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## Summary

- The outcome of the EU referendum presents profound challenges to medical research. The UK and Scottish Governments, funders, regulators and the wider research community must now work constructively to preserve the UK's world-leading research environment, mitigate substantial risks, and seize any opportunities.
- This reconfiguration of the UK's relationship with the EU coincides with major structural changes in the UK research system, and it is vital that all stakeholders clearly communicate that the Scottish research community remains 'open for business'.
- Our Fellows from across the UK are already reporting cases of senior staff and early career researchers from other EU nations declining employment offers, citing the referendum result. The ability of the UK, including Scotland, to attract talented researchers, and retain those already here, is crucial to maintaining the quality and capabilities of our research base and the UK's attractiveness to industry investment. There is an urgent need to reinforce the long-standing positive perception of UK science among the international community, and the Academy has launched a joint 'Science is Global' initiative with this objective.
- Fellows are concerned that collaboration opportunities may be curtailed following the referendum, and have shared examples of colleagues feeling obliged to step down from joint EU project applications, and industrial collaborators delaying decisions on research partnerships. Any opportunities for further global partnerships should augment, rather than replace, collaborations with EU researchers, and will need appropriate financial support.
- The UK Government's recent commitment to underwrite Horizon 2020 projects approved prior to the UK's departure from the EU is a significant and welcome step towards providing greater certainty for the research community in the short-term. It will be important for the Scottish Government to explore ways to build on this commitment, and support Scottish research. EU research funding is a significant contributor to the Scottish research landscape, and delivers individual, institutional and collaborative benefits through dedicated resources such as Marie Skłodowska-Curie actions and the Erasmus+ scheme. We believe that research across the entire UK would be best served by the closest possible association with EU research programmes in any future relationship.
- We believe that continued alignment with EU regulations is beneficial across many areas of research, particularly around clinical trials and rare disease research. Nevertheless we recognise the potential benefits of increased flexibility to tailor regulations to the circumstances in the UK and the devolved nations. There are many opportunities for continued mutually-beneficial collaboration, including between the UK Medicines and Healthcare products Regulatory Agency and the European Medicines Agency.

## Introduction

The Academy of Medical Sciences promotes advances in medical science, and supports efforts to see these advances translated into healthcare benefits for society. Our elected Fellowship includes experts drawn from a broad and diverse range of research areas. We welcome the opportunity to respond to the European and External Relations Committee inquiry into Scotland's relationship with the EU.

Our written evidence has been informed by engagement with our Fellows, from across the clinical and non-clinical disciplines we represent. We would be pleased to provide further evidence, and our previous relevant outputs, if required.

The outcome of the EU referendum presents a profound challenge to medical research, the Academy has previously submitted evidence to Parliamentary Committees on the scale and scope of the UK research community's relationship with the EU.<sup>1,2</sup> It is now important that the Scottish Government and the wider research community work constructively to identify and undertake the actions needed to preserve Scotland's world-leading research environment – by mitigating the risks, and seizing the opportunities, which the UK's new relationship with the EU will present.

## Times of change

Scotland has a disproportionately large and vibrant life sciences sector – hosting a life sciences industry that is one of the largest in Europe – but decisive action is needed if this is to be preserved.<sup>3</sup> Based on the health and wealth benefits the sector delivers to society, both within Scotland and beyond, we see significant and reciprocal benefits from Scotland, and the UK as a whole, continuing to work closely with EU partners. Scotland's global reputation as a leading research nation is at risk from the uncertainty surrounding our future relationship with the EU. Damage is already occurring as UK-based researchers consider whether their future lies within the UK, and overseas collaborators question whether the UK remains 'open for business'.<sup>4</sup> Our Fellows from across the country have already reported job candidates and students from other EU nations declining offers at UK institutions, and EU nationals currently in the UK who are considering leaving.

This changing relationship with the EU comes in tandem with major structural and regulatory changes to the UK research landscape, as set out in the Higher Education and Research Bill.<sup>5</sup> Either of these processes alone necessitates the full scrutiny and attention of the community, to ensure that the best possible outcome is achieved for Scottish science. It is essential that UK and Scottish Governments work closely and openly with the research sector, to develop a clear vision at a time of change. Uncertainty around the UK's future lends fresh impetus to safeguarding and enhancing the attractiveness of the UK research environment, and it is vital that unique assets such as the NHS are fully harnessed as drivers and adopters of innovation.

