



Select Committee on Science and Technology

Corrected oral evidence: Life Sciences and the Industrial Strategy

Tuesday 12 December 2017

10.05 am

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Members present: Lord Patel (The Chairman); Lord Borwick; Lord Fox; Lord Hunt of Chesterton; Lord Kakkar; Lord Mair; Lord Maxton; Baroness Morgan of Huyton; Baroness Neville-Jones; Lord Oxburgh; Lord Vallance of Tummel; Baroness Young of Old Scone.

Evidence Session No. 23

Heard in Public

Questions 239 - 254

Witness

Professor Sir Mark Walport FRS, CEO designate, UK Research and Innovation (UKRI).

USE OF THE TRANSCRIPT

This is a corrected transcript of evidence taken in public and webcast on www.parliamentlive.tv.

Examination of witness

Professor Sir Mark Walport FRS.

Q239 **The Chairman:** Sir Mark, thank you for coming today to help us with this inquiry. If you do not mind, please introduce yourself for the record. Then we will start with the questions.

Professor Sir Mark Walport: Thank you very much indeed. I am the chief executive-designate of UK Research and Innovation.

The Chairman: You start formally when?

Professor Sir Mark Walport: UK Research and Innovation comes into legal existence on 1 April 2018. We are a shadow organisation at the moment, but not shadowy, I hope. We have a shadow executive board and we have a shadow main UKRI board, which is chaired by Sir John Kingman. That has met twice.

The Chairman: If you wish to make any opening statement, please feel free to do so. If you do not, we will go straight into the questions.

Professor Sir Mark Walport: I will make a very brief introductory statement, if I may. As you will know, the life sciences sector is quite a joined-up sector. In some ways, it goes back to the creation of OSCHR—the Office for Strategic Coordination of Health Research—which has been chaired since its inception by Sir John Bell. It is quite a complicated landscape where we have both public and private funding; we have the NHS, the Department of Health and a very important charitable sector. The sector has been talking to each other for many years through the mediation of the Office for Strategic Coordination of Health Research.

In terms of what is going on at the moment, we have the overarching industrial strategy, which was published recently. Within that is the life sciences strategy, which is the subject of your inquiry; the sector deal, which was announced last week; the patient capital review, which is important; the NHS research strategy; and obviously the work of UK Research and Innovation. There is a lot going on.

The Chairman: Thank you very much. You mentioned life sciences. Lord Oxburgh may have a question to ask you about what we mean by life sciences.

Professor Sir Mark Walport: This is predominantly a human health life sciences strategy, if I can put it that way. Life sciences clearly includes plant health, animal health, and the microbial world, some of which is relevant to human health but not all of it. This could be viewed as one section of a life sciences strategy. It is focused on human health. That is not to say that the remainder of the life sciences are not also economically extremely important, and it will probably take me to a point where one of our jobs, over the spectrum of research and innovation that we will support using public funds, is to produce an overall strategy for UKRI as a whole. This can be viewed as predominantly a human health life sciences strategy.

Lord Oxburgh: More medical, perhaps, than human health. All sorts of things, including nutrition, would come into a health strategy.

Professor Sir Mark Walport: In terms of an overall health strategy, yes, I could not agree more.

Lord Oxburgh: To pursue this a little further, do you have any inkling that the Government may commission a strategy for the non-medical life sciences? A number of these are very important for the economy of the country.

Professor Sir Mark Walport: As you know, we have the industrial strategy challenge fund. As part of that, there will be an open call in the new year for further areas for a possible industrial strategy. There is already something about food. It is quite likely that more will come up through that. I cannot tell you the Government's plans for commissioning further specific reviews.

Lord Oxburgh: I cannot speak for others, but I thought that the Bell report was extremely valuable. The one failing was that he did not persuade government quite early on to change the name.

Professor Sir Mark Walport: Yes. Ultimately it is the contents and how they are delivered that matter. It is a semantic point almost. I could not agree with you more about the broad scope of the life sciences.

Baroness Neville-Jones: Following on from the previous question, you say that there is the challenge fund. Will the Government take a view of where the priorities lie? If I may say so, there are probably quite a lot of agricultural institutes that house scientific expertise and excellence, but it is a very disaggregated field. Without a bit of stimulus, do you think they will naturally respond to the possibilities open to them, given that another feature of the scene is that they are in parts of the world where there is a great national interest in seeding some wealth creation?

