



Public Policy Projects



Finding a cure:

Getting the best Brexit deal for Britain's life sciences

A report by Public Policy Projects | Supported by QuintilesIMS

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Introduction by Rt Hon Stephen Dorrell



About QuintilesIMS

QuintilesIMS is a leading integrated information and technology-enabled healthcare service provider worldwide, dedicated to helping its clients improve their clinical, scientific and commercial results. Formed through the merger of Quintiles and IMS Health, QuintilesIMS employs 50,000 people across the globe, including 3,500 people in the UK and Ireland and conducts operations in more than 100 countries. Companies seeking to improve real-world patient outcomes and enhanced clinical trial outsourcing through treatment innovations, care provision and access can leverage QuintilesIMS' broad range of healthcare information, technology and service solutions to drive new insights and approaches. QuintilesIMS provides solutions that span clinical to commercial bringing clients a unique opportunity to realize the full potential of innovations and advance healthcare outcomes. Learn more, visit www.QuintilesIMS.com

QuintilesIMS in the UK

The outcome of the EU referendum on the UK life science market presents new challenges from regulatory, funding and patient access to medicines perspectives. The UK remains an influential market on the global stage, with a particularly strong research and scientific base. A combination of the post-Brexit era with a financially pressured NHS, recent changes to national patient access systems by NICE and NHS England could potentially have a chilling effect on global pharma investment in the UK. Currently life sciences are a jewel in the crown of UK PLC. Given the possible challenges Brexit poses to the financial and automotive sectors with a future potentially outside the single market, the UK life sciences industry should remain a stable and consistent growth sector through the uncertain economic times that lie ahead.

QuintilesIMS has provided much of the evidence-based insights for the Market Briefing Report, from the UK Market Prognosis 2020, our annual macroeconomic and data forecast of growth trends in the UK pharmaceutical industry to 2020 - including an assessment of why the voice of the UK life sciences needs to be heard by those negotiating UK exit from the European Union.

QuintilesIMS will continue to provide UK government and industry with the evidence-based insights on clinical trials, medicines usage, uptake and patient access to inform a targeted life sciences industrial strategy that will maintain the UK life sciences as a success story for UK PLC.

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FINDING THE CURE

It is easy to see why David Cameron described UK life sciences as *“truly a jewel in the crown of our economy”*.

The sector is made up of medical biotechnology, pharmaceutical and medical technology and the wider scientific base on which it depends; it generates annual revenues of £60 billion, exports of £30 billion and employs 220,000 people. It underpins the quality of UK healthcare both because its presence ensures that scientific advances are immediately available to UK patients, and because the opportunity to work at the frontier of life science attracts some of the best clinicians and academic scientists in the world to work in the UK.

Seen in its wider context, it is also a cornerstone of the UK science sector, which is the second largest in the world after the United States and is the key to the global success of UK universities.

It is hard to overstate its importance both to our economic health and to our ability to maintain and develop the quality of life in Britain.

As the Government prepares to launch its Brexit negotiations, we have heard much about the importance of the City of London and the financial services sector – and they do indeed represent a vital national interest; the purpose of this report is to ensure that policy makers are equally focussed on the implications of Brexit for UK life sciences and that its interests – and therefore the interests of UK citizens as a whole – are fully understood and protected.

One of the key interests of the sector lies in the regulatory structures which surround it. The good news is that leaving the EU means that responsibility for these structures will become solely a UK responsibility, which should make it easier to challenge the undoubted tendency of all regulators to err on the side of risk aversion. This has led some leaders of UK science to celebrate the prospect of Brexit and look forward to the opportunity to create a more liberal regulatory structure for life sciences outside the EU.

This prospect is undoubtedly attractive, and we shall need to develop to the full the opportunities which it creates. To do so we must understand quickly how the new regulatory structures will work and which requirements we propose to change. That is important both to develop the argument that the UK is about to become more attractive as a location for life science development, and to understand how the new UK regime will relate to the regimes which apply

elsewhere in the world, and in particular in the United States, the rest of the EU and Japan.

A key conclusion of this report is that policy makers need to focus on our future relationship with these three blocs, which together account for over 90 per cent of world sales of new hi-tech medicines. Future trading relationships with BRICT (Brazil, Russia, India, China and Turkey) countries are important to the wider interests of the UK, but their demand for medicines is focussed on primary care and generic manufacturers; they are not significant markets for the hi-tech, speciality patented medicines that are the lifeblood of innovation for the industry and which are pushing forward boundaries in cancer and other devastating diseases.

This conclusion underlines the importance of ensuring that UK life sciences remains at the heart of mainstream developments in these key markets. Regulatory structures which encourage separation of the UK (3% of global demand) from the rest of the EU (27 per cent of global demand) or the United States (54 per cent of global demand) run the risk of isolating the UK sector from key markets and encouraging global pharma businesses to focus their research activities elsewhere.

The report also draws out the importance of ensuring that Brexit does not undermine UK-based research and development activity. In 2015 the UK received scientific support to the value of €8.8 billion; ministers have made a welcome commitment to ensure that this level of funding is maintained in future but that is, in reality, not the real issue. Maintained funding is obviously welcome, but the essential UK national interest is to ensure that the UK science continues to be at the heart of the wider European scientific community.

This emphasis on the global nature of life sciences is an important theme which runs through the report. Quite apart from the importance of ensuring that UK regulatory structures are recognized in other key markets, it is also important to ensure that UK-based employers have access to the best and brightest research brains in the world. The multi-lingual, multi-cultural academic and clinical communities of London, Oxford, Cambridge, and many other UK centres, bring not only cultural diversity to those communities but also scientific competitive advantage to the UK as a whole.

Policy makers must respect the electorate's sensitivity to immigration policy, but they must also recognize that science, and science-based industry, is a global

activity and that we face a simple choice: we either participate in full in that global scientific community or we prejudice a key British national interest.

The final key theme drawn out in the report is the close relationship between the strength of the UK health and care sector and the competitiveness of UK life sciences. Recent figures from the ONS have demonstrated that in 2014 health and care accounted for 10 per cent of economic activity in the UK economy, but government spending constraints are likely to see that proportion continue to fall over the rest of the decade. Quite apart from the social policy implications of seeing health and care fall as a share of GDP at a time when the economy has returned to slow growth and demand for these services is rising, the report draws out the implications for the competitiveness of UK life sciences of a healthcare sector which is unable to afford to provide its patients with best practice care.

Virtually all economists agree that the short term effect of Brexit will be, at best, a period of slower growth in the UK economy; against that background the implications for UK life sciences is yet another reason why it is important to ensure that public spending pressures are not allowed to undermine the quality of UK health and care services.

The story of the development of life sciences is at heart a story of human achievement and a source of optimism for the future; it is also a source of strength for the UK. We owe it to ourselves to ensure that our contribution is not sacrificed on the altar of political convenience.

Rt. Hon. Stephen Dorrell

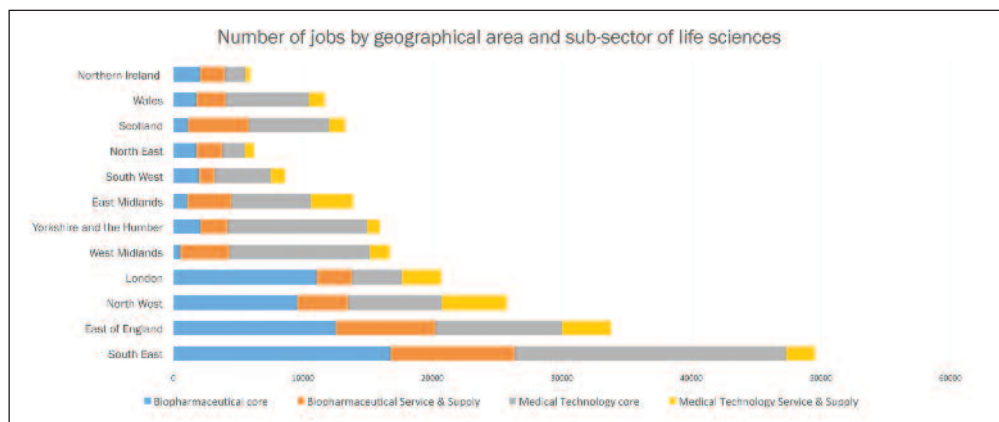
The Jewel in the crown: The contribution of the life sciences sector to the UK

The life science industry is truly a jewel in the crown of our economy
David Cameron¹

The UK is a global leader in life sciences. Despite representing just one per cent of the world's population, the unique combination of a world class research base, significant financial investment and the particular benefits of the NHS as a single health care system mean the UK is particularly attractive to pharmaceutical and biotech companies.

This has obvious benefits to the wellbeing of patients in the UK, improving health outcomes, quality, and quantity of life, and allowing previously fatal or chronic disease to be managed. Alongside these immediate health benefits, the life sciences sector makes a large and growing contribution to the British economy and national prosperity.

