices. There is considerable collaboration on joint projects and in sharing knowledge of best practice between leading UK hospitals and institutions in EU countries. The Shelford Group would be very concerned at any measures which made this more difficult. In particular, there is considerable uncertainty about how any particular model might facilitate or hinder freedom of movement for clinicians and researchers and/or access to grants, to allow this kind of exchange with our EU colleagues.
5. Around 10 per cent of UK public funding in science is granted by the EU, and around 80 per cent of all international collaborations in the UK are with an EU partner. Whilst funding to replace EU sources may be potentially replaceable via UK taxation or other sources, access to collaboration depends significantly on the UK being part of EU funding frameworks. Any model for the UK's future involvement with the EU should recognise this and seek to establish a system that works to the mutual benefit of the UK and EU member states.
6. There is a further benefit to allowing free movement of early EU career researchers and students into the UK, in that it not only brings in new knowledge but also creates stronger links with leading departments in other EU countries. For example, the Division of Imaging Sciences and Biomedical Engineering at King's College London has a high proportion of EU students and researchers (about 37%)³ working on imaging and interventional techniques to the considerable benefit of NHS patients at Guy's and St Thomas' Hospital. The evidence shows that once links and free movement are established, it creates a beneficial cycle that encourages further interchange of researchers and knowledge, and subsequent input into clinical patient care. A particular example of this is where an Italian national was attracted to work on a PhD in the UK and has ended up working at a senior level in both clinical scientific applications and research at this Hospital, to the benefit of UK patients.
7. The free movement of skilled individuals and research funding is also beneficial with regards to the important work in the field of genetics. Identifying disease-causing or contributory genes for some of the major diseases requires very large patient sample sizes across different ethnicities, and the EU provides a way to access and fund large cohorts effectively.
8. Furthermore, the EU, through its collaborative grant system, is able to bring together under one funding stream otherwise disparate state-of-the-art laboratories, clinicians and scientists, to tackle global disease problems that would present any one state with a major resource and capacity problem to solve. The Shelford Group considers it very important that the scientific, medical and research

³ Data supplied by King's College London.

position of the UK should not be weakened by Brexit for both of the aforementioned scenarios, in order to avoid potentially negative consequences for patient and public care.

9. The development of personalised medicine is likely to be speeded up by initiatives such as European Reference Networks,⁴ which put leading clinicians and researchers in touch with each other for small numbers of patients with particular specialist conditions. These networks are intended to help EU citizens access the best possible healthcare for their condition, drawing on the resources of all EU member countries. This should be addressed in Brexit negotiations so that the UK population of patients with rare conditions do not lose out in an era when medical care is becoming more targeted and expertise more localised. As an example, the UK was reliant on EU and other overseas providers for proton therapy, but is now building its own facilities and developing its own expertise at high cost. It cannot conceivably replicate this to implement the most desirable treatment techniques for all possible conditions, at the most advanced level, all the time, within realistic resource levels, even if human expertise could be obtained. Continued access to such Reference Networks should improve access to and efficacy of care for small groups of patients where failure to diagnose and treat efficiently often leads to far greater expense.
10. An increasing proportion of the NHS scientific workforce comes from the EU, particularly at entry and early-career level. Some departments, in areas where it is hard to recruit and where training numbers are limited by UK service capacity, rely on a relatively high proportion of overseas nationals to maintain and develop their services. An example is radiotherapy physics, where there is a national and international shortage of suitably qualified and experienced staff. Anecdotally, it seems that 10-20% of this workforce comes from the EU - the current ease of movement and residence makes it much more straightforward to employ and retain these staff and develop their long term contribution to NHS services.
11. The protection of intellectual property could be a concern, particularly if the UK adopts different systems to those in the EU. Anything which complicates the process of registering patents, copyright and trademarks will increase costs to the NHS and the regulatory burden on its commercial IP activities. If regulations begin to differ between the UK and the EU, this is likely to increase development costs to ensure the requirements of both regimes can be met.
12. The Shelford Group considers it essential that these matters are addressed in Brexit negotiations in order to maintain the UK's ability to be at the forefront of international collaborations that range from fundamental research to applied and translational effort which seeks to apply state of the art science to solving major medical problems. We are concerned at a possible loss of research and development capacity, and for the ability of the NHS and its academic partners to attract and retain scarce expertise. The 21st Century reality of research is a need to work together, whether dealing with large scale common issues, such as obesity, crisis events, pandemic infections travelling across international borders, or making personalised medicine a reality for small groups of patients with specific conditions spread across large geographies.

Priorities the UK Government ought to have when negotiating a new relationship with the EU, from a science and research perspective.

13. Many medical and scientific colleagues within the NHS are very concerned about whether the UK will be able to access large collaborative EU grants and/or projects in the future. Leading universities associated with the Shelford Group hospitals are worried that this will undermine their world-leading status, not only due to a reduction in financial input but also to the more critical flow of knowledge and skills. Continued access to and collaboration on large projects should be a key element of any negotiation.
14. However, the EU is not entirely focused upon large projects. For example, Erasmus students and programmes allow individual undergraduates and postgraduates multiple means of access to learn new techniques and practices. For instance, Erasmus funds travel and accommodation, and even provides small project grants, to facilitate education and the further links that it brings. Placements in pathology are just one example where this programme brings huge benefits to the NHS. This kind of small scale collaboration often bears fruit in the long-term when it comes to undertaking research and development in an increasingly interconnected world.
15. The most important element is the human one. Reallocating UK money from EU membership to UK research and development cannot guarantee its ability to purchase the scarcest resource of all, which is high levels of human knowledge, skills and imagination. In a world where there is a limited number of individuals with good scientific and technical skills, there is intense competition for those with these highly valuable attributes. This is especially true when seeking to attract and work with individuals who are additionally able to lead and inspire effective large scale research and development programmes. Attracting the right people requires paying attention to the whole context; not only funding for facilities and associated support, but also providing an environment where individuals are able to build research and development groups which attract the best human resources, and where the creation of new ideas and intellectual property is supported and encouraged by the surrounding organisational, economic and social infrastructure.