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<sup>1</sup> Submission to inquiry on the influence of EU membership on UK science (2015) Academy of Medical Sciences.

<sup>2</sup> Submission to inquiry on EU regulation and the life sciences (2016) Academy of Medical Sciences.

<sup>3</sup> <http://www.scottish-enterprise.com/knowledge-hub/articles/publication/scottish-key-facts>

<sup>4</sup> [www.timeshighereducation.com/news/brexit-growing-numbers-uk-academics-face-eu-funding-worries](http://www.timeshighereducation.com/news/brexit-growing-numbers-uk-academics-face-eu-funding-worries)

<sup>5</sup> Evidence submission to the Higher Education Reform Green Paper (2016) Academy of Medical Sciences.

Considering the scale and importance of the EU to Scottish research and innovation, we believe that Scotland, the Scottish Government and the UK-wide research sector would be best served by a direct and high-level conduit for input from the UK research community into the UK Government's negotiation process with the EU. This submission draws on the experiences of our Fellows to highlight key risks and opportunities that lie ahead, spanning recruitment, collaboration, funding and regulation within the medical sciences.

## **Recruitment and retention**

Research is a global enterprise, delivered by a skilled and mobile workforce – almost a quarter of researchers in Scottish Universities are EU nationals, and Scottish researchers, clinicians and students, particularly those at early career stages, benefit from working and studying in other EU nations.<sup>6,7</sup> Scotland's reputation as a leading destination for research and investment is a valuable asset, and action is needed to ensure that Scotland does not become isolated.

Our Fellows consider that uncertainties around immigration are making the UK, including Scotland, a less attractive destination, particularly for early career researchers. Several Fellows highlighted examples of recruitment difficulties following the referendum, and expressed concerns that there are insufficient high-quality UK candidates to meet demand for research positions. Fellows reported candidates declining offers and interviews for positions ranging from PhD placements to senior Chair appointments, citing the EU referendum as a leading factor in their decision. This aligns with published anecdotal examples, and a wider systematic collection of evidence is currently underway by major research funders and other stakeholders.<sup>8</sup> These uncertainties also threaten the retention of EU nationals currently working in the UK: several Fellows reported that their non-UK EU colleagues are considering leaving the UK.

It is critical that Scotland continues to be perceived as an attractive and welcoming destination for researchers, with a fair, efficient and transparent immigration system that supports ease of movement from all parts of the world. Any future system should build on visa models in place elsewhere, including the United States, to adopt elements which will bring greatest benefit to Scotland. The Scottish Government and the research community should seize all opportunities to reinforce a clear and consistent message – that Scotland continues to welcome overseas researchers. Alongside the other national Academies, we recently launched a joint 'Science Is Global' initiative to draw attention to this message.<sup>9</sup> Recent Government statements have sought to clarify the current situation for EU nationals within the UK, but a longer-term settlement is needed as soon as possible.<sup>10</sup>

## **Collaboration**

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<sup>6</sup> <http://news.scotland.gov.uk/News/Research-excellence-in-Scotland-continues-2754.aspx>

<sup>7</sup> International Higher Education in Facts and Figures (June 2016) Universities UK.

<sup>8</sup> [www.nature.com/news/e-mails-show-how-uk-physicists-were-dumped-over-brexit-1.20380?WT.mc\\_id=TWT\\_NatureNews](http://www.nature.com/news/e-mails-show-how-uk-physicists-were-dumped-over-brexit-1.20380?WT.mc_id=TWT_NatureNews)

<sup>9</sup> [www.acmedsci.ac.uk/more/news/science-is-global/](http://www.acmedsci.ac.uk/more/news/science-is-global/)

<sup>10</sup> [www.gov.uk/government/news/statement-the-status-of-eu-nationals-in-the-uk](http://www.gov.uk/government/news/statement-the-status-of-eu-nationals-in-the-uk)