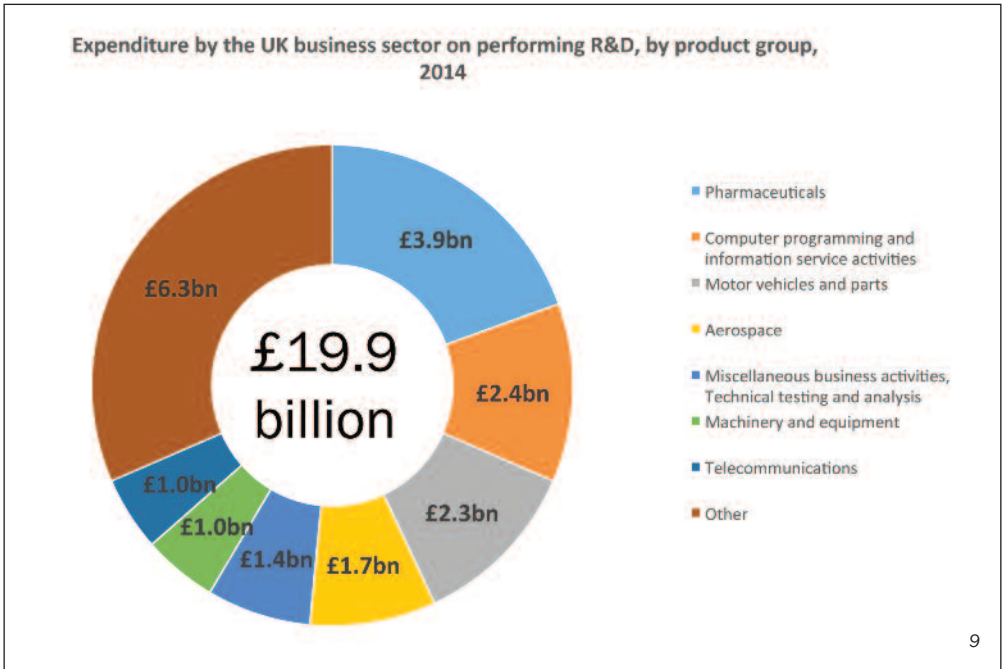
Over 220,000 people are employed in the life sciences sector either directly or through the supply chain, with an annual turnover in excess of £60bn². Pharmaceutical manufacturing alone contributes around £13.0bn to UK Gross Value Added (GVA), more than in any other European country aside from Germany³. To put this in context, this represents more than double the contribution of the textiles and clothing industry and is equal to 0.8 per cent of total UK GVA. At £330,000 the pharmaceutical industry also has the highest GVA per employee of any high technology sector⁴.



Strength and Opportunity 2015: The landscape of the medical technology and biopharmaceutical sectors in the UK, May 2016

The UK is the third highest beneficiary of foreign direct investment in pharmaceuticals after Germany and the United States⁶ and the industry contributes significantly to UK trade, with exports worth £30bn and a trade surplus of £3bn⁷.

The pharmaceutical industry is the largest investor in UK Research and Development (R&D), providing over 20 per cent of funding. This investment has made a crucial contribution in securing the UK's position as a global leader in scientific research, with the second highest share of life sciences academic citations in the developed world⁸.



ONS, UK Gross domestic expenditure on research and development: 2014

Analysts have predicted that the UK life sciences industry could come to rival the world leaders of San Francisco and Boston¹⁰. In order to maximise this global competitive advantage, the Government has made support of the life sciences sector a priority and a key part of the UK’s industrial strategy.

The importance of the UK market

The strength of UK life sciences is recognised internationally. Recent investments by large pharmaceutical companies reflect the UK’s importance, both in terms of R&D and as a key sales market.

The UK’s science base is highly regarded by the pharmaceutical industry: the UK has the second largest number of science graduates in the Organisation for Economic Co-operation and Development (OECD) and access to the ‘golden triangle’ of Oxford, Cambridge and London is highly coveted by the life sciences sector.

The UK’s position as a premier market of choice for the industry is highlighted by the fact that the UK is the third ranking market for New Chemical Entity launch numbers in the world¹¹. The National Institute for Health and Care Excellence (NICE) is regarded as the gold-standard in health technology assessment, with the

impact of its technology appraisals affecting \$325billion of pricing across the global pharmaceutical market¹².

Prior to the EU referendum, the UK was forecast to be the second fastest growing developed market after the US over the next five years, at a Compound Annual Growth Rate (CAGR) of 5-8 per cent, at list price (excluding PPRS rebates and other rebates and discounts offered by the pharmaceutical industry to the Department of Health and wider NHS).¹³

¹ HM Government Strategy for UK life sciences: one year on, December 2012

² Strength and Opportunity 2015: The landscape of the medical technology and biopharmaceutical sectors in the UK, May 2016

³ Life Sciences Competitiveness Indicators, May 2016

⁴ UK National Accounts, The Blue Book: 2016

⁶ Life Sciences Competitiveness Indicators, May 2016

⁷ Maintaining and growing the UK's world leading Life Sciences sector in the context of leaving the EU, UK EU Life Sciences Transition Programme Report, for the UK EU Life Sciences Steering Committee, September 2016

⁸ Life Sciences Competitiveness Indicators, May 2016

⁹ ONS Statistical Bulletin, Gross Expenditure on Research and Development 2014

¹⁰ Telegraph, UK in a life sciences 'renaissance' as funding booms, Julia Bradshaw, February 2016

¹¹ QuintilesIMS Market Prognosis 2016

¹² Brexit's Impact On The Global Pharmaceutical Industry: Market Authorization & Pricing, Pharmaceutical Online, Yulia Privolnev, July 2016

¹³ QuintilesIMS Market Prognosis 2016

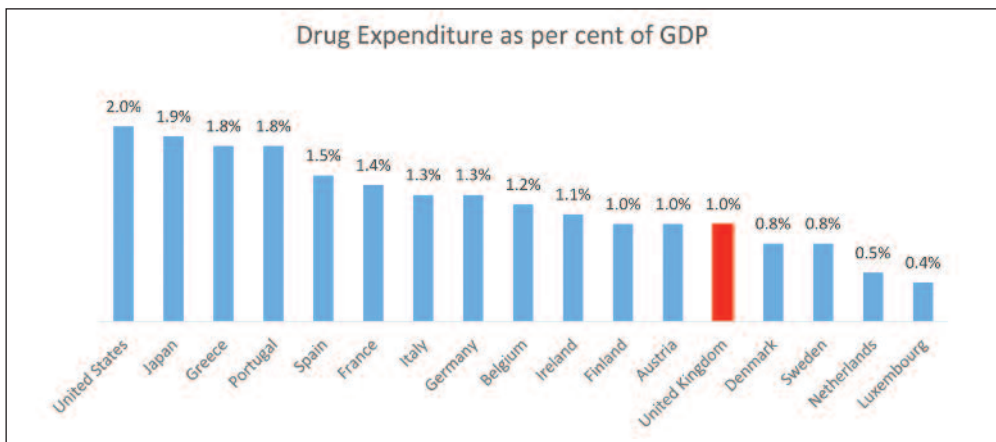
Commercial challenges

Despite the UK's attractiveness and the growing strength of the sector, UK life sciences face significant commercial challenges.

NHS finances

The success of the life sciences sector in the UK is uniquely bound up with that of the NHS. The NHS faces a significant cost-containment challenge in the coming years. Even including the pledge of an additional £10bn funding, year-on-year increases in funding are set to be at an historic low. Clinical Commissioning Groups are facing an increasing pressure to cut costs, with a £2bn national overspend. Since January 2016 local health and care systems have come together to develop regional Sustainability and Transformation Plans (STPs), strategic plans mapping out showing how local services will evolve and become financially sustainable over the next five years.

Drug spend is often seen as an attractive target for savings. Current medicines spending sits at one per cent of GDP in the UK, behind spending in Germany, France and the US. That equates to medicines expenditure (at list price) per head of just £231 in Britain, in comparison the USA, Germany and France spend £648, £343 and £341 per head respectively¹⁴.



ABPI Knowledge Hub

The PPRS scheme, which accounts for approximately 70 per cent of the UK prescription medicine market value, caps the increase in NHS drug spending at 1.8 per cent for 2016, 2017 and 1.9 per cent in 2018¹⁵. Any increase above the cap, results in manufacturers operating within the PPRS paying a rebate. The total rebate paid back to the Government since the inception of the current scheme in 2014 stands at around £1.45 billion¹⁶. Manufacturers not within the

PPRS must operate within the statutory scheme, which required mandatory price cuts for all medicines sold of 15 per cent, this is currently being adjusted.

This increased focus on cost cutting comes at the same time as drug approval regimes have tightened. This combination of price restraint and fewer drug approvals creates the risk of a feedback loop in which less money is available for research and development of new drugs which in turn undermines the long term attractiveness of UK based pharmaceuticals.

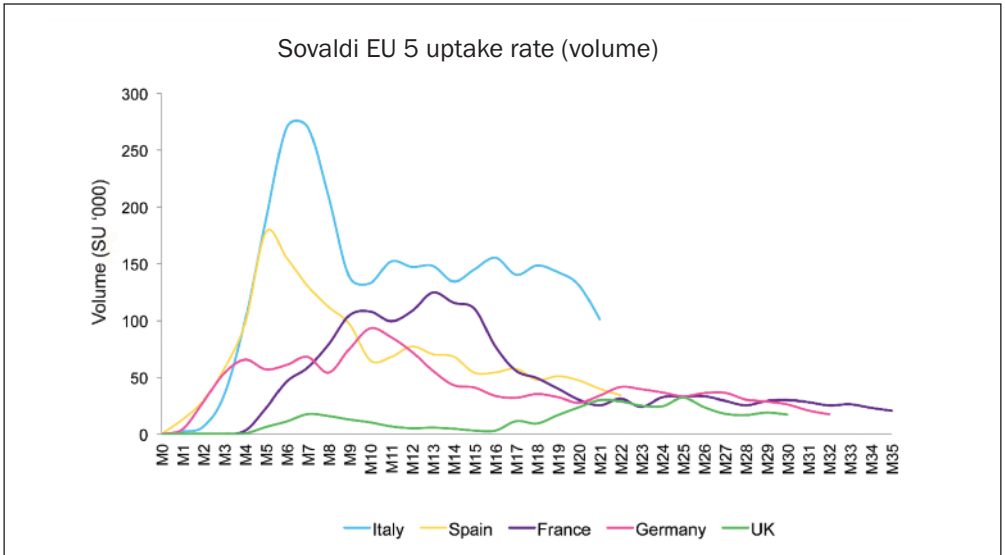
Drug approvals

The NHS in England and Wales requires that, in addition to being approved by the EMA or MHRA on grounds of quality, safety and efficacy, new drugs have to demonstrate that they offer cost effective enhancement to existing treatments for similar conditions. NICE has established an international reputation for carrying out these assessments, but the combination of new drug developments and rising cost pressures has led to this process becoming increasingly complex and constrained. A similar approach operates in Scotland with the Scottish Medicines Consortium (SMC).