What science and technology-related legislation, regulations and projects will need to be reviewed in the run up to the UK leaving the EU?

16. The reviewing of science and technology-related legislation, regulators and projects is a major issue. Careful consideration must be given as to what elements of EU legislation ought to be embodied in UK legislation and what must be revised.
17. Examples of regulations and directives currently in the process of implementation that affect the NHS directly include the Medical Device Regulations and the Basic Safety Standards (BSS) Directive (2013/59/Euratom). The former will require the UK to put mechanisms in place to comply with the Regulations by 2018, whilst then also raising the question as to what elements (if any) the UK might want to change when enacting similar regulations into UK law at a later date. The UK medical device regulator and Competent Body (the Medicines and Healthcare Products Regulatory Agency) is still

working through what processes might be adopted to ensure that the UK does not lose the benefit of its current regulations or end up with competing legislative and practical requirements. The latter will lead to changes in UK legislation in a timescale that is likely to require compatibility with the Directive (by 2018), with the safety elements of this revising Directive probably to be of benefit to radiation practitioners, operators and patients in the UK.

18. Further work will need to be done to scope what legislation needs to be reviewed and to set appropriate priorities for this. Our concern is that matters that particularly affect and impact on Shelford Group hospitals will be a long way down the legislative agenda, leading to prolonged uncertainty and hampering the development and delivery of services.
19. The Shelford Group welcomes the Government's announcement on August 13th 2016 to underwrite financial support to the end of Horizon 2020 projects for UK beneficiaries where these are entered into while the UK is a member of the EU.

The status of researchers, scientists and students working and studying in the UK when the UK leaves the EU, and what protections should be put in place for them.

20. The status of researchers, scientists and students working and studying in the UK when the UK leaves the EU, and what protections should be put in place for them, is critical. We are already receiving reports of worried non-UK EU citizens working as scientists and technologists in the NHS considering their long-term positions, and we are concerned that this may undermine the commitment of these staff to supporting the NHS and associated research and development. Early practical reassurance is required, for example an assurance that EU citizens already studying and working here will not be forced to leave and will have their long term rights and professional and life chances protected.

Opportunities that the UK's exit presents for research collaboration and market access with non-EU countries, and how these might compare with existing EU arrangements.

21. The Shelford Group already partakes in research, development and clinical collaborations with scientists in non-EU countries. This is not likely to change significantly and there should continue to be potential to join in with and help to shape large and small collaborations. The majority of collaborations are associated with the availability of funding and further work would be needed to identify not only existing funding flows to and from EU and non-EU countries, but also the effect of potential changes on the direction and quality of scientific and clinical research and development.
22. Loss of the ability to shape EU research and development is a concern, as it is important to have the ability to collaborate with key individuals and research groups wherever they are based. Future arrangements are therefore unlikely to compensate for what will be lost and it will require considerable time to build up alternative links to other groups, even assuming that these exist.
23. Access into external markets is not likely to be affected, as the UK needs to comply with any regulation within those markets. It would be possible for the UK to set up its own regulatory framework to alter

(and potentially relax) regulation to make it easier for other countries to sell their products into the UK, but any international company is likely to make their products compatible with EU regulations in order to be able to sell into that market. It is therefore difficult to see how changing UK product regulation will result in reduced costs to the NHS, except where the UK is the main recipient of a particular product. Given that the UK's healthcare products market is about 3% of the international total, it is unlikely that any significant cost reductions will be achieved for the NHS overall. Harmonisation with regards to products and services should also ensure safety and product regulation as it applies to patients and patient care will be maintained.

24. The Shelford Group believe that there is a major opportunity for the National Institute for Health Research (NIHR) and UK regulators to revisit the role of the European Medicines Agency in drug discovery and clinical trials. In a post-Brexit UK, there is the potential to have much greater flexibility to establish systems and governance for clinical research that in turn will make us far more competitive internationally. As such, it is fair to assume that any withdrawal from EU regulations on clinical trials, drugs and devices could generate greater responsiveness for the UK and the NHS as an international research partner for industry.
25. The UK's departure from the EU may provide impetus and renewed energies in developing industry and academic research partnerships in USA, Canada, South East Asia and Australia, which may have been overlooked and under-utilised previously but have provided large sums of money in recent years to leading research projects. For example, Oxford University Hospitals NHS Foundation Trust has received £32m in the past five years from the Bill Gates Foundation, and £189m in the same time frame from industry. The Government should provide support and facilitate relationships in establishing a greater global network for UK science and research programmes.

Other measures the Government should undertake to keep UK science and research on a sound footing, with sufficient funding, after an EU exit.

26. In the short-term, the UK government will have to match-fund the amount of money that researchers are going to lose when they are not any longer allowed to apply for or be eligible for EU collaborative grants, if the UK is not to lose significant research capacity.
27. In the long-term, the mobility of skilled professionals and attraction of larger research groups will mean that the UK will have to compete to become even more attractive to researchers from the EU than it is already if it is to recruit and retain non-UK EU citizens.