Professor Sir Mark Walport: That is undoubtedly true. Looking at the life sciences more broadly, there are of course the agritech centres. I recently had the opportunity to visit the University of Lincoln and its Holbeach campus, which is very focused on food sciences and food production. We also have the biological energy sector. So there is a lot of activity in the north-east. These are important sectors and I am sure they will be supported. Whether there will be a specific strategy is for government to answer rather than me, but certainly looked at through a UK Research and Innovation lens, this is an important area. The UK is very good at this, from the most basic plant science right through to the applied.

Baroness Neville-Jones: Hopefully that will encourage the Government.

Q240 **The Chairman:** Thank you very much. Can I start with the implementation of Sir John Bell's report on the Life Sciences Industrial Strategy, as we now commonly know it? It is about implementation and who should take responsibility for implementing a strategy. Within it, who should take responsibility for the life sciences sector deal? We have heard evidence that the role of the Secretaries of State for both the health

department and BEIS will be extremely important. Do you have a view about implementation?

Professor Sir Mark Walport: First, I agree. Ultimately, accountability for the industrial strategy is at the highest level of government. The Prime Minister is chairing the Cabinet's economy and industrial strategy committee. On the life sciences sector deal specifically, BEIS is scoping governance and implementation plans, but there will be a life sciences council and an oversight board.

Implementation, of course, is in many parts. UK Research and Innovation will have responsibility for the industrial strategy challenges, for example. We will have responsibility for the health of the sector—the basic science—but industry will have a key role. Those delivering the research and innovation will have a role and the NHS has a role, so there will be many people who will need to play a part in order to deliver this strategy. Ultimately, accountability is with government for holding everyone to account for doing it.

The Chairman: Who do you think should lead it?

Professor Sir Mark Walport: Ultimately, a life sciences council is being established that will be co-chaired by the Secretaries of State for BEIS and for Health. If that is in effect the governing council, that gives the answer.

The Chairman: Will UKRI have any role in implementation?

Professor Sir Mark Walport: Yes, certainly. We will have responsibility for several elements of it. As I say, there is the work of the Medical Research Council in supporting the fundamental research and the research as it goes into innovation. There is also Innovate UK and its work. Several of the catapults have relevant activity, such as in cell and gene therapy. Ultimately, there are also the specific industrial strategy challenges.

Q241 **Lord Oxburgh:** Have you looked at the life and effectiveness of earlier industrial strategies? This is very important for this country at this time. Are there lessons to be learned from earlier strategies? It is really quite hard to identify any that have been important.

Professor Sir Mark Walport: I must confess that although I am interested in history I have not gone through the history of previous industrial strategies in great detail. This is about making choices in an intelligent way, because at the end of the day "picking winners" is a phrase that has bad resonance.

On the other hand, when one is dealing with public funds one has to make choices. The industrial strategy as it stands has a series of challenges and vertical sectors. It does not pick winners. One of its four cross-cutting challenges is about data science and artificial intelligence. Another is about ageing; of course, life sciences have an enormously important role to play there and in how we deliver social care. Then there is clean growth in energy and there is the future of mobility. It takes a much more cross-cutting approach than saying simply, "We will support

this particular sector in this particular way". That rather distinguishes it from previous strategies. As part of the related work, the different sector reviews have been established. It is different in its organisation. We will need to look back on it in 20 years and reflect.

Lord Oxburgh: Fingers crossed.

Lord Fox: You mention the life sciences council. How do you see that relating to UKRI? In other words, what influence will it have on your operations?

Professor Sir Mark Walport: I cannot tell you what the membership of that council will be exactly, but it will be interested in the work that UKRI does, because the work that we do in delivering taxpayers' money for research and innovation will be crucial to its work.

Lord Fox: It will be interested in or will be able to guide?

Professor Sir Mark Walport: It will certainly be able to guide. The decision as to which industrial strategy challenges to fund, for example, is ultimately a ministerial decision. The job of UKRI is to collect ideas and to propose and develop those ideas. It will be a collaboration, but ultimately Ministers will decide.

Q242 **Lord Vallance of Tummel:** The document on life sciences says that there will be an implementation board jointly chaired by industry and government. Is that what you meant by "council"? I imagine it will be. Beneath that, there will be subgroups to oversee each component of the deal: pharma, medtech, diagnostics, et cetera. This is a very brief summary. In the shadowy world you are now in, is there any way of shedding a bit more light on who will be on this?