Furthermore, a consequence of increasing cost pressures is that even when new drugs are approved for use within the NHS, there is a tendency for take-up to be relatively slow. This is particularly true for specialty medicines for complex and serious diseases or rare, often genetic disorders known as orphan diseases. These medicines are a growing portion of clinical development activity and, in developed countries, of medicines spend. Looking forward to 2020, QuintilesIMS forecasts that 76 per cent of European medicines budget growth will be devoted to specialty medicines as a whole, which will include a significant contribution from medicines for the rarest diseases¹⁷.

Sovaldi provides a case in point. Sovaldi is a drug that can rapidly and effectively cure Hepatitis C and prevent the need for liver transplants. It received a positive NICE assessment and is listed on the World Health Organisation (WHO) list of essential medicines, but widespread implementation within the English NHS has been delayed on the grounds of affordability in year. As a result, patients suffering from Hepatitis C have experienced continuous delays in access to a lifesaving drug that is widely available in other developed economies. It should be noted that Hepatitis C prevalence differences also exist between the countries, although not enough to account for the breadth of uptake variation.

Medical devices for complex conditions are also experiencing implementation delays, despite recent positive NICE approvals.



QuintilesIMS MIDAS

This combination of regulatory process and cost pressures has the combined effect of undermining the improved life outcomes possible for NHS patients and creating a more challenging environment for the UK life sciences industry¹⁸. This is evidenced by QuintilesIMS data which demonstrates uptake of new medicines in the UK approved by NICE runs at 15.3 per cent of the average of other countries in the first year of launch¹⁹.

Cancer Drugs Fund

The Cancer Drugs Fund (CDF) was launched in 2011 in order to alleviate some of these pressures by giving cancer patients access to drugs that were not approved by NICE. The CDF was recently restructured as a managed access fund which will be subject to NICE assessment and will allow drugs to enter and exit the scheme. New criteria will also allow the fund to reach larger populations (above the previous 7000 cap), though the budget will remain static at £340 million per year.

Although the original CDF alleviated some of the pressures, and the recent changes addressed some of the concerns created by the scheme, the increasing complexity of access arrangements remain a significant concern to the UK pharmaceutical industry. The Association of the British Pharmaceutical Industry (ABPI) anticipates that up to two thirds of existing cancer drugs will be removed from the CDF²⁰. This has led QuintilesIMS to forecast that the new fund will have a negative impact on total market sales of up to £372 million²¹.

Accelerated Access Review

The final report from the Accelerated Access Review²² was a further attempt to address some of these concerns. Its importance was underlined by Simon Stevens (Chief Executive of NHS England) when the Review was launched, when he said:

Across the NHS we're going to create headroom for faster and wider uptake of important new patient treatments. In doing so we're going to create new opportunities in the run-up to Brexit for our globally successful UK life sciences sector. If we get this right there are huge gains within our grasp, for patients across the NHS and for the wider success of our country²³.

The review recommends the creation of a new Accelerated Access Partnership to speed up and simplify the process for getting transformative treatments to patients and provide support for innovators. It recommends greater use of conditional approval to allow for the collection of real world evidence on drugs and aims to give patients access to the most innovative new drugs up to four years earlier than present time scales, although this is heavily dependent on achievement of demanding efficiency objectives elsewhere in NHS budgets.

¹⁴ QuintilesIMS World Review Analyst 2014

¹⁵ Understanding the 2014 Pharmaceutical Price Regulation Scheme, ABPI

¹⁶ Industry contribution to NHS medicines bill at £1.45bn, ABPI, September 2016

¹⁷ QuintilesIMS MIDAS 2016

¹⁸ Accelerated Access Review: Interim report, October 2016

¹⁹ Quintiles IMS Worldview

²⁰ ABPI comments on the NHS England's decision for the Cancer Drugs Fund, February 2016

²¹ QuintilesIMS Market Prognosis 2016

²² Accelerated Access Review, Final Report, October 2016

²³ Accelerated Access Review, Final Report, October 2016

Brexit – where are we now?

Along with much of the UK's business community, key figures in the life sciences sector made clear their preference for the UK to remain in the EU. Over 90 representatives of the UK's leading life sciences companies authored a letter to the Observer during the referendum campaign highlighting the commercial risks and likely negative impact on patients to new medicines if the UK were to leave²⁴. A Campaign for Science and Engineering survey of researchers found that 93 per cent agreed that EU membership is a major benefit to UK science and engineering²⁵. However, life sciences did not feature prominently in a campaign which focused largely on immigration.

Europe is the single biggest global market, and access to this market is a key reason for global biopharmaceutical companies deciding to establish their European HQ in the UK and invest in R&D activities

UK BioIndustry Association (BIA)²⁶

What do we know about Brexit so far?

The UK's future relationship with the EU remains uncertain. The range of possible future relationships extends from a Norwegian style European Economic Area (EEA) relationship, known as 'Soft Brexit', to a complete severing of ties. This latter option, known as 'Hard Brexit', will be the default outcome if the UK fails to secure a mutually agreed deal by the end of the Article 50 negotiation process. This would mean the UK engaged and traded with the EU on unfavourable World Trade Organisation (WTO) terms. Beyond that very little is known. The EU has indicated that it will not enter into any formal negotiations until the UK has triggered Article 50, and despite some Parliamentary pressure the Government has not set out its negotiating priorities.

The Prime Minister's Brexit speech to the Conservative Party Conference was widely interpreted as leaning towards a 'Hard Brexit'. Her speech pledged a 'Great Repeal Bill' that would repeal the 1972 European Communities Act and transpose all existing EU Law into British Law. She also committed to triggering Article 50 by March 2017. Though the Prime Minister indicated she would seek single market access she also pledged to curb free movement and to remove the UK from the jurisdiction of the European Court of Justice (ECJ). It seems unlikely that both positions are compatible as the EU has been clear; that both free movement and ECJ adjudication are non-negotiable pre-requisites for single market access.

I want it to give British companies the maximum freedom to trade with and operate in the Single Market – and let European businesses do the same here. But let me be clear We are not leaving the European Union only to give up control

of immigration again. And we are not leaving only to return to the jurisdiction of the European Court of Justice.

Theresa May, UK Prime Minister²⁷

There are emerging differences from within the Cabinet as to what the future relationship should be. Chancellor Phillip Hammond is thought to prefer a relationship that protects Britain's economic interests, along the lines of a 'Soft Brexit' model, whereas Liam Fox and David Davis, the Ministers for International Trade and Exiting the EU appear to favour a 'Hard Brexit'.

It is also unclear whether the Prime Minister will enjoy a Parliamentary majority for any deal. She faces pressure from the right of her party to sever ties with the EU, but also from a group of centrist Conservative MPs who are opposed to an acrimonious divorce. At the same time, the SNP, the Liberal Democrats and Labour Party all look set to oppose many of the Government's proposals, raising the prospect of an early General Election. A case currently before the High Court will determine whether the Government is required to seek Parliamentary approval to trigger Article 50.

On the continent the looming French and German elections have led to a hardening European negotiating stance with Britain. There is a strong desire not to let Britain pick and choose the elements of EU membership it would like to retain. Meanwhile, the EU-Canada trade deal was almost scuppered by its rejection by the regional Walloon Parliament in Belgium, which bodes ominously for any future deal the UK tries to secure during the two-year Article 50 period.

To summarise, the landscape remains almost as uncertain as it did on June 24th. Questions ranging from the extent of single market access to the status of EU nationals currently living in the UK remain unanswered.

