

Exiting the European Union Committee

Oral evidence: The progress of the UK's negotiations on EU withdrawal, HC 372

Thursday 18 January 2018

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Members present: Hilary Benn (Chair); Mr Jonathan Djanogly; Stephen Kinnock; Jeremy Lefroy; Mr Pat McFadden; Seema Malhotra; Stephen Timms.

Questions 634-690

Witnesses

I: Professor Greg Hannon, Director, Cancer Research UK Cambridge Institute; Professor Eilís Ferran, Pro-Vice Chancellor for Institutional International Relations, Cambridge University; Dr Andy Williams, Vice President Cambridge Strategy & Operations, AstraZeneca; and Michael Lawrence, Business Development Director, Deimos Space UK.

Examination of witnesses

Professor Greg Hannon, Director, Cancer Research UK Cambridge Institute; Professor Eilís Ferran, Pro-Vice Chancellor for Institutional International Relations, Cambridge University; Dr Andy Williams, Vice President Cambridge Strategy & Operations; and Michael Lawrence, Business Development Director, Deimos Space UK.

Q634 Chair: First of all, can I welcome our witnesses and everyone who is here to watch our proceedings to this meeting of the Select Committee for Exiting the European Union? We are taking evidence here today in Cambridge as part of our work on Britain's withdrawal from the European Union. We are going to be focusing today in particular on the impact of this on life sciences, pharmaceuticals, research of universities, space, and on Cambridge and the wider region. It is part of a series of visits that we have made to different parts of the United Kingdom, and we will be drawing on the evidence that we receive today in the report that we are working on, looking at the options for our future relationship. If you are interested in the work of the Committee, you can go to our website, and



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you can see more of the previous evidence sessions and the five reports that we have published since we were established in the autumn of 2016.

Can I also remind everybody that if you have a mobile phone, if you could make sure it is on silent that would be extremely helpful?

It gives me great pleasure to welcome our witnesses who are appearing before the Committee today: Michael Lawrence, Business Development Director from Deimos Space UK; Professor Eilís Ferran, Pro-Vice Chancellor for Institutional International Relations at the University of Cambridge; Dr Andy Williams, who is Vice President Cambridge Strategy & Operations, AstraZeneca—that is a good title—and Professor Greg Hannon, senior group leader from Cancer Research UK. We have a lot of questions to ask from the Committee, and succinct answers, although informed, would be really helpful so that we can get through as much stuff as possible in the time we have available. We are due to wrap up in an hour and 20 minutes' time.

The opening question—I would ask each of you to comment on this briefly—is: in what way does Brexit worry you, and what needs to be sorted out so that those worries eventually disappear? We are trying to identify at a very high level what the things are that you are most concerned about, each of you, in the area of work that you are dealing with. I will start with you, Mr Lawrence.

Michael Lawrence: For the space sector I think the biggest worry is our ability as a UK industry to access future EU space programmes, particularly the Galileo, Copernicus and Space Surveillance and Tracking programmes. Historically the UK has played a big role in these programmes and wishes to do so in the future. There is still some uncertainty about how exactly that will be carried out.

Q635 **Chair:** There are reports that the EU has said to British companies that if you are doing work on some of these contracts, in respect of Galileo, that you will not be able to do that any more after we have left. Are you aware of companies being told that?

Michael Lawrence: There is certainly a lack of clarity. Some statements at a high level indicate that UK companies will be able to participate, but there is no firm agreement. That uncertainty means that when people are looking at the long-term plans it is hard to see exactly how UK companies can participate, also because much of the UK space sector—the larger companies and smaller companies like my own—is part of a larger European group. It is relatively easy for work to be transferred to other parts of the different international companies.

Q636 **Chair:** Have you seen any evidence of that happening thus far because of the uncertainty you have just referred to?

Michael Lawrence: Yes, anecdotally I have heard of some of the larger space companies who are, from a risk mitigation point of view, putting contracts in other places because they know that it is then certain that the contract can be delivered. If the contract was going to be led by the

UK, there is uncertainty; so, it is legitimate for those companies to take that risk avoidance strategy.

Q637 **Chair:** The continued uncertainty is damaging to the sector?

Michael Lawrence: Definitely. It is damaging right now and potentially more damaging in the future.

Q638 **Chair:** That is very helpful. Thank you. Professor Ferran.

Professor Ferran: Our major concerns are access to research funding. Overall we are dependent on research funding for 40% of our income each year, and all that EU funding is around 12% to 15%. That is around £60 million a year. We are concerned around people—20% of our staff come from the EU, and they are particularly concentrated in our research staff, our post-docs, who are the engine of our research endeavour.

We are also concerned about mobility in general, given the way that research these days is global, Researchers work in collaboration and they visit each other regularly. We are concerned about students because 11% of our undergraduates and 24% of our postgraduates are from the EU. We also have our own students who benefit from the Erasmus programme; so, it is about their ability and their internationalisation as well.

We are concerned about uncertainty—we are seeing some effects of that—and we are concerned that the political message continues to say just how important international collaboration and international ability is to doing world-class research.

Q639 **Chair:** On the question of staff that you have highlighted, what evidence have you seen that people have either upped sticks and decided to go somewhere else or declined to take a job here in Cambridge because of the uncertainty?

Professor Ferran: Overall we have not seen a major impact on staff going or not coming. Indeed, the number of researchers coming from the EU is greater than those leaving over the last three years, and there is turnover amongst research staff because they are on fixed-term funding. But we have seen on a number of occasions, in particular with some very high-profile recruitment, that we have not been successful. A range of reasons are given. Brexit has been mentioned in that, and in particular we think uncertainty of portability of ERC funding was a major factor.

We have also seen in other live cases at the moment that they are moving rather slowly, and in some instances we feel that is connected to uncertainty around Brexit.

Q640 **Chair:** Can I ask you the same question about funding in respect of Horizon 2020 that I asked Mr Lawrence? Have you seen any evidence that people are anxious about including UK partners because they think it may have an adverse effect on the bid being successful?



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Professor Ferran: Again, in overall terms we are still applying and being successful, but we have certainly seen one case of an individual effectively being excluded from a consortium, the reason being great uncertainty about access to equipment if there was a UK partner in that.

We have also seen a number of instances of people who have put in grants to the ERC that have been thrown out at the first round, which, given the quality of the research grant and given past experience, was not expected.

Q641 **Chair:** The problem with an individual in the UK having access to equipment: is this equipment in another EU member state?

Professor Ferran: Yes, a big part of that is located in the UK, and others cannot come in to get easy access to that equipment.

Q642 **Chair:** Thank you very much. Dr Williams?

Dr Williams: I guess I would focus on the people side of things. There are two aspects of that. You have been round the campus and seen today that we have a very large, growing facility on the campus. We have brought 1,000 people into Cambridge in the last three years; 300 of them are non-UK nationals. That is a great success, and I guess our concern is the ability to continue to have a diverse workforce, because technology and innovation requires that diversity of thinking and the ability to be able to recruit global talent into the UK is critical to that.

The second area would be again about people—actually about patients. Our biggest concern at the moment is post-Brexit, when we leave, we will no longer have access to the EU markets unless we get our products validated and quality-controlled within an EU member state, and we do not actually have the time to do that. Patients will not be able to get their treatments as a consequence of that.

Q643 **Chair:** How are you preparing as a company for the potential worst outcome—we obviously hope for something better—in respect of certifying the testing of new medicines, and those kinds of thing?

Dr Williams: We do not know what the outcome is going to be, but even an intermediate outcome may not be that great for us. It really comes down to patients and patient safety. You have to make sure that every time you manufacture a batch of drugs it is safe—it is like the previous batch and has all those characteristics. We are setting up some parallel testing on our Swedish site of drugs that have been manufactured in the UK, sending them over to Sweden, and then we have to completely replicate the processes of validation and quality control for those products.