Currently, 60% of the UK's internationally co-authored research papers are with EU partners, and international collaboration is known to produce research with greater impact.<sup>11,12</sup> EU funding programmes, such as Horizon 2020, are designed to actively encourage collaboration and the sharing of specialist research infrastructure. From 2007-2013, the EU supported 3,539 UK researchers to access European research facilities.<sup>13</sup> Our Fellows highlighted a number of examples of collaborative projects supported by the EU which help UK researchers to work cooperatively to tackle major global health challenges, including European and Developing Countries Clinical Trial Partnership, which is linking the EU and African nations to develop treatments for poverty-related diseases.<sup>14</sup>

The Academy is concerned that UK researchers could become progressively excluded from EU consortia, particularly from leadership roles, due to a perceived disadvantage to the chances of an application being successful. Fellows have shared with us examples of colleagues choosing to step down from project applications under development, and industry collaborators pausing planned research partnerships – echoing examples across the wider community.<sup>15</sup> The network of connections supported by EU funding provides access to expertise, greater influence over global research decisions, and ambassadors for UK-led research outputs abroad. Several Fellows are concerned that, without this level of collaboration, it will be increasingly difficult to conduct studies requiring large populations, such as clinical trials of medicines for rare diseases.

However, the benefits of collaboration are not limited to only EU partners, and Fellows see opportunities to strengthen ties with other nations, including India and China. Importantly, this global approach should augment, rather than replace, collaborations within Europe and it will be important to retain and build on existing relationships. Several Fellows note that the strength of EU collaboration is built upon significant, demarcated resources. While further global partnerships should be welcomed, capitalising on this opportunity will require appropriate resource as, currently, funding is a limiting factor.

## **Funding and resources**

EU research programmes have been a significant, and growing, contributor to UK medical science.<sup>16</sup> Scotland performs particularly well, attracting more research funding per head of population than other parts of the UK.<sup>17</sup> From 2007-2012, 789 Scottish organisations were involved in over 4,000 projects, receiving a total of €351m of EU funding from Framework Programme 7.<sup>18</sup> EU funding is coupled to the indirect benefits of access to networks and collaborative opportunities, allowing Scottish researchers to contribute to research addressing the scientific and health challenges of our times.

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<sup>11</sup> The Royal Society (2016) UK research and the European Union: the role of the EU in international research collaboration and researcher mobility.

<sup>12</sup> International Comparative Performance of the UK Research Base (2013) BIS

<sup>13</sup> The Royal Society (2016) UK research and the European Union: the role of the EU in funding UK research.

<sup>14</sup> [www.edctp.org/](http://www.edctp.org/)

<sup>15</sup> [www.theguardian.com/education/2016/jul/12/uk-scientists-dropped-from-eu-projects-because-of-post-brex-it-funding-fears](http://www.theguardian.com/education/2016/jul/12/uk-scientists-dropped-from-eu-projects-because-of-post-brex-it-funding-fears)

<sup>16</sup> The Royal Society (2016) UK research and the European Union: the role of the EU in funding UK research.

<sup>17</sup> [https://www.parliament.uk/documents/post/postpb007\\_research\\_funding\\_in\\_Scotland\\_final.pdf](https://www.parliament.uk/documents/post/postpb007_research_funding_in_Scotland_final.pdf)

<sup>18</sup> *Ibid*

Future access to this funding, and the benefits it delivers, is uncertain. In the event of complete disassociation from EU research programmes there would be a significant shortfall in the Scottish research funding landscape, shifting the balance within the interdependent ecosystem of public, private and charitable funding sources which support medical science. It is unclear how such a gap might be filled, and we urge the UK and Scottish Governments, and charitable funders, to consider how best to maximise the support for internationally collaborative research within existing portfolios. The UK Government's recent commitment to underwrite Horizon 2020 projects approved prior to the UK's departure from the EU is a significant and welcome step towards providing greater certainty for the research community in the short-term.<sup>19</sup> It will be important for the Scottish Government to explore ways to build on this commitment and support Scottish research through the challenges ahead.