²⁴ BIS Press Release, *Life science leaders say UK is better off in a reformed EU*, May 2016

²⁵ CASE-EPC, *The role of EU membership in UK science and engineering research*, December 2015

²⁶ BIA, *UK Life Sciences Manifesto 2015–20*

²⁷ Theresa May, *Britain After Brexit: A Vision of A Global Britain*, October 2016

Determining the impact of Brexit on life sciences

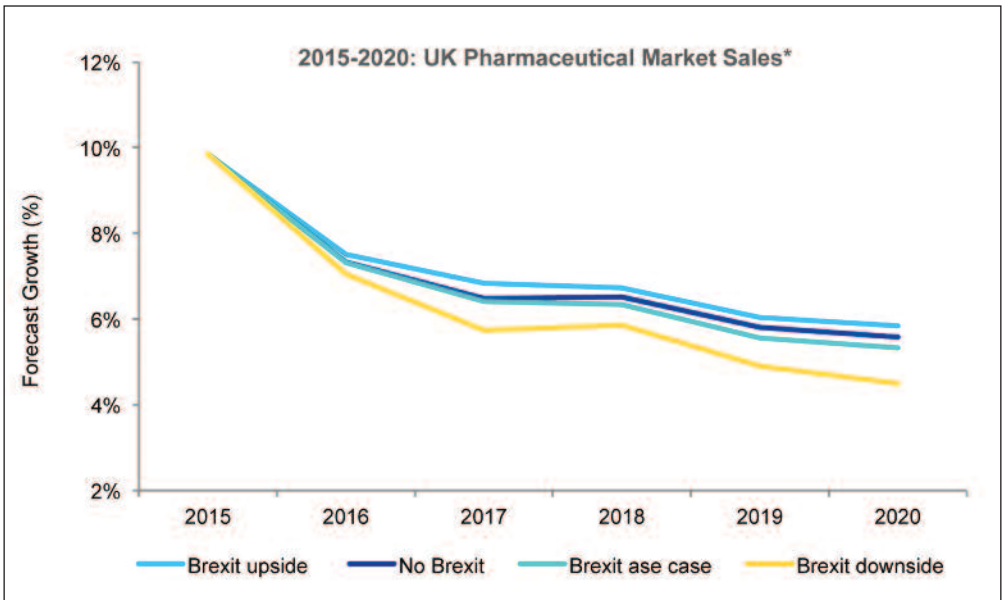
Harmonisation in the life science innovations, products, processes and treatments that flow from that research brings with it access to the EU market, and in the process attracts inward investment into UK life sciences.

House of Commons Science and Technology Committee²⁸

In the run-up to Brexit we need not only to secure - but actually enhance - our vibrant and globally successful UK life sciences sector.

Simon Stevens, Chief Executive, NHS England²⁹

Until the outline of the future EU-UK relationship becomes clear, it is impossible to say for certain what impact Brexit will have on the life sciences sector. The greater the severing of ties, the less attractive the UK will be for future life sciences investment. The chart below uses QuintilesIMS data to show how significant the range of post-Brexit EU-UK models could be on the annual growth rate of market sales over just the next five years.



QuintilesIMS Market Prognosis (at ex-manufacturer price levels, excluding rebates and discounts)

Immediate reaction

The immediate reaction to the vote from the sector has been mixed. Large pharmaceutical companies have adopted a wait and see approach, and have continued to invest in the UK. GlaxoSmithKline (GSK) has unveiled a plan to invest £275 million in three sites in the country and AstraZeneca has reaffirmed their commitment to a £330 million new R&D centre. Alnylam, a US biotechnology company, announced in September that it would be making an investment of hundreds of millions of pounds to establish its European drug development team in Berkshire.

Half of our global R&D takes place in the UK and it is not high on our list of priorities to change that.

Sir Andrew Witty, outgoing GSK Chief Executive³⁰

Despite the current approach of business as usual, there is a widespread industry acceptance that the future relationship negotiated by the UK will determine future investment decisions.

The biggest problem is the uncertainty, until we know more about the agreement it's hard to say how attractive the UK market will be.

European Pharmaceutical Company Executive³¹

The reaction from the scientific community has been less sanguine: academics have already reported an increased unwillingness from European partners for co-operation on projects with UK researchers and they have sounded warnings about future science funding.

The UK is dependent on EU funding to a concerning level

Daniel Hook, Digital Science³²

Pharmaceutical companies have been relatively safeguarded from the turbulence elsewhere on the stock market as pharma is widely seen as a defensive investment in times of uncertainty. However, UK biotech stocks, which are inherently high-risk, have been particularly hit in the post Brexit aftermath as investors move to safe-haven assets.

²⁸ House of Commons Science and Technology Select Committee, *EU Regulation of the Life Sciences*, June 2016

²⁹ Accelerated Access Review, *Final Report*, October 2016

³⁰ *Brexit: An experiment full of risk for British science*, *Financial Times*, August 2016

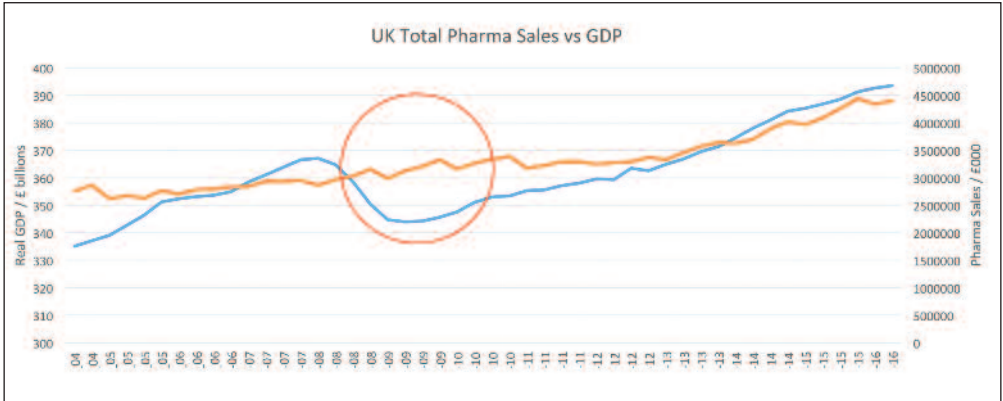
³¹ PPP Interview, October 2016

³² *UK scientists dropped from EU projects because of post-Brexit funding fears*, Ian Sample, *Guardian*, July 2016

Impact of the post-Brexit economy

Macro-economic environment

Economic forecasts are united in their prediction that the decision to leave the EU will, at least in the short term, have a negative impact on the UK economy. The Economist Intelligence Unit forecasts that UK GDP will be six per cent below baseline by 2020.³³



QuintilesIMS Market Prognosis

Pharma has previously tended to be relatively unaffected by macro-economic conditions. Nonetheless healthcare spending represents around 10 per cent of UK GDP³⁴ and it will not be immune from any fall in GDP. The EIU suggests that the knock on effect of a weaker post-Brexit economy will mean health spending is 4.8 per cent lower than it would have been by 2020.³⁵ This would necessitate a further £10bn in NHS savings on top of the £22bn efficiency savings already committed. Chancellor Philip Hammond has announced that the Government will not now seek to eliminate the deficit by 2020, potentially allowing for additional public spending – but he has been equally clear that a policy of fiscal restraint will continue over the course of this Parliament. November’s Autumn Statement will provide the first indication of the impact of Brexit on NHS spending.

Further NHS savings or cost-containment measures will almost certainly lead to more pressure on drug budgets. This could result in more restrictive pricing agreements, greater use of generics, a more aggressive approach to pricing from the Competition and Markets Authority (CMA) or a revision to NICE’s cost effectiveness ratio, leading to fewer new drug approvals. New initiatives to increase access to new or more costly medicines could be postponed. The economic environment will also decrease the likelihood of any move towards PPRS rebate ring fencing.

This will be compounded by the fact that as NICE and NHS England approve fewer drugs, companies will choose not to launch new drugs in the UK³⁶ due to the tougher fiscal environment. A further likely effect will be that as the UK struggles to afford, and therefore match, best practice for medicine it will become a less attractive location for clinical trials, whose purpose is to measure incremental benefit over current best practice.

Launch price in the UK has a major impact across Europe, that means that if the NHS is going to start further cost-cutting that has an impact elsewhere, so we'll have to consider launching elsewhere first and coming to Britain later.

Tom Delahoyde, Managing Director UK&I, Chiesi³⁷

The net result is that patients in the UK are likely to face delays and restrictions in accessing new drugs. QuintilesIMS forecasts indicate that the impact of the tougher macro-economic environment will have an impact on sales in the range of up £264 million on total sales.

Sterling devaluation

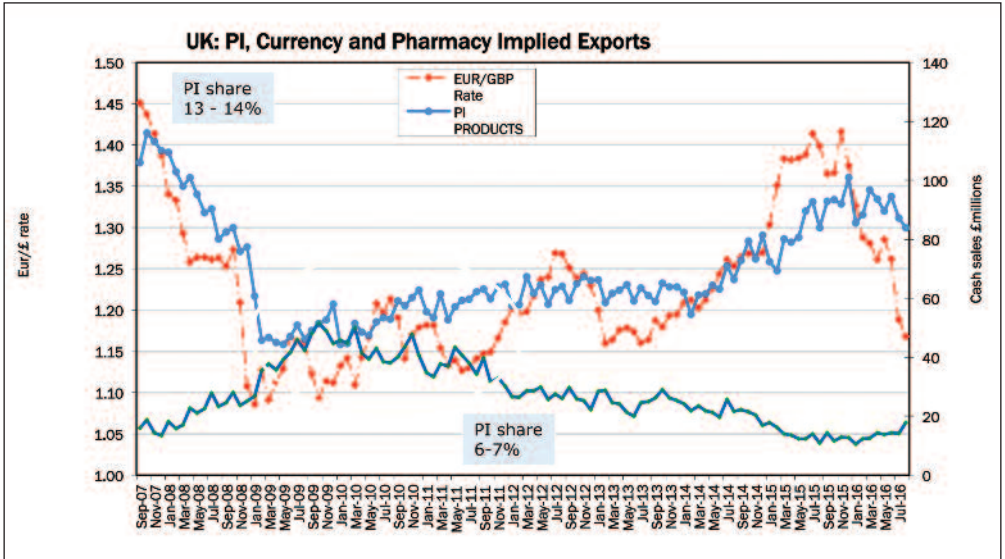
An immediate consequence of the June referendum has been a sharp drop in the value of sterling. Sterling now trades the lowest rate against the dollar in three decades.