Q644 **Chair:** That is if an agreement could not be reached in which the EU would say, "It is okay, we will continue to recognise the testing and validation you have done in the UK even though you are no longer in the EU"?



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Dr Williams: To an extent, yes; it is all down to the regulatory process. If we have complete harmonisation of regulatory processes, then post-exit, as long as the EMA and the MHRA had harmonised processing that is fine.

Q645 **Chair:** Presumably you would want, if it were possible, to continue to participate in the EMA?

Dr Williams: Yes.

Q646 **Chair:** Very clear; thank you very much indeed. Professor Hannon?

Professor Hannon: First, apologies for my voice.

Chair: Do not apologise at all.

Professor Hannon: It is going to be a bit of a struggle. What I would like to do is echo and expand on a couple of the points made so far. From the perspective of this institute and its research in the Cambridge area, I think people are the most important thing. Being a part of the larger European intellectual environment is a huge boon to UK science, and given the percentages of EU staff mentioned by Professor Ferran—there are around 23%, in fact, and that is almost exactly the percentage of EU staff in the institute, but it is hugely skewed. If you look at our technical and scientific staff, closer to 45% are European. That is true at PhD student level, and it is true of people training beyond their PhD. It is a little bit of a lower percentage at the level of the senior staff, the group leaders, but still it is an enormous, enormous percentage, and we benefit from the exchange and from the scientific expertise that these people bring in from other institutes in Europe. Equally, we see migration of UK scientists outside the UK to train in Europe, and many of those then return, bringing back unique expertise.

Being part of the Horizon 2020 funding scheme and the ERC funding scheme is also critically important to us. Currently this building has £10 million in ERC funding, but the impact goes substantially beyond the funding itself, because it is being integrated into these large cutting-edge projects as partners with our European colleagues, and that is so important. If we want to be part of these consortia that push at the very cutting edge of science, we need to be fully integrated into the EU community.

Finally, another concern from my clinical colleagues is their ability to participate seamlessly in clinical trials. There are partnerships that already exist within the EU. For example, Cancer Core Europe is a consortium of six institutions spread across six different European countries that has diagnosed 60,000 UK citizens with cancer and is carrying out as part of that consortium 1,500 separate clinical trials. For a lot of diseases, again, accessing patient populations is critical, and it is very clear why that is important for what one may call rarer diseases. However, if we look at cancer—cancer becomes increasingly classified as a molecular disease. You do not just have breast cancer and you no



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longer just have a sub-type, for example, of breast cancer; you have a particular molecular configuration. Finding sufficient numbers of patients—and I am sure that AstraZeneca could comment further on this—to bring into these trials needs a large population.

I think we need to be concerned at all of those levels and put into place policies that allow free movement of our scientific colleagues, and access not only to the funding but to scientific partnerships within Europe, and to ensure that we participate in European clinical trials.

Q647 Chair: That is very helpful. It has been said by some that if we do not get the right arrangements, particularly in relation to the certification, validation and approval of new medicines, that they may come on-stream in the UK later than in the rest of the EU; and we can look at other countries around the world where there is some delay. Is that a view that you share or a concern that you have if we do not get the right arrangements?

Professor Hannon: Yes, I do think that view is shared by my clinical colleagues in the institute. That would have a direct impact on patients, particularly those patients being treated in the most innovative and cutting-edge ways.

Dr Williams: I think that is the pragmatic answer—you can go to a market of 500 million before you go to a market of 50 million—but in addition to that of course you have manufacturing going on in the UK, and it would be difficult to justify further investment in manufacturing in the UK if we then cannot use those products within the European setting as well. At the moment, we have stopped additional major investment in our north-west manufacturing facility until we have greater clarity about how that would work moving forward.

Q648 Mr Jonathan Djanogly: I have an interest in this slightly as a regional MP, but I would just be interested to hear your views on the wider implications of what is going on for the area. If we look at what is going on at the moment, because of for instance the very high housing costs in Cambridge, a lot of people are living outside of Cambridge. Increasingly, because of the high rents in Cambridge, business is spreading through the region, and the Cambridge bubble effect, if you like, is spreading through the area to the better of all.

I know from what I hear in my own constituency that there are concerns that what is going on at the moment may reverse what seems to be a fantastic momentum that Cambridge has and is spreading out through the area, and I would just be interested to hear your views as to whether you think that is at the moment a concern, and perhaps on the things that we should be doing to try to put forward the best face.

Professor Ferran: I would begin by just setting the context of Cambridge University's role in the development of the region. We are the anchor point of the Cambridge cluster. We are one of the top three university-led clusters in the world, up there with the Boston region and



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with Silicon Valley and Stanford. That cluster has around, we estimate, 4,700 companies within it. They employ around 60,000 staff. They have a combined turnover of around £12 billion. They are major economic players, and we see that the University has played its role in relation to that, particularly through our technology transfer offers, Cambridge Enterprise, which is key in enabling start-ups. One of the things that is particularly noticeable about Cambridge Enterprise is that its success rate—the five-year “out” from there—is significantly higher than the national average. We are actually developing companies that have sustainability, and we think that is important to the region.

Dr Williams: You characterise the position well; obviously, you are a local MP. We see that in our local staff. We have brought staff into the Cambridge area, and you are right, not as many are living in Cambridge now—only about 20%, 25%. People are moving further and further out, which in itself creates challenges with infrastructure and housing. It also has the peripheral benefit, of course, of bringing highly skilled scientists into more diverse areas of the region. One of the theories put forward is as they then move on to new jobs, they are more likely to work where they live than where the jobs are, and that will help spread the growth to another community.

When we moved to Cambridge we were very keen not to be seen as sucking things out of Cambridge. We came here as a partner. We take both our regional and national responsibilities very seriously. We do a lot of outreach, we do STEM activities, we support the Science Centre, which goes out to King’s Lynn and all those areas that we found more difficult to get to when we were based in Cambridge. Alongside the University we are participating in programmes like Accelerate East, which is looking at ways of trying to co-ordinate skills development across the eastern region area. In short, the answer to your question, with regard to Brexit, is that we need to do some more work to bring advantages to those areas of our region that are not as advantaged.

Q649 **Mr Jonathan Djanogly:** In terms of the general momentum that we have at the moment that everyone in this room I am sure would recognise, do you have concerns that that is at risk in the current climate?

Dr Williams: The momentum actually is growing at the moment. A local business group, Cambridge Ahead, is showing life sciences growth of 10%, 20% or 30% depending on the measure you use for that, and that momentum has at least continued since AstraZeneca came and has probably accelerated. If there is one thing I would ask, it is what do we need to do to maintain that? We have to increase our basic funding and R&D as a country. I think we have a commitment now to go up to the OECD average in 10 years. That is a bit long—potentially a year or two’s time it would still put us far behind our main competitors in, say, Germany and the US. Obviously, that is a big ask of the country, but if you really want to know the answer to how you maintain your R&D



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science base, which is excellent, and which is what keeps us in the UK and brought us to Cambridge, then an increase in that R&D funding is what is required.

Q650 Mr Jonathan Djanogly: Separate from it being a European issue; separate from where the funding comes from?

Dr Williams: At the moment Germany spends about 50% more on R&D than the UK, and the US about double. We more than punch above our weight, and it is astounding that Cambridge University, amongst others, is so successful within that environment.

Q651 Stephen Timms: Can I pursue, Dr Williams, some of the points you were making in answer to the Chair at the start? In evidence to the Business Select Committee AstraZeneca suggested we need quite a long transition on the way to Brexit, maybe up to five years. At the moment it looks much more likely we will either get perhaps a two-year transition period, which is what the Prime Minister has been talking about, or we may end up, if the negotiations are not ultimately successful, trading on WTO rules from March of next year. From the pharmaceutical sector's point of view, what would those two scenarios mean?