Although the UK's affiliation with EU programmes remains unchanged until the completion of negotiations, several Fellows were concerned about perceptions among UK and EU researchers that EU grants are now harder to obtain if led by UK researchers. Evidence on this is currently limited, but will be analysed as soon as it is available. Attrition to EU funding income is likely to disproportionately impact the UK's world-leading Universities because they derive an above-average share of their income from EU programmes. Some Fellows also highlighted the complementary scope of EU research funding, noting that it frequently targets 'blue skies' research and niche research areas that were less well-served by UK funding sources, as well as encouraging engagement between academia and small-and-medium-sized enterprises. For example, the pan-EU GeoParkinson Study Group, led by the University of Aberdeen, receives EU funding for research which is examining the link between Parkinson's disease and environmental determinants.<sup>20</sup>

We believe that Scottish research would be best served by the closest possible reciprocal association with EU research programmes. The UK's negotiation process to leave the EU offers opportunities to explore new models of affiliation with EU research programmes, which may allow continued access. Within the UK, there is an opportunity to reappraise the approach to public research funding and the role of research within the UK's future. The Academy hopes that the Government will seize this opportunity to maximise the value of the UK's research base, and place public funding on a trajectory to align with comparator nations. This reappraisal could include a reassessment of VAT levied against joint research facilities, which is currently governed by EU legislation, to foster greater collaboration between sectors. Our Fellows note the need for a strong and well-resourced system to support international collaboration, to ensure that the UK remains an outward-looking hub for global research excellence.

## Regulation

Regulatory harmonisation across the EU has simplified the EU operating environment for research, by creating unified regulatory frameworks. It provides a strong platform for collaboration by facilitating the exchange of people, ideas and research data, ensuring the highest standards for patient safety, and providing equivalence for medical

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<sup>19</sup> <https://www.gov.uk/government/news/safeguarding-funding-for-research-and-innovation>

<sup>20</sup> Environmental risk factors for Parkinson's disease and parkinsonism: the Geoparkinson study (2007) Dick *et al*, *Occup Environ Med*.

qualifications to support free movement of clinical researchers.<sup>21,22</sup> The UK community, including the Academy of Medical Sciences, has been at the forefront of shaping a range of EU regulations around research and innovation – helping to draft legislation, chairing key committees, and frequently acting as rapporteur. A new model of collaboration may see the UK transition from being a leader, to being a follower, at a time of rapid innovation in the field of pharmaceuticals and medical devices.

We see value in the UK, including Scotland, retaining appropriate mutual recognition and alignment with existing and new EU regulations, in research-relevant areas such as clinical trials, data protection and sharing, medical devices regulation, intellectual property, and the use of animals in research. The future ability to influence the development of such regulations will depend on the nature of the UK's future relationship with the EU. A divergence from EU standards would increase administrative barriers to trials and licensing, making the UK less attractive to researchers and industry. Fellows highlighted the expected relocation of the European Medicines Agency as a major loss to the life sciences sector. They foresee mutual benefits to the MHRA retaining access to the EMA, and welcomed the UK Government's active commitment to examining the impacts of leaving the EU on this sector.<sup>23</sup> A departure from the EU would see a significant shift of responsibility for regulation onto the UK and devolved administrations. This raises questions around future demands for science advice in this area within UK and Scottish Governments, and whether the current system should be expanded or strengthened. We would welcome opportunities to explore ways in which the Academy could assist the Scottish Government in assessing additional requirements for advice.

Some Fellows have drawn attention to the EU Regulation on Clinical Trials on Medicinal Products for Human Use, and the unintended consequences of earlier versions of this legislation, including delays to trials and increased costs. Lessons might be learned from such examples, and we continue to believe that research and society are best served by legislative systems which are agile, transparent and proportionate, both within the EU and the UK. A shift in the balance of regulatory power may provide opportunities to tailor regulation to the UK's specific strengths and circumstances. However, the UK Government will need to balance the benefits of alignment with wider partners, including the EU, with the flexibility to capture potential benefits from more customised regulation.

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<sup>21</sup> Joint National Academies (2013) Submission to BIS Review of the Balance of Competences between the United Kingdom and the European Union.

<sup>22</sup> BioIndustry Association (2014) UK Life Sciences Manifesto 2015-2010

<sup>23</sup> [www.parliament.uk/business/committees/committees-a-z/commons-select/science-and-technology-committee/news-parliament-2015/eu-regulation-of-the-life-sciences-correspondence-15-16/](http://www.parliament.uk/business/committees/committees-a-z/commons-select/science-and-technology-committee/news-parliament-2015/eu-regulation-of-the-life-sciences-correspondence-15-16/)