This decline in value is already affecting the life sciences sector. In the short term this is likely be beneficial for British-based companies making their products more competitive and a profit boost on conversion to sterling. However, companies reporting in euros and dollars are already seeing their margin and debt impacted as a result of the change in exchange rate.

We've already seen a significant decline in our margins as a result of the fall in exchange rate.

European Drugs Company Executive³⁸

The UK is likely to see an increase in drug exports. Currently the UK is a net parallel importer - averaging four per cent of volume and six per cent of value. A weaker pound is starting to reverse this trend, leading to growing exports. Analysis of parallel trade shows that weakening sterling has already had an impact in changing some pharmaceutical trade flows, but the effect to date is much less dramatic than the exchange rate slide.



QuintilesIMS Supply Chain Management

Any future increase in exports of medicines could lead to lower UK drugs stocks and supply chain issues. The future of parallel trade is uncertain, but the risk of medicine shortages for UK patients, similar to those seen in other European countries who are significant net exporters, is real. There will also be greater reluctance from the NHS to import drugs from those countries with a stronger currency.

The exchange rate decline will also have secondary impacts such as on the relative competitiveness of salaries, potentially making the UK less attractive to global talent.

³³ "Brexit" Will cost 6% of GDP, *The Economist Intelligence Unit*, June 2016

³⁴ ONS, *UK Health Accounts 2014*, May 2016

³⁵ *Brexit - What's next for pharma?*, Ana Nicholls, *PharmaTimes*, July 2016

³⁶ *QuintilesIMS Market Prognosis 2016*

³⁷ *PPP Interview*, October 2016

³⁸ *PPP interview*, October 2016

Key concerns for the life sciences

The following areas relate specifically to the type of deal that the UK is able to secure and they will ultimately determine the future success of life sciences within the UK.

The most significant concern, expressed across the sector, is the UK's future access, licensing and regulatory relationship with the EU. In QuintilesIMS polling conducted in August of 2016, 52 per cent of industry respondents said that Brexit would decrease the UK's importance in launch sequencing³⁹. Medicines are, and always will be, highly regulated and the UK has an interest not just in ensuring its regulations align with the second largest market in the world, but also in maintaining influence over that regulation.

Access, licensing and regulation

Most significant is the future relationship between the UK's Medicines and Healthcare Products Regulatory Agency (MHRA) and the European Medicines Agency (EMA). The future regulatory relationship will affect both the commercial attractiveness of the UK and also the speed at which British patients will be able to access innovative medicines. A 'Hard Brexit' which saw an end to EMA-MHRA co-operation would have a significant negative impact on the life sciences sector. QuintilesIMS Market Prognosis suggests that the potential negative impact of regulatory dealignment on drug sales to 2020 could be up to £144 million.⁴⁰

Current arrangements benefit both patients and companies across the EU. Pharmaceutical companies can get mutual recognition of national licenses across the Europe, or they can secure a European wide license through the EMA. This latter approach is one increasingly used for specialist drugs treatment, the major area of market growth.

The EMA will undoubtedly have to leave London.

Sir Mike Rawlins, Chairman MHRA⁴¹

The EMA is currently based in London. As a result of the UK leaving the EU, it is inescapable that the EMA will relocate. The EMA's current base gives the UK a high level of influence over the European body and increases the UK's importance in the eyes of the life sciences sector. The attractiveness of hosting the EMA can be seen by the speed at which other countries have bid, or suggested they plan to bid, to host the body, among them Sweden, Germany, Spain, Italy, France, Ireland and Denmark.

Japanese pharmaceutical companies have been clear that a key attraction of basing their European operations in the UK is proximity to the EMA. According to the Japanese Ministry of Foreign Affairs, relocating the EMA would mean the *"appeal of London as an environment for the development of pharmaceuticals would be lost, which could possibly lead to a shift in the flow of R&D funds and personnel to Continental Europe."*⁴²

Regulatory alignment

Beyond the loss of the EMA, a longer term concern is whether the UK and EU regulatory pathways will remain aligned. Even under a 'Soft Brexit' model, drugs which are centrally authorised by the EMA would need additional authorisation in the UK, delaying patient access. The Swiss model would require the UK to take full responsibility for medicine authorisation, but the Swiss authorisation agency does work closely with the EMA under mutual recognition agreements. If Britain were to pursue a 'Hard Brexit' outside of the European Free Trade Association (EFTA) and the EEA, regulatory pathways would become largely separate. The EMA does, however, operate a number of far more limited mutual recognition arrangements with countries such as Australia and Canada on issues such as good manufacturing processes to streamline authorisation.⁴³

Any divergence between EU and UK processes will decrease the commercial attractiveness of the UK. In 2015, the UK made up just 2.5 per cent of total global sales value for prescriptions medicines compared to 16.6 per cent in the rest of the EU. If as a result of 'Hard Brexit' companies are forced to go through separate authorisation processes it seems clear that their priority will be the larger EU market. The UK would then lose its position as the third ranked country for number of new chemical entity launches which means British patients waiting longer to access life changing medicines.

If we were to split into a UK process and a European process of drugs regulation, then global companies would make the rational decision to prioritise patients in a market where they are getting access to populations of 500 million rather than 60 million.

Mike Thompson, Chief Executive, ABPI⁴⁴

MHRA is a world respected agency, it is recognised as an integral part of the European process, and currently we are at the forefront.

UK Pharmaceutical Company Executive⁴⁵

The MHRA enjoys a strong reputation in Europe and regularly receives the highest number of rapporteur/co-rapporteur appointments for the EMA⁴⁶. Because of this,

the UK not only receives the benefits of EU wide regulatory convergence, but also drives the direction of regulatory policy.

Despite high mutual regard between the EMA and MHRA, following Brexit the EMA will, inevitably, become increasingly responsive to pressures from within Member States of the EU, including a pressure to regard its natural partner in drugs regulation as the US Food and Drug Administration (FDA), rather than the British regulators, particularly if the Transatlantic Trade and Investment Partnership (TTIP) is ratified. The risk is that this would isolate the UK and reduce its influence over the rules of drug authorisation and access.

It is held in the highest regard by our continental colleagues, so I know that our European colleagues are desperate for the MHRA to be retained as part of the regulatory process. I do believe a deal can be struck in the best interests of patients.
Mike Thompson, Chief Executive, ABPI⁴⁷

The MHRA has been able to exploit its reputation, leadership and expertise to positively influence the EU medicines regulatory regime.
UK BioIndustry Association⁴⁸

While some additional administrative requirements are inevitable in any model in which the UK is not a full EU member, a 'Hard Brexit' would exponentially increase the scale of that burden, the most likely result will be British patients facing delays in accessing new and innovative medicines.

Clinical trials

A significant section of the life sciences community sees opportunity in the ability to opt out of the EU's Clinical Trials Directive (CTD). Many scientists claim the CTD adds overly burdensome complexity and bureaucracy to medical trials and fails to recognise the risk based nature of innovation. The FDA is said to have referred to the 2004 EU Clinical Trials Directive as "Europe's gift to America" - a view shared by the Ethical Medicines Industry Group in the UK.

The EU directives come from a culture of deep regulatory conservatism which simply does not understand how primary invention and implementing innovation happen.
Professor Angus Dalglish, Professor of Oncology, St George's⁴⁹

The greatest risk for science is for the UK to stay in the EU and be at the whim of its inept regulators.

Jamie Martin, Scientists for Britain⁵⁰

Britain is more inclined towards a relatively liberal risk-based regulatory environment that allows fields to move quickly – to reflect on ethical issues but not to over-regulate.

Professor Sir John Bell, Chair of the Accelerated Access Review External Advisory Group⁵¹

Consistent with such a view of the CTD, its introduction did see a significant decline in commercial trials in the UK which almost halved between 2000-2003 and 2004-2007. However, the Association of Medical Research Charities (AMRC) has said that the major cause of problems in the UK has been the ‘stringent’ approach that Britain has taken to implementing the directive compared to other European countries⁵². It is also unclear whether the UK would gain a significant advantage from establishing its own clinical trial system, as it could mean UK trial results do not count across the EU. The UK is currently the most popular location for phase I trials in Europe, second for phase II and third for phase III⁵³, suggesting significant downside to establishing a separate regime. Opting out of the CTD would also leave the UK unable to contribute to the future debate about a regime that underpins licensing across the EU.

New clinical trial rules set to be introduced across the EU in 2018 as part of Clinical Trial Regulation EU No. 536/2014 are seen as a substantial improvement. The 2018 reforms were heavily influenced by the UK and have been introduced precisely to address concerns about the overly restrictive nature of the CTD. They will introduce a single EU trial portal allowing industry to apply centrally and receive approval to conduct trials in all EU member states. If the UK is excluded from the new clinical trial regime, it seems likely that the market will become an afterthought. It will be too costly and complex to apply and conduct clinical trials in the UK after having already received approval from the more lucrative EU market. This poses an immediate risk, as companies are unlikely to begin complex multi-year trials in the UK when they could well become misaligned with Europe later in the process.

Trade

EU membership and access to the single EU market significantly influences businesses’ decisions to invest and operate in the UK.

UK Bioindustry Association⁵⁴

In 2015 life sciences imports and exports were approximately £29.7bn and £29.5bn respectively, 44 per cent of all exports went to the EU⁵⁵. Future trading relationships between the EU and the UK will have a major impact on the strength of the industry.