Dr Williams: I think if we were to just leave now or whenever it is, in March next year, we would go back to WTO rules, which would obviously affect trade. We have estimated that would cost AstraZeneca around \$30 million a year in additional trade costs. Our bigger concern to some extent is the bureaucracy associated with that, which we would be able to handle, but smaller companies may not be able to. Again, I would come back to—I started with it—our bigger concern, which is patients in Europe who would no longer have access to their oncology medicine in the UK. Without any agreement, without any harmonisation with the EMA, there is not a process by which, at the moment, they would get their medicines. We are asking for a minimum three-year transitional period. We are just figuring out parallel testing on our Swedish site. We have a slight advantage, remember. We have a Swedish site. We already have the infrastructure in place. We do not have the people. You have to have a qualified person to do the work, and that qualified person has to be an EU national as well according to EMA rules, and so—I will stop there.

Q652 Stephen Timms: Can I just pursue that a little bit further? Your big competitor GlaxoSmithKline has talked about what this would mean for it. It has said—again, this was in evidence to one of our Select Committees—that it would need to build six new labs and re-authorise products, and it has looked at the cost of that, which is between £60 million and £70 million. Just as a technical point, I do not quite understand why it would need to re-authorise products. Is that something that you would need to do as well?

Dr Williams: We would need to do that. The advantage we have is that we have a Swedish site. When you validate clinical material and in-market material it has to be done within a validated lab as well, using



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validated equipment, following validated assays and validated processes. It is not a very straightforward process, and quite rightly too, because these are things you are putting into patients. It is a lot more than just sending a sample over the Atlantic or over the North Sea and then doing a couple of assays. It is a very highly controlled—necessarily controlled—regulatory process.

Q653 Stephen Timms: But products are authorised at the moment; why does Brexit mean they have to be re-authorised?

Dr Williams: It is not to do with authorisation; it is to do with validation of material. Once pharmaceuticals are authorised they are authorised within the country for the uses that they have. I do not think they require re-authorisation, but each time you release a new batch of material, that batch of material needs to be quality-tested before it can be released into the market, and it needs to be done under very strict what we call GxP conditions—good laboratory practice, good manufacturing practice—so that you can ensure that the material is safe to use.

Q654 Stephen Timms: The point is that after Brexit it would have to be done twice rather than once.

Dr Williams: Theoretically it will need to be done in the UK for the UK market and then we will have to transfer it over, and if there is no harmonisation of the regulatory environment then we would have to re-test it in the EU. As I was saying, that is nothing trivial. Once you have it, once all that is in place, it is not too much work, but it is not trivial setting that up, particularly in Glaxo's case. It does not have those labs already in place in a European location, because labs themselves have to be validated.

Q655 Stephen Timms: GSK estimates that that will cost it £60 million or £70 million; it will be a bit less for you, because you have some of that infrastructure already there?

Dr Williams: To be fair, we have not costed it yet. It would be considerably less than that. We have an advanced manufacturing plant in the north-west generating—I have the number here – drugs for 120,000 patients in Europe with prostate and breast cancer. We do not really want to have to tell them they cannot have their medicines. It is at the moment very much a people focus on this; we will figure out the financial cost at some point. It will not be as high as £70 million, but at the moment it is a patient challenge that we have, and of course the patient challenge in the wider context of the pharmaceutical industry—it applies both in the UK and in Europe, in both directions—is if organisations do not have their batch release mechanisms ready in time, then that will hinder the prevalence of medicines across Europe.

Q656 Stephen Timms: Thank you. Finally, can I just ask Professor Ferran a question? I note that your background is in company law, a commercial area. What do you think the impact of coming out of the EU on WTO terms next March would be, particularly for the financial-services sector?



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How do you see that panning out?

Professor Ferran: That is my other capacity, as a law professor. I think on WTO terms in the context of financial services it is complicated, because we are talking about services rather than goods. The key problem with services is not monetary tariffs but regulatory tariffs. It is really about the regulatory alignment that you need for that.

If I could just add from the University side on the things that are of most concern to us—access to research funding, access to student funding—WTO terms, again, is not what is relevant; for us, it is whether we get access to FP9 and associated programmes. The timing of that is that those new programmes would begin at the beginning of 2021. In a sense that is the key transition date for us—whether we are going to be in the next set of Framework Programmes, and whether we are going to be in them for the full seven years or not.

Q657 **Stephen Timms:** Anything more on financial services?

Professor Ferran: On financial services my view is that the ideal model would be one that is hybrid and that secondly in part relies on EU equivalents in areas where that works, and I think we need to be realistic about that. In other areas, moving to a regulatory alignment based on international standards, and recognising—for example in the banking area—that actually it is whether the on-the-ground supervision is working effectively or not is crucially important. So in a sense you may ask what level of regulatory alignment we need for supervision to be effective.

Q658 **Jeremy Lefroy:** It is just a follow-up to what Dr Williams was saying. I will just declare an interest as a board member of the Liverpool School of Tropical Medicine and of the Innovative Vector Control Consortium. You mentioned that of course if there was the necessity to do batch-testing this would be reciprocal, and therefore European manufacturers who supply to the UK would need to do batch-testing in the UK for a much smaller market than UK manufacturers who do batch-testing in Europe. Would this have cost implications for UK consumers, particularly with the National Health Service?

Dr Williams: It is hard to say, to be honest. I think for products that are already licensed for approval in the UK undoubtedly I would expect foreign companies to add in batch-release costs in the UK. Would it impact on trends on pricing mechanisms? It is hard to say. It is not a huge cost once it is set up. It is the setup costs that would be expensive.

Q659 **Jeremy Lefroy:** Do you think there would be cases where European manufacturers would simply say it is not worth going through the trial for a market of 65 million, or would you think the flow would be maintained?

Dr Williams: I think for drugs that are already approved it would be maintained. You have to remember that there will be still people here as well—the idea of withdrawing products from a market where patients are in need is something I believe they would be very reluctant to do. Where



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it may impact again is if you were going through market authorisation in Europe. It may delay even further your attempt to go into market approval within the UK.

Q660 Jeremy Lefroy: It is more likely to be new drugs rather than existing drugs that you are—

Dr Williams: We are getting a bit theoretical. I think it would still happen; I just think it is more likely to cause further delay and complexity.

Q661 Seema Malhotra: My first question I want to direct to Mr Lawrence if I may, and ask about the European Space Agency. The European Space Agency is not an EU agency; not all EU member states will be members, and not all ESA member states are EU member states. There is also some participation by Canada in selected programmes and activities and some of these decision-making processes, I understand. You talked at the very beginning about concerns around Galileo and Copernicus et cetera. I wanted to explore just a little bit with you in relation to the European Space Agency whether you saw there being legal, institutional or other barriers to us having a continuing relationship. Can you say more about what you would also want the UK space sector to be getting out of its future relationship with the European Space Agency?

Michael Lawrence: It is very important for the UK to be part of the European Space Agency, and the fact that that is separate from the EU is helpful, but I think—going back to the earlier point—the European Space Agency's work is often directed to EU space programmes. The European Space Agency is effectively the R&D arm of the EU space policy. If the EU decides to commission a next generation of navigation satellites, observation satellites or space surveillance and tracking, it will turn to the European Space Agency to deliver those programmes and potentially to operate some of those programmes in orbit.

The risk and the difficulty that could occur is that if the EU programme, for example Galileo and navigation satellites, includes some security element or some aspect that the EU wants to keep as an EU capability, then non-EU members—even if they are part of ESA—would be excluded from certain parts of those EU programmes. That is a live issue now for Galileo, because there are security elements of the Galileo system and there is a real risk that UK companies, who have historically been very successful in providing security elements, cryptography and this kind of thing, could potentially be excluded from future iterations of that satellite system.