The WTO exempts finished pharmaceuticals from tariffs but active pharmaceutical ingredients are not included. This suggests any relationship not based on single market access would have a detrimental impact on the life sciences supply chain. The introduction of import VAT and new border controls could place significant burdens on pharmaceutical trade, in comparison to the current highly harmonised environments. This would affect both pharmaceutical trade with the rest of the EU and those countries with which the EU has trade agreements, including the crucial Swiss market.

EU trade deals have provided UK business with greater access to over 50 foreign markets, including a recent EU-South Korea Free Trade Agreement, which has led to significantly increased levels of trade.

The Academy of Medical Sciences⁵⁶

Leaving the single market would prevent the UK from benefiting from new TTIP arrangements with the US. President Barack Obama announced during the referendum campaign that the UK would be at the 'back of the queue' for a future trade deal with the US. This means the UK would miss out on what both the then Department for Business Innovation and Skills (BIS) and the MHRA said were substantial opportunities that TTIP could offer to UK life sciences⁵⁷.

A new trading arrangement could make it easier for Britain to import cheap pharmaceuticals from outside of the EU. However, such an arrangement would be entirely dependent on adequate standards of safety and manufacturing quality, which would be costly to police. It is also unclear how attractive the UK market would be for manufacturers in emerging markets given the UK already has extremely low prices for generic agents.

Without the trade harmonisation that the EU single market provides, the UK will become less attractive for life sciences investment and less attractive for new product launches. Trade barriers erected as a result of leaving the single market would likely lead to job losses, increased drug costs and lower patient access to new and innovative medicines. QuintilesIMS Market Prognosis indicates that trade barriers alone could have a negative impact on pharmaceutical sales over the next five years of £87 million.

It has been suggested that the Government could seek to negotiate specific access to the free market for certain industries such as the automotive or pharmaceutical industry. However, such a prospect has been largely dismissed in Brussels as European leaders seek to avoid creating loopholes within the single market.

Others have suggested that the benefits of leaving the EU could be compensated through new trading relationships with emerging markets such as the BRIC (Brazil, Russia, India, China, Turkey) countries. However, while the BRIC pharmaceutical markets are large in overall size (volume), the medicines that dominate them are primary care low cost generics and increasingly locally sourced - high-tech innovative medicines get very little of their global sales from emerging markets. QuintilesIMS forecasts that over the next five years BRIC countries will compromise less than 2.2 per cent of cumulative 5-year sales of new specialty launches, smaller than the UK domestic market at three per cent of total sales and dwarfed by the rest of the US, the Rest of the EU and Japan at 54 per cent, 26.8 per cent and 5.6 per cent respectively⁵⁸. As such there is very little commercial opportunity to be gained by the UK life sciences sector from emerging markets, especially when compared to developed markets such as the EU.

Immigration

Our research base is enriched by the best minds from Europe and around the world..... reassurance to these individuals and to UK researchers working in Europe will be a priority for the government.

Theresa May⁵⁹

Science thrives on the permeability of ideas and people, and flourishes in environments that pool intelligence, minimises barriers and are open to free exchange and collaboration.

Paul Nurse, Director Francis Crick Institute⁶⁰

Life sciences is a global sector and benefits more than other industries from free movement of labour. Seventeen per cent of researchers and academics in higher education institutions are EU nationals and 72 per cent of UK-based researchers spent time at non-UK institutions between 1996 and 2012⁶¹. Half of researchers from Cancer Research UK's Beatson Institute are from other EU countries and a further 28 per cent are from non-EU countries⁶². It is well documented that the UK life sciences industry recruits globally fill skills gaps and to complement domestic skills⁶³.

There is evidence, even prior to Brexit, the UK's increasingly restrictive immigration policy was having a negative impact on the ability to recruit the best scientific talent⁶⁴ and anecdotal reports indicate that the referendum result is already further damaging recruitment. The pro-EU group Scientists for EU have reports from 41 foreign researchers who have refused to take UK posts or are thinking of

refusing in response to the referendum result and 100 who are planning to leave the UK or have left⁶⁵.

There is also evidence that the Government's refusal to make firm commitments on the position of EU workers currently in the UK is also having an impact and is 'creating the negative impression that the UK is closed to foreign workers'.⁶⁶

Any further restrictions on freedom of movement from the EU as a result of a changed relationship could undermine the UK's ability to maintain a world-leading life science environment. Further restrictions on the number of overseas students in the sciences would clearly have a pernicious effect, undermining the position of UK universities as world-leading centres of scientific endeavour. A restrictive immigration policy will make the UK a less attractive environment for global pharmaceutical companies who have invested to develop the UK's talent base. A negotiating position from the UK which seeks to restrict freedom of movement would therefore be both detrimental to UK life sciences and decrease the likelihood of the EU allowing harmonisation in other areas vital for the life sciences future success.

The UK's reputation abroad has been completely undermined by all the xenophobia surrounding the Brexit referendum

Karola Dillenburger, Director of the Centre for Behaviour Analysis at Queen's University Belfast⁶⁷

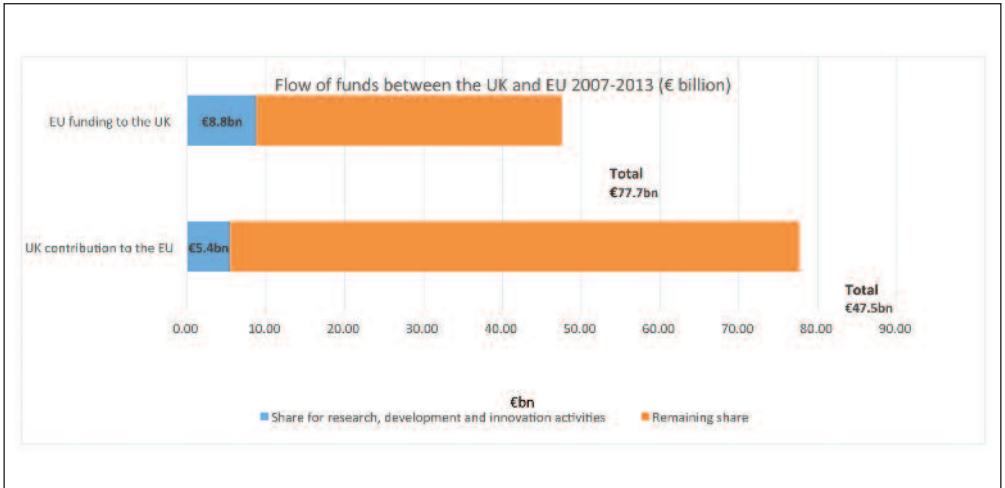
Research and Development Funding

It is clear that the UK has overnight become less attractive as a place to do science.

Mike Galsworthy, Scientists for Europe⁶⁸

That the UK was a net contributor to the EU budget was well publicised during the referendum. In health and biosciences funding, however, the UK is a net recipient and British scientists have proven incredibly skilled at securing European Research Council (ERC) funding. The loss of research and development funding is of concern across the industry. The UK attracted a total of €8.8bn in R&D funding from Europe last year⁶⁹ and over 15 per cent of Europe's total scientific support⁷⁰. This has played a crucial role in mitigating the effects of flat UK government funding for science in recent years.

The Government has already committed to underwrite funding from the EU's Horizon 2020 projects secured while the UK is in the EU. This commitment however, only provides short term relief, particularly given the long research cycle



UK Research and the European Union. The role of the EU in Funding Research

within life sciences. Loss of EU research funds would deprive UK scientists of one billion pounds a year⁷¹ and 40 disruptions to the development of projects for Horizon 2020 have already been reported by Scientists for Britain.

By underwriting Horizon 2020 funding, we are again demonstrating the importance we place on maintaining the world-leading research that takes place in the UK.

Jo Johnson Minister of State for Universities, Science, Research and Innovation⁷²

It's a confirmation of the bare essentials but nothing more.

Mike Galsworthy, Scientists for Europe⁷³

The opportunity for the UK to continue to benefit from scientific funding post-Brexit is not impossible, particularly if a close relationship with the EU is maintained. Non-EU countries such as Norway and Turkey currently participate in Horizon 2020 as associate countries and Israel is a net beneficiary to the tune of €1.60 for every €1 it puts in.⁷⁴ This could provide a route for the UK to maintain access to the fund and its soon to be successor, Framework 9. EU countries are themselves likely to want to maintain access to the UK's world leading academic and research environment.

Despite that, it cannot be assumed that the EU will automatically grant Britain access to scientific funding. Following the 2014 referendum in which the Swiss voted to restrict freedom of movement, Switzerland was, as part of sanctions,

suspended from access to Horizon 2020 funding and was only able to later negotiate limited access. With restriction of freedom of movement currently at the heart of the Government's negotiation demands the Swiss example could well be a precedent for the UK.

There is no precedent for an EU member to leave and then become an associated member.
Sarah Main, Director of the Campaign for Science and Engineering⁷⁵

The advantages of Europe-wide co-operation go beyond purely financial benefit. The Innovative Medicines Initiative (IMI) is Europe's largest public-private sector initiative aimed at speeding up the development of and improving access to medicines, particularly in areas of unmet need. The Initiative has invested €5.3 billion, split over two phases, and is funded by both the EU, through Horizon 2020, and the European pharmaceutical industry. The impact of the fund lies not just in the research funding it provides, but also in the facilitation of Europe-wide co-operation to bring together experts from across the continent. The CBI has hailed the IMI, saying "the access to chemical compound collections and collaboration between industry and academia across Europe provided by this programme could not be supported by a national government alone."⁷⁶

The UK also receives significant additional scientific funding beyond Horizon 2020 for instance from the European Structural and Investment funds which only EU members are eligible to access. The life sciences sector is also uniquely dependent on the EU's venture capital funding, currently 25-40 per cent of total VC funds,⁷⁷ without which there will be significantly fewer biotech start-ups.

Other figures in the business and the academic community argue that the advantage of leaving the EU would be that the UK would have a freer say on how research is run. Sir John Bell, Professor of Medicine at Oxford University, believes that the advantages of being able to introduce a light touch regulatory system and not being constrained by state aid rules, combined with increases of research funding could propel the UK to greater scientific dominance.

It certainly is very helpful in terms of establishing international collaborations, like grants, but my belief is that the best science attracts the funding and I don't see any reason why the best scientists would not still be attracted to best universities and research centres in the world, many of which are in the UK.... the UK has historically been committed to life sciences through schemes like tax credits and the patent box so we will still have a vibrant life sciences and biotech economy.
Paul Cuddon, Analyst, Numis Securities⁷⁸

If the UK reinvested just a fraction of the ‘saving’ from EU budget contributions, they could double the Medical Research Council and Innovate UK funding
Leslie Galloway, Chair, Ethical Medicines Industry Group⁷⁹

However, both academic and industry representatives agree that making such an approach to be successful would require high levels of additional treasury investment. This appears unlikely in the current economic climate and therefore any ‘Hard Brexit’ could lead to major reductions in UK science funding.

Intellectual property

The life sciences sector relies heavily on IP protection: the system of patents and supplementary protection certificates protects enormous investment in R&D and trade mark rights safeguard commercial strategy. Much of UK IP law is either harmonised with, or directly derives from, European law. Brexit therefore could potentially lead to a significant loss of IP rights.

Patents

The UK is a signatory to the European Patent Convention (EPC), an agreement independent of the EU.⁸⁰ The EPC provides a one-stop pan-European patent application procedure which results in a “European patent”.⁸¹ The benefits to UK pharma industry are twofold: the single application procedure has substantially reduced the cost of obtaining a patent, and the single body of law which has grown under the EPC has allowed the UK to influence the shape of European IP law. However, the EPC does not create a one-stop patent per se. A European Patent is in fact a bundle of national patents which must be enforced or challenged on a country-by-country basis: pharma innovators therefore face the challenge of policing national patents in up to 38 separate jurisdictions.

A solution to this problem has emerged after more than 40 years of negotiations in the form of the Unified Patent (UP) overseen by a Unified Patent Court (UPC). UPs would be truly European patents, enforceable across 25 EU member states in a single court. The UP and UPC are created by a separate international treaty that is independent of the EPC and the EU Treaties, although signatories must submit to EU law in all proceedings before the UPC. The UPC was due to come into effect in spring 2017, when the UK was expected to ratify the agreement. The Brexit vote has now delayed the coming into force of the UPC. It remains difficult to see whether the UK could participate in the UPC post-Brexit, for both legal and political reasons.

UPC and UK life sciences

There were two obvious benefits to the upcoming UPC for UK life sciences. First, a single patent enforceable across 25 separate member states meant innovators could prevent infringement across a European market through one injunction. The arrangement offered the best of both worlds, since UPs and selected national patents could be obtained in parallel whilst UK pharma saw how the UPC developed. Second, London was to be the seat of the Chemical and Life Sciences Central Division⁸², giving UK life science the benefit of having substantive law shaped by an English legal tradition praised for its appreciation of industry realities, as well as having the benefit of instructing English barristers and solicitors.

The UK's life sciences may not be able to hold on to these benefits post-Brexit. A fundamental issue will be whether a post-Brexit UK could participate at all in the UPC. A consortium of UK IP firms have commissioned a QC's opinion which has concluded that UK participation would technically be possible⁸³ – however, the opinion admits that the law is not clear on the matter, and at least one sponsor of the opinion sharply disagrees with it⁸⁴. Another issue is whether politically the UK Government could now ratify an agreement which requires limited submission to EU procedural law.

Supplementary Protection Certificates (SPCs)

SPCs provide crucial extended protection for certain patented medicines which have unusual barriers to marketing – for example, particularly lengthy or onerous regulatory requirements. As SPCs are only available by virtue of EU law. If future UK SPCs are not aligned with the EU, companies face a situation where exclusivity is longer in one country than another leading to double the litigation. It is therefore imperative for UK pharma that post-Brexit, the SPC regulations are either transposed entirely into UK domestic law or remain in force as a feature of the UK's relationship with the Single Market.

Trade marks

Currently, two forms of trademarks are available in the UK: UKTMs covering only the UK,⁸⁵ and EUTMs covering the entire EU.⁸⁶ There are several possible outcomes from Brexit for EUTMs held by UK pharma: at one extreme, the UK could simply make no provision for them, in which case UK pharma would find their EUTM rights lost in the UK; alternatively, the UK could convert EUTMs into UKTMs.⁸⁷ Both options would see EUTMs no longer enforceable on a pan-EU basis. Both could also see UK pharma companies lose the right to decide when it first places trade mark-bearing products on the UK/EU market, a right currently protected under the EU's parallel imports law.⁸⁸

- ³⁹ QuintilesIMS, *Brexit – what now for pharma webinar*, PharmaPhorum, July 2014
- ⁴⁰ QuintilesIMS Market Prognosis 2016
- ⁴¹ PPP Interview, October 2016
- ⁴² Ministry of Foreign Affairs of Japan, *Japan's Message to the United Kingdom and the European Union*, September 2016
- ⁴³ EMA Mutual Recognition Agreements
- ⁴⁴ Scrip, *Pharma intelligence*, July 2016
- ⁴⁵ PPP Interview, October 2016
- ⁴⁶ *If Brexit, Whither EMA?, YourEncore Insights - Life Sciences*, Peter Pitts, July 2016
- ⁴⁷ *Big Pharma might have shrugged off Brexit, but Britain's life sciences industry faces an uncertain future*, Telegraph, Julia Bradshaw, June 2016
- ⁴⁸ House of Commons Science and Technology Select Committee, *EU Regulation of the Life Sciences* June 2016
- ⁴⁹ *Brexit means we can revive clinical trials killed by the EU*, Telegraph, Angus Dagleish, October 2016
- ⁵⁰ *How Brexit Will Affect Science and Research*, The Pharmaceutical Journal, Jamie Martin, May 2016
- ⁵¹ *Brexit offers opportunities for UK scientists*, Financial Times, August 2016
- ⁵² House of Commons Science and Technology Select Committee, *EU Regulation of the Life Sciences* June 2016
- ⁵³ *Brexit - What's next for pharma?*, PharmaTimes magazine, July 2016
- ⁵⁴ House of Commons Science and Technology Select Committee, *EU Regulation of the Life Sciences*, June 2016
- ⁵⁵ *Maintaining and growing the UK's world leading Life Sciences sector in the context of leaving the EU*, UK EU Life Sciences Transition Programme Report, for the UK EU Life Sciences Steering Committee, September 2016
- ⁵⁶ House of Commons Science and Technology Select Committee, *EU Regulation of the Life Sciences*, June 2016
- ⁵⁷ *Ibid.*
- ⁵⁸ QuintilesIMS Market Prognosis 2016; QuintilesIMS Midas
- ⁵⁹ *PM wants positive outcome for science in Brexit talks*, Pallab Ghosh, BBC News, July 2016
- ⁶⁰ *What comes next after Brexit vote, scientists ask*, Anne Gulland, BMJ, June 2016
- ⁶¹ *International Comparative Performance of the UK Research Base – 2013*, Elsevier for BIS, October 2013
- ⁶² House of Commons Science and Technology Select Committee, *EU Regulation of the Life Sciences*, June 2016
- ⁶³ HM Treasury Analysis, *The Long Term Impact of Leaving the European Union*, April 2016
- ⁶⁴ *Immigration: Keeping the UK at the Heart of Global Science and Engineering* CaSE, January 2016
- ⁶⁵ *Brexit: An experiment full of risk for British science*, Financial Times, August 2016
- ⁶⁶ *Maintaining and growing the UK's world leading Life Sciences sector in the context of leaving the EU*, UK EU Life Sciences Transition Programme Report, for the UK EU Life Sciences Steering Committee, September 2016
- ⁶⁷ *Brexit: An experiment full of risk for British science*, Financial Times, August 2016
- ⁶⁸ *Brexit Briefing: Scientists feel the effect*, Financial Times, August 2016
- ⁶⁹ *Maintaining and growing the UK's world leading Life Sciences sector in the context of leaving the EU*, UK EU Life Sciences Transition Programme Report, for the UK EU Life Sciences Steering Committee, September 2016
- ⁷⁰ *UK research and the European Union The role of the EU in funding UK research*, The Royal Society, December 2015
- ⁷¹ *Examining the implications of Brexit for the UK Research Base*, Digital Science, May 2016
- ⁷² *Safeguarding funding for research and innovation*, Government News Release, August 2016
- ⁷³ *Scientists for EU Press Release*, August 2016
- ⁷⁴ *How Brexit Will Affect Science and Research*, The Pharmaceutical Journal, Jamie Martin, May 2016
- ⁷⁵ *Brexit future EU Research Money for the UK may rely on free movement*, John Morgan, June 2016
- ⁷⁶ *Chemicals, Pharmaceuticals and the EU*, CBI, April 2016
- ⁷⁷ *Maintaining and growing the UK's world leading Life Sciences sector in the context of leaving the EU*, UK EU

Life Sciences Transition Programme Report, for the UK EU Life Sciences Steering Committee, September 2016