Q662 Seema Malhotra: Have you raised these concerns directly with representatives of the UK Government?

Michael Lawrence: Yes. There is good dialogue between UKspace, the trade association of which my company is a member, and the UK Space Agency. We have a good engagement in terms of sharing issues, looking for potential mitigation and exploring all of the potential options. Clearly,



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going back to the earlier point, the issue at the moment is that there is uncertainty so it is hard to actually be definitive about how the UK can participate in procurement that is live at the moment, procurement in the future, and particularly shaping the new programmes that are emerging at the moment.

Another example is that the EU is just adopting a new strategy for space surveillance and tracking, bringing together European assets for tracking space debris and minimising the risk of collisions between satellites in orbit. The UK, France, Germany, Italy and Spain as a subset of the European Space Agency are getting together to effectively create EU policy in this important area. At the moment the UK has a very important role in helping shape EU policy along with four other larger member states, but if we are not in the EU we will not be shaping that policy, and we have much less chance of actually delivering some of the operational systems into the future.

Q663 Seema Malhotra: In that respect what you are also saying is that it could jeopardise our role and our leadership in the space sector in the future, even if we are in a close relationship with the ESA going ahead?

Michael Lawrence: Yes. It is absolutely essential that we are a key member of the European Space Agency. We are at the moment, and the Government in recent years have increased their commitment to the European Space Agency. However, that is not the only answer and is not the only issue. We have to be part of the EU policymaking in space. The EU is a big user of space systems, the space policy of the EU is developing all the time, and, as I mentioned, Space Surveillance and Tracking is its next big programme, coming along after the navigation and the Earth observation programmes. That is where the research focus will be driven, from the EU space policy. ESA will respond to that, and the ESA member states can take part in those research programmes, but they could be restricted from taking part in the delivery of those programmes if there is an EU policy issue that means non-EU members cannot participate.

Q664 Seema Malhotra: Could you talk us through a little bit more about how the space sector is currently regulated?

Michael Lawrence: There are some regulations at the international level—UN regulations on access to outer space and this kind of thing. There are more local regulations across Europe covering things like frequency and spectrum for communications satellites. There are national regulations, and there is a Bill going through Parliament to open up launch opportunities from the UK. There is multi-level regulation.

The UK participates in a number of different bodies, for example through Ofcom in the frequency and spectrum discussions. I think there will be through the UK Space Agency continued engagement in all of these regulatory bodies. Many of them are intertwined with the EU. I am not an expert on space law, and so I do not know exactly all of the intricacies,



but it is clear that the EU as a bloc does play a big part in setting global regulations, and then each nation interprets the EU regulations in certain instances for its own national interests. The example of the space Bill going through Parliament, which opens up launch opportunities for the UK, is a subset of the broader international picture.

Q665 Seema Malhotra: In terms of how the UK participates in the development of regulations, would you say that we participate as an individual nation at UN and other levels in that global discussion, or is it primarily through the EU bloc, participating in the EU first and then coming out?

Michael Lawrence: It is both, but I think the UK is seen as one of the major space nations within Europe. Often it works in an EU context, and the UK will be an important player in those broader EU discussions as well.

Q666 Seema Malhotra: If we were limited through the ESA in leaving the EU may we continue through the other forms that are relevant for development of regulation, although our voice would be weakened?

Michael Lawrence: Yes. I think the EU as a group does carry a lot of weight in terms of broader negotiations in these issues.

Q667 Seema Malhotra: Are there other EU-wide bodies with whom you would want to see us maintain a close relationship?

Michael Lawrence: We participate in EUMETSAT, the weather services. I think that is probably the next one that I would mention beyond the European Space Agency. There are probably others that I could think of; I may get back to you with a few other examples.

Q668 Seema Malhotra: If I could just ask a final question to the panel. Just taking further the point that you have been making about proportion of staff as EU nationals and the impact of current Brexit policy on them, have your organisations responded to concerns raised by your staff or students from the EU as to how Brexit may affect them, and have any of those concerns been alleviated by the agreement on citizens' rights or working towards the agreement that was announced before Christmas?

Professor Ferran: Yes. On whether we have taken steps, we have worked very hard to get out the message at our senior levels, the vice-chancellor and others, that we are welcoming and that Cambridge is a place that is diverse, open and inclusive. In terms of given practical advice, we have been providing very specific as well as general advice to our staff and students, and assisting a lot of them in applying for permanent-resident status, and we will continue that in the transition through to the new settled status.

I think the announcement in December is helpful. Equally, on students it has been helpful, and I think for students the key issues have been not just about their status but also about fees. There I think the Government



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have been helpful in terms of providing assurance for those who are in the system and will come into the system in 2018. We are starting to get concerned about 2019, because of course the admissions round starts early; indeed, we are gearing up for it now. Because we have an early admission date, by October, we really will need clarity on that by April; certainly, August would be too late. Otherwise, that will have a big impact, we think, and we saw that in 2016, when the number of applications went down because there was uncertainty.

Michael Lawrence: Just some numbers from my company; we are relatively small. In May 2016 we had 21 staff, and 70% of them were EU nationals. As of today we have 15 staff, and 50% of them are EU nationals. We have seen a number of people returning to Spain, where our parent company is based. I cannot say that directly that was a result of Brexit, but clearly the uncertainty and the lack of clarity about their future status means that these highly qualified staff could work anywhere in Europe so they just decide to go. We have lost five people back to Spain.

Dr Williams: As you would imagine, we have put in similar processes as the University. We have a specific Brexit intranet page to provide both information and practical support where we can on applying for residency and things like that as well. But, contrary to what the University is saying, we are seeing some people leaving. It would be fair to say, as you know, Cambridge was very much a Remain area. There was a lot of upset and concern but generally not a lot of movement. Things have settled down, and there have been some reassurances, but the place where we have seen a difference is in what we would call our global roles—that rare global talent. We have examples in our strategy groups where the global talent—one person in particular—just left and got a job in France. We said, “Why have you done that?” He said, “I will wait and see, and I will come back if things are sorted out”.

The thing you have to realise about global talent is that they have choices. They choose to be in the UK, and actually part of the definition of being a global talent is that you are prepared to go to anywhere in the globe to get your job. Why that is particularly dangerous for us is that the global talent are those who bring the groups and the additional activity. Although they are fairly small in number at the moment and we are not seeing a mass movement of EU residents back into the EU, the reason we came to Cambridge was to be an attractive place for that global talent with all the things that brings with us. Some of them are EU nationals, some are from the rest of the world, but we are just seeing anecdotal evidence, as in specific—one, two or three—cases, of them moving elsewhere.

Professor Hannon: I think the agreement certainly gives some comfort. I notice from personal experience that a lot of EU nationals in my own lab have been watching this very closely, but of course the best thing would



be for this to be codified, and the sooner that this becomes part of UK law the better.

We are seeing impacts—and, again, it is hard to quantify this—precisely when you are talking about a global talent pool, because the pool is so small and every situation is sort of out of one. I have heard examples from my own institute. One of our faculty was chairing a very prestigious fellowship panel for CRUK. One of their top candidates was offered £1.3 million in funding to come from the EU to the UK. Again, these are top fellowships, incredibly competitive, and highly sought-after, but he declined, citing the uncertainties of Brexit as the reason to take a position elsewhere.

While we might not be seeing shifts in these large populations of European students and post-docs that are yet quantifiable, I think we are seeing examples at this very, very top level of an erosion of our ability to recruit.

Q669 Stephen Timms: Thank you to all of our panellists for spending some time with us today. I wanted to drill down a little bit more into the issue of regulatory alignment, taking as the base for this that there are two really important areas of regulatory alignment from the point of view of the European Union—one around the supply and licensing of medicines and medical equipment, and the other around clinical trials. Either choosing one of those areas, or both, just set out what you think could be the risks and costs of regulatory divergence, or indeed say whether you see any potential opportunities from regulatory divergence either in the area of clinical trials or in the area of licensing of medicines and medical supplies. Professor Hannon.

Professor Hannon: From the clinical-trials perspective it is absolutely critical that we have regulatory alignment. CRUK funds roughly 200, I believe, clinical trials at the moment, and about 28% of those actually have a European component to them in patient populations. If one were to lose access to European patients, from an outward-looking perspective, that would reduce our ability to do the highest-quality clinical trials. From an inward-looking perspective, if we did not have regulatory alignment it would compromise our ability to participate in these larger, pan-European efforts—and I cited Cancer Core Europe as one of those—where you have a very large consortium that is able to draw on large patient populations to do the most cutting-edge, innovative, genomically informed, patient-specific, precision-medicine clinical trials. Regulatory alignment in that space is absolutely critical to the UK remaining as one of the leaders in that space.

Dr Williams: If we consider what would happen if we became more divergent from a regulatory perspective—you do the thought exercise, but then you look at how the EMA was established and the role that the MHRA played in that. The MHRA actually played a leading role in the establishment of the EMA and still leads on a lot of its activities. You do not want to go into the lowest common denominator. You do not want to



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be going for a lower safety standard in Europe than you would in the UK. The only area we potentially thought the MHRA could be competitive, if you like, to the EMA is in speed: that we may be able to establish processes that will allow us to work more quickly. As Professor Hannon would say, you still need to have regulatory harmonisation, or else you will not be able to use the same material across different clinical trials. We looked at it, and you do not play around with safety. It is just not somewhere that you can go easily other than through potentially going quicker.

Professor Ferran: I think you have heard the clinical-expertise experts speak. I would just say more generally that of course we collaborate and have research consortia all around the world, and so we manage some of those divergence issues. However, our key partners and our main partners are with Europe, and that has been facilitated by not just free movement, but also by the common standards and the common regulatory framework, which has just taken out a lot of the bureaucracy associated with managing those consortia.

Q670 **Stephen Kinnock:** Just out of interest, have you done any assessment of what the cost may be in terms of time and resource, opportunity cost and financially, of having to create a separate regulatory regime for the UK to somehow disentangle us from the current deeply intertwined UK/EU regulatory regimes? In the scenario planning that you have done, I am just wondering if there is any definition of what that actual cost would be in tangible terms.

Dr Williams: It is difficult to do when the first thing we are asking for is certainty to know what the future relationship is going to be. We know some basic building blocks, like establishing a lab in the EU that can do GCP and GxP-type activities, but until we have that certainty—businesses are very good at this: “Tell us what the rules are, and we will go and figure out how do to them”. There is only so much you can do theoretically until you know what the rules are.

Professor Hannon: I have been informed by my policy adviser that CRUK is actually commissioning research in this area, trying to calculate what the financial impacts will be, but I think you brought up a really important point on opportunity cost. I guess I keep harping on on this. The opportunity to participate in the EU intellectual environment and in the EU clinical environment is absolutely critical and has to continue. But there is also financial opportunity. There are clinical trials that are happening on this site that gather significant European funding. There is also going to be a cost to system with the loss of those. Particularly with the breast cancer trial, as that would not have happened without €1.6 million in European funding. We have costs associated not only with the establishment and different regulatory network, but we have opportunities that will be lost and trials that we just will not participate in.

Q671 **Stephen Kinnock:** One final question; you, I am sure, have been following the debate about what the future relationship between the UK



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and the EU could or should be with great interest and—this is a personal view—it seems to be boiling down to a choice between what people are calling a Canada-based model or a Norway-based model. The Canada-based model is very deeply integrated in terms of trading goods but not so much in terms of services and some of the regulatory alignment that we are talking about here, and the Norway model is where the European Economic Area, EEA, countries are pretty much aligned with most of the *acquis communautaire* and all of these regulations and directives that we are talking about today. If you were advising the British Government right now as we go into this critical phase of the Brexit negotiations, would you be pushing for a Canada model or for a Norway model?

Professor Ferran: The Canada model does not work for us, because it does not address the issues that we have. Of those choices, we would definitely be advocating a Norway model, which would keep us in all of the funding programmes and would ensure student mobility and researcher mobility as well. But, of course, that means we would be assuming free movement, which would be part of the Norway model. If that is not politically achievable, we would want to be as close to that as we can get by a bespoke deal, keeping us in FP9 as an associated country. If we cannot get that, then we would want whatever the UK puts in place by way of alternative funding to be not just at the monetary level comparable to ERC funding, but also capture the really crucial thing about European funding and the ERC in particular, which is if you get an ERC grant you have won a competition against the best in the world. Anything the UK does would need to deliver that sort of genuinely international excellence as well.

Dr Williams: Without looking behind to my policy adviser, I am pretty confident that we have not taken a view on that. I would come back to something I said before, which was that we need regulatory certainty so we can plan for the future. Obviously, continued membership of the EMA or harmonisation is key for us but so is smooth supply; so, trade as well to an extent. In global supply of medicines that supply chain just goes backwards and forwards all over the place. It would take a lot of work to unpick that if we had barriers to the supply of materials between the UK and Europe—that is probably a bit of both, isn't it?

Professor Hannon: Again, just to echo Professor Ferran in a way, certainly I think we would prefer a model where we maintained as much of our ability to recruit the top-tier global talent as is possible. I think that the point made about FP9 is right on the money, and I think that there is evidence that we as a research enterprise compete extremely well amongst the best in the world. In fact, the UK trials disproportionately to its population from the ERC granting system, and so although we are not the largest country, we have been exceptionally successful and are generally at the top of the list for getting grants from ERC that support individual science. Then, if you look at the nationality breakdown within that group from the UK that gets these grants, it is very mixed. It is about 50%—there is about equal representation of UK



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citizens and EU citizens—which says that not only are we competing in the ERC granting system with the best in the world but we have attracted researchers to the UK that are of that calibre from Europe.

Michael Lawrence: We definitely need freedom of movement. We need the best possible access to the single market. I am not sure if the Norway model is better for that. We need access to the Horizon 2020 programme, and we need access to the European Union space programmes. I think all of those things are not delivered either by a Canada or Norway agreement; they are something different, and they are much closer to today's situation.

Q672 **Mr Pat McFadden:** I have been listening to all this, and I suppose I would like to ask a slightly provocative question again. The picture you have all pointed this morning is of the crucial value of collaboration in Europe between everything that you do, whether it is cancer research, drug development, space or whatever, and you have then expressed a desire on an institutional basis to continue to take part in the European institutions that are there for that—the European Medicines Agency, the European Space Agency and so on. You said that the best that we can hope for following Brexit is a more passive participation where we may still be able to take part if we manage to negotiate that, but that we will probably lose at least some of our policy-making power that we currently enjoy. Have I accurately summed up what you have told us this morning? My question is: what is the point of Brexit? Do you see any point in Brexit at all?

Michael Lawrence: There is nothing positive about Brexit at all, full-stop.

Professor Ferran: I thought you might ask this question. The only positive that I can see is that it has actually put the spotlight on to universities. We have always made the case that we are a very successful part of the UK operation. We are globally successful and we are competing at the highest level, and maybe Brexit is giving us an opportunity and a challenge to get that message out there more strongly, but that is as far as I can go.

Q673 **Mr Pat McFadden:** Dr Williams, what is the point of Brexit?