- ⁷⁸ *Big Pharma might have shrugged off Brexit, but Britain's life sciences industry faces an uncertain future, Telegraph, Julia Bradshaw, June 2016*
- ⁷⁹ *EMIG Presentation Opportunities in Brexit, October 2016*
- ⁸⁰ *The full text of the EPC is maintained in an updated form on the website of the European Patent Office: <http://www.epo.org/law-practice/legal-texts/html/epc/2016/e/index.html> (accessed 22nd October 2016).*
- ⁸¹ *Article 2(1), EPC.*
- ⁸² *Paragraph 3 of Section I of the Conclusions of the European Council (28/29 June 2012): http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/ec/131388.pdf (accessed 22nd October 2016).*
- ⁸³ *The full opinion, by Richard Gordon QC and Tom Pascoe, can be read here: http://www.bristowsupc.com/assets/files/counsel_s%20opinion%20on%20effect%20of%20brexit%20on%20upc,%2012%20sept%202016.pdf (accessed 22nd October 2016).*
- ⁸⁴ *That sponsor is Bristows LLP, one of the largest IP law firms in the UK: <http://www.bristowsupc.com/commentary/counsels-opinion-on-brexit/> (accessed 22nd October 2016).*
- ⁸⁵ *Pursuant to the Trade Marks Act 1994.*
- ⁸⁶ *Pursuant to the Trade Marks Regulation, Council Regulation (EC) No 207/2009.*
- ⁸⁷ *The second option seems most likely in view of the proposed Great Repeal Bill; see footnote 6.*
- ⁸⁸ *Article 13(1), Trade Marks Regulation.*

Securing the best deal for life sciences

While we are disappointed by the vote, we do not intend to reduce our presence in the UK. On the contrary we are going to increase our research activities and engage more closely with universities and healthcare ventures.

Belén Garijo, Chief Executive of Healthcare for Merck⁸⁹

It is hard to think of an industry of greater strategic importance to Britain than its pharmaceutical industry

Theresa May⁹⁰

The outcome of the Brexit negotiations will determine the future success of life sciences sector and on the ability of patients in the UK to access innovative life changing medicines.

A close relationship between the EU and the UK with a high degree of convergence along the lines of the ‘Soft Brexit’ would be the best for patients in the UK. Mutual co-operation on regulation and authorisation, access to scientific funding and collaboration combined with ease of trade should also allow the life sciences sector in the UK to maintain its dominant edge. The success of the Swiss pharmaceutical industry demonstrates that with appropriate co-operation and ease of access, there is no reason the British life sciences sector could not thrive in a close EU-UK relationship.

A ‘Hard Brexit’ would mean loss of scientific funding, regulatory divergence and the imposition of trade and free movement barriers. This would make the UK a less attractive place for investment and launch of new medicines. Commercial reality dictates that if the UK, which only represents a fraction of global sales, were to operate a separate system innovators would deprioritise Britain. This would not only erode the significant economic contribution of the life sciences sector but also lead to fewer new product launches in the UK. Simply put, a ‘Hard Brexit’ means UK patients losing access to innovative medicines, putting lives and quality of life at risk.

The UK Government must therefore secure a deal which allows the UK life sciences sector to enjoy a close and harmonised relationship with the EU, such as that currently enjoyed by Norway and Switzerland. That means rejecting a ‘Hard Brexit’ model and making the necessary compromises to secure continued single market access for the UK.

The following are the five key priorities for Life Sciences in the Brexit negotiations:

- 1) **Access and regulation:** The Government should secure maximum alignment between the UK and the EU on authorisation and licensing. The EMA and the MHRA should adopt mutual recognition procedures and continue to co-operate closely. Forthcoming regulations such as the EU Falsified Medicines Directive and General Data Protection Regulations should continue to be implemented in EU to ensure maximum regulatory convergence.
- 2) **Freedom of movement:** The Government must ensure UK life sciences companies and research institutions are able to access the best talent to complement the domestic workforce. A permissive system of free movement for academics, researchers and employees in the life sciences sector should be negotiated with the EU. Because of their significant contribution both to the life sciences sector and the wider economy students must be excluded from any cap on migration. The right of EU nationals to remain in the UK should be immediately affirmed.
- 3) **Trade:** The Government should negotiate a UK-EU trade deal that mimics the current EU-UK harmonisation of movement of pharmaceuticals and active ingredients. The most effective way to do this would be to secure continued UK single market access. Any arrangement outside of that is likely to significantly increase the burden for companies wishing to operate in the UK. If this cannot be secured any trade agreement must prioritise eliminating tariffs on active pharmaceutical ingredients.
- 4) **Research and Development Funding:** The Government must make attaining ‘associate member’ status to new Framework 9 academic funding and continued participation within the IMI a priority. As the ABPI has recommended, the Government should also seek a mechanism for participation in the European Investment Bank and European Investment Fund in order to ensure a continued funding pipeline for the UK’s venture capital market.
- 5) **Intellectual Property:** The Government should agree UK UPC participation. A close post-Brexit UK-EU relationship would ease legal and political difficulties involved with that new agreement and retain the benefits of the UPC for UK life sciences. SPC regulations should either be transposed entirely into UK domestic law or remain in force as a feature of the UK’s relationship with the Single Market. The full benefits of EUTMs could also be retained by UK life sciences if the UK’s continued to participate in the Single Market.

If we engage positively with the Brexit negotiations, there could be significant benefit for the UK.

Leslie Galloway, Chair EMIG⁹¹

Mitigating the effects of Brexit

Given the uncertainty for the financial sector and heavy manufacturing in a future potentially outside the single market, it seems clear that the life sciences industry will provide a crucial pillar for future economic growth.

Professor Sir John Bell, Chair of the Accelerated Access Review external advisory group⁹²

Even under a 'Soft Brexit' model for the pharmaceutical industry, the disruption will have a negative effect on commercial attractiveness in the short term. In order to mitigate against this the Government should work closely with the UK EU Life Sciences Steering Group to introduce measures that will maximise the UK's competitive advantage.

A joined up industrial strategy

Theresa May and her government have a golden chance to make life sciences the beating heart of an open-for-trade, healthier Britain.

Erik Nordkamp, Chief Executive, Pfizer⁹³

If we are able to properly join up industry, universities and the NHS the rewards could be great.

Leslie Galloway, Chair EMIG⁹⁴

The ABPI believes that capitalising on the potential of the NHS as a single health care system offers significant opportunities for developing the life sciences sector⁹⁵. The Government should seek greater engagement with the industry in developing policy moving forward, and focus on the opportunities for investment in life sciences and pharmaceuticals.

Barriers to uptake of new innovative medicines must be tackled and approvals processes simplified. Central to this will be improving access. The Accelerated Access Review, and in particular its recognition of the need to take into account the impact of Brexit, is a welcome first step, but it must be backed by investment. The NHS should build on its global leadership in the use of real world evidence in assessing the impact of new drugs.

Both the R&D tax credit and patent box play a crucial role in securing investment in the UK. They will however diminish in attractiveness as the headline corporate tax rate is reduced. EMIG has therefore recommended that both should be recalibrated and benefits increased in order to maximise future investment in innovation within the UK. The UK Government should also commit to more long term guarantees for funding lost as a result of leaving the EU.

Conclusion

Taken together these measures could play a significant role in mitigating some of the adverse effect of the decision to leave the EU. However, across the life sciences sector there is consensus that they cannot match the scale and opportunity offered by EU membership. The only way therefore to protect life sciences in the UK is to seek maximum co-operation through a close and mutually beneficial relationship with the EU - a 'Soft Brexit' model, similar to EEA membership which has continued access to the single market at its heart.

Life Sciences flourish in an internationalised environment. The prescription medicines industry is a truly globalised industry, which benefits enormously from the elimination or minimisation of borders on research and development collaboration and business development. No country in the world develops pharmaceutical treatments for its population alone; this is an industry which succeeds only if its products are developed for the world. To do that most efficiently, it needs an international infrastructure of regulation, cooperation and business harmonisation. The EU's regulatory and other structures supporting the pharmaceutical industry have speeded up availability of medicines to British patients, encouraged the development of "orphan" products for the very rarest, often genetic origin diseases, and grown the UK's scientific base.

The Government has rightly recognised the vast potential offered to the UK through its life sciences sector. An approach to leaving the EU which saw ideological considerations placed above securing the right relationship for the economy and for UK patients, would see the UK life sciences sector relegated to a second-tier player. The result of 'Hard Brexit' would not only be a sick economy, but sick patients unable to access a cure.

⁸⁹ *Brexit: An experiment full of risk for British science, Financial Times, August 2016*

⁹⁰ *We Can Make Britain A Country That Works for Everyone, Theresa May, July 2016*

⁹¹ *PPP Interview, October 2016*

⁹² *Accelerated Access Review October 2016*

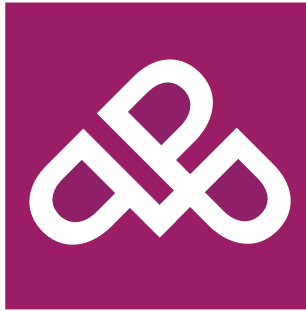
⁹³ *Make life sciences the industrial key to Brexit-Britain, Erik Nordkamp, Telegraph, September 2016*

⁹⁴ *PPP interview, October 2016*

⁹⁵ *Maintaining and growing the UK's world leading Life Sciences sector in the context of leaving the EU, UK EU Life Sciences Transition Programme Report, for the UK EU Life Sciences Steering Committee, September 2016*

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