Dr Williams: Thanks for that one. Just as a point of clarity, the EMA is not about collaboration, it is about regulatory authority and getting a decent process. The point of Brexit? Positives? You presumably all know AstraZeneca's stance before the vote. I guess the positive from our perspective is you always have to look at change as potential disruptive change and therefore an opportunity for innovation—see, I am doing my best.

Mr Pat McFadden: By the way, just to interject, I was not asking this because I was asking you to be either positive or negative. I just asked from your point of view whether there was any point in this. I know what



my view is.

Dr Williams: I am not sure; it is a bit subjective. I think from an objective perspective it has allowed us to develop the Life Sciences Industrial Strategy which, actually, for the first time in quite a while, has brought together all the different players across the industry, academia and Government into what looks like a fairly rational plan. I think implementation of the Life Sciences Industrial Strategy will to an extent help put us into a better position moving forward. You could have done that without leaving the EU, but it sometimes take a disruptive pressure like that to take you somewhere different.

Q674 **Mr Pat McFadden:** Professor Hannon?

Professor Hannon: I myself moved here before Brexit from America thinking that I was coming to Europe—

Mr Pat McFadden: You were.

Professor Hannon: So it is difficult for me now in retrospect to see very much positive about it.

Q675 **Jeremy Lefroy:** I just want to start off with a specific one for Professor Ferran. We have been made aware of an agreement between Imperial College and the French National Centre for Scientific Research which is that all their researchers will have equal access to funding, resources and opportunities for collaboration. I am sure you are probably aware of that. but I wondered if Cambridge University was looking at, or already has in place, similar arrangements.

Professor Ferran: We are doing a lot of contingency-planning and thinking. Our planning at the moment is very much based around people, because we see people as being absolutely central to everything we have been talking about. We have put in place arrangements with a number of institutions. With the Max Planck Institute we have a new centre with our social anthropology department to enable joint-working between the two. We have also put in place a new arrangement with Sciences Po in Paris, again to facilitate academic exchange between staff and students. Indeed, its first launch event is going to be a conference on the future of Europe—very much work in politics, history and public policy.

In terms of putting a physical hub in Europe or anything like that, we are looking at all options. We have established a research lab in Singapore. We expect to have others in Asia in the coming years. We will be open to doing that in Europe as well if it is appropriate to the sort of research that we are doing, but we are essentially building around people in what we do.

Q676 **Jeremy Lefroy:** My second question is for everybody, and it really follows a little bit on from what Pat asked. In my area, although we had one of the highest Remain votes in the Midlands, the vote to leave was still higher than the Remain vote—I was not able to persuade people



otherwise—and in places like Stoke-on-Trent, very close to me, it was higher still. This comes down really to integration within the UK and social cohesion within the UK. What can all of your organisations do to ensure that we move towards greater social cohesion within the UK? AstraZeneca has moved down from Macclesfield to Cambridge. How can we see things move from Cambridge to Macclesfield, or to Stafford or to Stoke-on-Trent, or Wolverhampton, so that we see the great benefits of all the great work that you are all doing spread throughout the UK, rather than being based in certain clusters? Perhaps we will start with Mr Lawrence.

Michael Lawrence: My company is based at the Harwell Space Cluster in Oxfordshire along with the European Space Agency centre and the Satellite Applications Catapult centre. I think the ability of the UK to work as a whole in the space sector is exemplified by the way the Catapult centre has actually set up regional centres across the country: Scotland, Durham, the south-west, the south coast and the East Midlands. I actually sit on the advisory board for that regional-centres group. I go out to these different centres regularly—twice a year—for meetings, and from a business point of view we are also trying to develop our business in conjunction with these regional centres. We have been doing some work in County Durham on a tourism app based on positioning technology. We have also engaged in potential project collaboration with the Universities of Southampton and Portsmouth at the south-coast centre. I think there is a broad development opportunity for the space sector across the UK. It is not all based around big companies. Particularly, with the applications of space technology, people are using location services; people are using Earth observation data in many different domains, and so the boundaries of the space sector are actually quite permeable. We are finding that by helping new companies understand what data is available and how to access that data, and how to integrate it with other datasets, we can build more business. There is definitely growth potential across the UK in many different areas, and finding those connection points is actually what the Satellite Applications Catapult is trying to do.

Professor Ferran: The new University vice-chancellor made one of his first visits around the UK around a week or so ago to Stoke-on-Trent to talk to students about Cambridge and getting the message out to the UK that we really want students from all over the UK and all backgrounds to come. I mention that in particular, as you mentioned Stoke.

One of the things that we have done is to look at what students who have come to Cambridge from the EU have then gone on to do in the UK—for example, we looked at our education faculty and students from the EU who have then done training in Cambridge and gone into schools across England and Wales. We could do that in other sectors as well—we just chose education—and the number of our alumni who are going out into the rest of the UK from the EU and elsewhere was quite revealing.



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The third example that I would give in terms of spreading Cambridge's success—and it is a regional example—would be in the agri-tech area. We have brought together a consortium from East Anglia, working in agri-tech ourselves and others, and that is working locally, but it is also a key partner with us in our relationship with the Government of India around agri-tech. We are bringing the global to the region and also bringing the region to the globe, and that is a key part of what we are doing.

Dr Williams: Contrary to all the stories, we have not actually exited the north-west. We now have over 2,000 people in Cambridge; we also have almost 4,000 people remaining in Macclesfield, and that partly tells you the answer to your question. I think what you have to understand is that the pharmaceutical industry is global. You need to be globally competitive. You cannot mess around; you have to be in places where you can be globally competitive. We are globally competitive in R&D at Cambridge, and despite the ongoing situation we are still globally competitive in Cambridge. We have a fantastic science base. We have great universities. We have great institutes. It is going really, really well. Let us not lose that message.

The reason we are still in the north-west is because of the potential there for advanced manufacturing capability as well, which would also be global and world-leading. My answer to the question would be that really we need to identify where we need to be globally leading, where we can be globally leading, and how we position that. There is a case for clusters—undoubtedly Cambridge is successful because there is this small set of people in a relatively small area—but that does not mean in that supply chain that staff cannot live further out. There are other activities you can do. It is really recognising that global competitiveness. Wherever it sits, whether it is in Newcastle—there is a thriving life sciences sector in Newcastle—or Dundee, you must find out where you are globally competitive, and work on that. If you try to force yourself to be globally competitive where you clearly are not, you will lose it.

Professor Hannon: I am surprised I have not had a note from my policy adviser. From a CRUK perspective, we run five Cancer Research UK institutes. There is one in Glasgow, one in Chester, Oxford and Cambridge and then at the Francis Crick Institute in London. Those serve in a way as clusters, but the region of Cancer Research UK is much broader, because they provide grants to researchers and institutions across the UK. That is the UK perspective.

If you think about the perspective of my own centre, you will have this afternoon Professor Richard Gilbertson, who is the chair of the department of oncology here and head of the CRUK major cancer centre in Cambridge. I would suggest that you ask him this question, because he has been crafting programmes to extend the region of the major centre here throughout hospitals in the region. He is doing a lot of work on that, and I am sure that he could give you a really great perspective



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on how the Cancer Centre here is trying to unify a much broader community.

Q677 Chair: Can I ask a question about trade in goods and to what extent the work that you are doing is dependent on getting stuff arriving quickly? Are you worried about our future trading relationship, delays, anything you require just in time? Is that something you have thought about at all?

Michael Lawrence: Certainly, the satellite manufacturers in the UK—Airbus, Surrey Satellite Technology—are part of very complex integrated international supply chains. You could have satellite components that originate in one country, move to another country, come back and go to another country. You could have 10 or more steps in the movement of hardware, and you also potentially have teams of engineers who move from one place to another to actually help commission or test their satellite in someone else's facility.

I think the space companies who are dealing in hardware are really worried that any barriers through customs or tariffs or whatever get in the way of that quick movement of their hardware, and the movement of their engineers to support that hardware would be a real problem to them.

Q678 Chair: Your businesses have developed precisely on the basis of that integrated supply chain over a period of 44 years.

Michael Lawrence: Exactly. Companies like Airbus have a very international heritage, and so they have competency centres all around Europe. The UK has some really important parts of that network, and the company itself will be trying to think what the most efficient way is to build and test bits of hardware. At the moment it is very integrated. Any barrier in the way that makes that smooth transition more difficult will cause the company to think, "Is there a more efficient way of doing this? Should we put all of our navigation systems in Germany?" for example, if that is easier than having some part of that done in the UK.

Q679 Chair: In respect of pharmaceuticals and research, and supplies—materials, nuclear materials, whatever—that you obviously routinely depend on for the work that the research team are undertaking.

Professor Hannon: Again, this is really speaking from personal experience, from the time that I have spent here in Cambridge in the last three or four years. What I have noticed is that there is a very big difference when turning to procurement within the EU versus outside the EU, particularly in terms of the potential for long delays. I fear that if my experience for example in trying to do procurement from the US was transferred—if the degree of complexity also applied to Europe—that would put us at a competitive disadvantage.

Dr Williams: That is one area where we have done the financial analysis: we think around \$30 million additional annual duty outwards



and about \$5 million duty inwards due to our global supply chain in the movement of materials. When you talk to the wider industry, its concern is obviously the cost, but perhaps for smaller companies it is their ability to adapt to the new bureaucracies that will come in place, and whether they have the infrastructure to even do it. Complexity of customs and border control may make this very difficult for the smaller companies.

Q680 **Chair:** That is assuming that we came out on WTO terms, I presume?

Dr Williams: It is quite complex for pharmaceuticals. The WTO terms for pharmaceutical products are reasonably good, and many countries are signed up to the fact that active pharmaceutical ingredients have no cost associated with transfer across borders. There are still some countries that are not, but they are covered by EU relationships with those countries. It is generally those countries that are not under the WTO active pharmaceutical ingredients agreement.

Q681 **Chair:** Can I ask another question about data and the transfer of data between the UK and EU countries? We have looked at this as a Committee, and either the Article 50 deal is going to have to reach an agreement that allows us to continue being able to transfer data on people in particular—research trials and that kind of thing—on the current basis, or the Commission, as we understand it, looks at third countries and decides whether the way in which they handle data meets European standards, and will issue what is known as a data adequacy decision. There are a number of non-EU countries that have those decisions. Is that something that you are concerned about? Is it something that you have looked at at all?

Michael Lawrence: There is an example that I know the UKspace trade association is worried about. There is a Copernicus data centre in Newport that holds many gigabytes of data from the Earth observation satellites. There is a question mark, I guess, about the status of that centre post-Brexit if it has not been specifically organised as part of an agreement. I am not an expert on the ins and outs of the policy around that data, but that is a good example where there is a lot of effectively EU space data being managed, held and disseminated from the UK.

Professor Hannon: I think this again bears on the whole clinical trials regulatory framework. Again, if we are going to participate in these broader clinical trials and include an EU component, we have to have harmonised regulations on protected human-subjects data. This will be absolutely critical, otherwise, again, we will be frozen out.

Q682 **Chair:** You have all talked about the importance of people and having access to the right people with the right skills to the work that you are undertaking. Have you had any conversations with the Government about what a future work visa system might look like if free movement as we currently understand it no longer continues, and do you think the Government are listening to any representations that you have made on that subject, so that it continues to be possible for you to get access to



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the right people? At the moment you are having to do that in respect of people coming from outside the EU, because you have made reference to the fact that some of your own staff are from the EU and some are from other parts of the world.

Professor Hannon: I have not been a party to any such discussions, but I have experience first-hand of this. I do think that we need to consider the impact, which would be largely negative, of treating this European highly skilled workforce in exactly the same way as we treat the immigration of non-European highly skilled workers. That having been said, I went through that immigration system. In comparison to the experiences I have had when I used to bring foreign workers into the US I felt it was quite smooth, but the challenge will be that the impact of having to have an immigration system for highly skilled EU workers will be enormous. To deal with those workers that are already here, to deal with this 45% of our typical workforce that we need to recruit from there, there will need, I think, to be both a tremendous amount of thought around the capacity to deal with that in a timely fashion—I hope that there would be provision made that would streamline the process for these really highly skilled workers.

Professor Ferran: We have thought a lot about this. We are currently the sixth-largest user of the Tier 2 visa in the country. I think we are the second-highest higher-education institution. It costs us £90,000 a year. We are putting through 450 people a year. I estimate that it is costing the staff members individually, just for the staff members, £500,000, and when you add in their dependants as well it is probably about £1.5 million a year in cost. It takes around three months. We have a very efficient office dealing with it, but it is a painstaking process. Simply extending the existing Tier 2 to EEA staff would not be welcomed by us or by the sector.

We have developed our sense of what an ideal future model would look like. It would essentially be based on the existing Tier 1 exceptional talent but would be extended beyond the existing level of professors effectively to cover team science in its entirety. It would have to include not just the PhD level and above roles but also the technicians, who are critically important to what we do, and we think that could be done in a way that is relatively unbureaucratic by trusting higher-education institutions to do a lot of the work and to rely on peer review for it.

In terms of whether we are getting through on that, we have had the opportunity over the past year to present some of that thinking and the data behind it. We hosted a meeting of civil servants in the Home Office, BEIS and others in 2017. We also participated here with others in a session with the chair of the MAC, fed into that. We were slightly encouraged by some of the tweaks to the immigration system in the Autumn Budget Statement, some of the relaxations around the Tier 1 route, and indeed actually some of what is in there is consistent with views that we had put in working together with RCUK and the MRC. In a sense there are some positive signs there.



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Chair: Of course, this is one area in which what happens is entirely in the hands of the UK. It is not dependent on the negotiations. Depending on what happens, it is for the Home Office to design a new system.

Q683 **Mr Jonathan Djanogly:** Just to back up on that and actually in relation to Seema Malhotra's question before, we did receive evidence that there have been recruitment issues, but the examples that were given by all of the witnesses were actually ones of perception—in other words you mentioned that people missed out on UK jobs because they said they did not have confidence in the Brexit process or there was a lack of certainty, in effect. Are there any other issues that have been coming up? Post-the phase 1 deal there is now certainty, pretty much, in terms of what the status of EU citizens will be, and if we get the future system right in the way that Professor Ferran was just explaining, is this an issue that we can sort out? This is what I am trying to get at. Or is leaving the EU just going to be bad news? Can we work through it? That is what I am trying to say.

Professor Ferran: I think we can work through it, but having been with some of our top younger scientists in physics earlier this week, actually the greatest concern came not from the EU post-docs but from the non-EU international staff, because they were saying "You might sort it out for the EU but then potentially leave no room for us". I think we have to look at this in the round.

Mr Jonathan Djanogly: Anyone else on this point?

Michael Lawrence: From the space sector point of view there are about 38,000 people directly employed in the UK space sector, and 11% of them are non-UK nationals. It is a big issue for the industry, and this mix of EU and non-EU talent that we need to attract and maintain in the UK is a big question. We need to have an integrated approach to the future.

Dr Williams: I should just make the point we also have many UK nationals working in our Swedish operation. It is not just a UK issue. We are working with both our European trade bodies as well as the UK trade bodies to sort that out.

Q684 **Mr Jonathan Djanogly:** Has anyone seen any evidence of UK nationals being given a harder time overseas as a result of the Brexit proposals?

Dr Williams: We have not seen that in Sweden, no.

Q685 **Mr Jonathan Djanogly:** Nobody else? We have been talking about attracting the brightest and the best, but of course particularly when it comes to manufacturing there are all sorts of levels of skills involved, and this is a part of the country where skills are in short supply. We have very low levels of unemployment and very serious skills issues not least as a result of that. In terms of attracting lab technicians and so forth, is it like nurses, where a very large proportion of them are EU nationals? Is it an issue at the lower end of the scale, if you like?



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Professor Ferran: For us it is perhaps not at the lower end of the scale. We have issues there around attracting lab technicians, and we are participating in the apprenticeship agenda.

Q686 **Mr Jonathan Djanogly:** But you are saying that is not a Brexit issue?

Professor Ferran: That is not a Brexit issue. We do have a big concern around specialist technicians, who are absolutely critical to the conduct of science, and we have lots of examples of instances where these are very specialist skills that we would like the UK to develop a workforce—at the moment it does not exist, and so we are dependent on in particular EU staff and having access quickly to those EU staff as well. That is one of our biggest concerns: to ensure that in this discussion around immigration that layer of staff, as well as those with PhDs and above, is taken into account.

Dr Williams: I would agree with Professor Ferran that it is not particularly a Brexit issue, but perhaps it jolted us into moving more quickly. We are on the board of the Science Industry Partnership, which is looking at new apprenticeships and new skills. There was an announcement in the Budget that concerned a Cambridge life sciences part of that, to try and nucleate the life sciences industry. Life sciences is not a particularly strong area for apprenticeships. There are very few apprenticeships. We have seen quite a big increase in apprenticeships within AZ MedImmune in the last two or three years, and obviously pulling those apprenticeships from the local community is easier than from a wider one. I would not directly lay it on the path of Brexit, but I think it is something that that industry was having to recognise, that those lower-level skills, which are still high-level skills, are better sourced from the local community than trying to pull them in from further afield.

Professor Hannon: Definitely for specialist technicians we need the opportunity to draw from Europe. These skills are scarce. They are exceptionally difficult to find, particularly in the competitive environment within Cambridge that the presence of our industry partners has created.

I just want to make the point about the flow of students pre-PhD—sort of our version of apprenticeships. A tremendous number of our students who are on the path to enter the PhD programmes come and do short-term internships in the institute, and I don't really know what the immigration implications of Brexit would be for that class of scientific migrant. I think it is important to recognise that that is also part of our intellectual exchange and also part of our mission as an institute of education.

Chair: I think there are a couple of final, very quick questions from Jeremy Lefroy, then Stephen Timms.

Q687 **Jeremy Lefroy:** Thanks very much, Hilary. You are all effectively globally connected organisations, so it does not so much apply to you. But, talking about opportunities again, I am the Prime Minister's trade envoy



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to Ethiopia, and I have noticed a real interest now from significant countries such as Ethiopia saying, “You have really not been interested in us for many years; on the aid side, yes, but not on the trade and research and development”. Are you noticing in your supply chains, perhaps for the smaller businesses with whom you deal, that there is a greater awareness of the need for the UK to be more connected globally? We have often heard that UK SMEs are much less likely to be involved in trade globally and exports than, say, their German, Italian, Spanish and French counterparts.

Dr Williams: Certainly from an AstraZeneca perspective we are active within Africa. We have a big Healthy Heart campaign in Africa, which I think put in some millions of dollars’ worth of drugs to try to address things like diabetes,¹ which is a growing challenge in Africa. We are very much aware of the African market.

Q688 **Jeremy Lefroy:** I am thinking more of your supply chain. Obviously, you are a global company, but others that you come across—

Dr Williams: In terms of manufacturing we are seeing increasing requirement from countries to manufacture in the place that you want to sell your product, and so that counts against going into countries that do not have a large requirement for the medicines that we make. It is a tricky one.

Michael Lawrence: I think we clearly need to look more internationally. There has been a very good initiative from the UK Space Agency in the last few years with its international partnership programme. It provides part-funding to enable companies to get together and collaborate to deliver products and services in developing nations around the world.

We have projects. We did something in Dubai. We have done work in Guatemala. We have just started a project in Mongolia, which we would not have done if we had not had this piece of extra support to enable us to get out there, understand the user needs and then develop a service. But that could be done inside or outside the EU; it is not really a Brexit issue.

Q689 **Stephen Timms:** Dr Williams, you told us earlier that one positive from Brexit has been the life sciences industrial strategy. I think I am right in saying that the coalition Government were working on the life sciences area, but I take it from what you have said that you have seen some significant change since the referendum. I just wondered if you can tell us what has happened.

Dr Williams: I guess it has put more energy behind the life sciences—Sir John Bell brought a committee of industry, academia and institutes together to look at how we re-energise, and it was in answer to the Brexit question: “What do we need to do in response to that?” I guess that is the positive side, but, from the negative side, we have not actually seen

¹ Witness later provided clarification that he meant to say hypertension not diabetes



the implementation yet. What we are really asking for is implementation of the Life Sciences Industrial Strategy, and one of the earlier points of that was an increase in R&D funding. We have seen some movement in that area, but there are many other aspects of that industrial strategy that we will need to implement if we are to remain globally competitive.

Q690 Chair: A final question from me: at the moment the Government are about to start to negotiate a transition period, implementation period or whatever you want to call it. Do you as individuals or organisations have a view about how long that should be? The Prime Minister in her Florence speech talked about around two years. Given some of the things that you have described and the uncertainty and so on, and working on the assumption that during a transition most things will stay the same, do you have a view about how long that should be?

Michael Lawrence: I think it needs to be as long as it takes to secure some of the issues that we have been talking about. There are multiple issues from an economic, science and innovation point of view, and many others outside of the remit of this group. It needs to be as long as it takes. It needs to be done in a way that actually responds to the real issues. Clearly, this is a political decision to leave the EU, but let us not let the politics actually screw up the rest of the economy, the culture and security of the nation.

Dr Williams: We have had a go at it. As you know, we are setting up our parallel testing at the moment. We think around three or more years will be what it takes to demonstrate that equivalence if we do move to a non-harmonised model.

Professor Ferran: For us it is the beginning of 2021, which is when the next FP9 programme kicks in, and then there is the question of whether we are in that for seven years or not. The one reservation we have about a long transition is that if it is not clear where we are going then we have that overhanging uncertainty throughout that period. So, I think yes, as long as it takes but also that there is a growing sense of what it is going to look like, which will provide some comfort.

Professor Hannon: I think it depends on the answers to a lot of the questions that we have raised today. The more harmonised we are, then the shorter the transition period can be.

Chair: That brings our proceedings to a conclusion. First of all, can I thank you on behalf of the Committee, Mr Lawrence, Professor Ferran, Dr Williams and Professor Hannon, for the evidence you have given? It has been really, really useful. We have learnt a lot. You have definitely adhered to our request to be succinct and to the point, that is why we have covered a lot of ground, and that will assist us greatly in the work that we are doing.

Can I also say that we are pleased to be joined here today by local Members of Parliament? Daniel Zeichner is sitting up at the back and has



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been observing proceedings. I think we hope to be joined by Heidi Allen at some point during the rest of our day here. We will now be moving as members of the Committee to a round-table with business, academic and health representatives, and then we are having a tour of the laboratory of molecular biology. If any of you want to read the transcript of the evidence session that has been taken today or if you want to hear it again, it is not available from the BBC iPlayer, but I am advised that you will be able to find that on the Parliament website. As I said at the beginning, if you are interested in the work of the Committee you can find a lot of material, transcripts of all our evidence sessions and the report that we have produced, and I hope you will see the evidence session that we have heard today reflected in subsequent reports that we produce. Once again, I thank our witnesses for joining us today and for giving up their time.