Professor Sir Mark Walport: I have not seen that, so I cannot answer that question, I am afraid.

Lord Vallance of Tummel: Do we know whether or not it is going to be a statutory body?

Professor Sir Mark Walport: I do not know the answer to that.

Q243 **Baroness Young of Old Scone:** I am sure you can cast light on my confusion about the sector deal, which we now have. Could you give us your thoughts on it, particularly on how it relates to the strategy and the implementation mechanisms that you have been talking about?

Professor Sir Mark Walport: The sector deal is the result of John Bell and his colleagues working with industry, with the Department of Health and the NHS, with organisations such as UK Research and Innovation and the charitable sector, to try to put flesh on the bones of the life sciences strategy. It is part of the implementation plan. It contains quite a lot of details on some new investments that companies such as Merck are making. It is the first stage, and it is not a completed work, illustrating how industry and the NHS in particular will respond to this very important strategic area for UK's industry, our health sciences as a whole and the way we deliver health.

Baroness Young of Old Scone: Is the relationship between the implementation process for the sector strategy and the implementation process for the sector deal one and the same thing?

Professor Sir Mark Walport: Ultimately, they are one and the same thing, yes.

Baroness Young of Old Scone: One last question: the sector deal felt a bit like a shopping list—a work in progress and an announcement on the story so far. Is that what you were expecting from it?

Professor Sir Mark Walport: The strategy has to be about deliverables. Yes, there are very specific things in the life sciences sector deal, but that is what we want to see. Seqirus, for example, which is the world's second-largest influenza manufacturer, is going to invest £40 million in a fill-and-finish facility in Liverpool. In a sense, the issue with the strategy is to implement it. These are some of the details of the implementation, particularly with a focus on industry. They are quite granular. It is definitely work in progress.

The Chairman: There are piecemeal announcements, such as one last week on the meeting in Downing Street chaired by two Secretaries of State with a lot of industry. Of course, what was announced is not public knowledge. Do you think somebody will co-ordinate this and get what is happening to a wider audience? For instance, at that meeting—I think you were there, so you might like to say something about it—there were several industries announcing their support tangibly. Is that correct?

Professor Sir Mark Walport: Yes. The important message that I took away from that meeting was some of the comments made by Roger Perlmutter, director of R&D at Merck, who made the important point that one of the key issues in investment decisions was about the quality of the UK's health research base. That was a critical thing that came across again and again. There was a lot of discussion about genomic science.

One of the most important features of the industrial strategy challenge fund is the creation of a very large platform that will bring together medical phenotypes—features of disease—and information about genomes, protein expression and metabolic expression. That will create an extraordinarily important platform, probably world-beating in its scale, building on investments to be made over many years in such areas as the UK Biobank, which involves half a million people, the last of whom were recruited 10 years ago, and the work of Genomics England in its sequencing of material from 100,000 people in the NHS.

When we put these things together they provide an extraordinary platform for the diagnostics and treatment of the future. That very much came out during the presentations at that launch of the sector deal in No. 10. Inevitably, when push comes to shove, a whole series of detailed investments will be made, and it will be partly up to industrial partners to work out when they want to make their announcements. Some things are undoubtedly still under discussion, and some companies have come off the fence in making their announcements.

Lord Hunt of Chesterton: Last week, Sir John Bell referred to the

meeting that you have described as a “sandpit” meeting of all these different organisations. He also commented that the Treasury “was there and wasn’t there” and was on the sidelines looking on. Was the Treasury there? What is the role of the Treasury?

Professor Sir Mark Walport: Treasury has a somewhat quantum state of being present and not present at the same time.

Lord Hunt of Chesterton: That is another very helpful analogy.

Professor Sir Mark Walport: The Treasury clearly scrutinises all this funding extremely carefully, as it does when we make the case for the industrial strategy challenges. Treasury scrutinises those very carefully, as one would expect.

Another very important thing that might not have come out strongly enough is that the Treasury has been looking carefully at the whole question of capital for growth. We are extremely good at starting companies; we are much less good at growing them. There has been the patient capital review. There was widespread consultation.

The Chairman: We will come to that in a subsequent question.

Lord Kakkar: I want to return to your observation, Sir Mark, about the important components that have been built over a period of time to support the base for health research and life sciences in our country. Is the strategy, or more broadly is government, doing enough to protect that broader base? How will co-ordinating the protection of that base, which is fundamental to this strategy, be secured?

Professor Sir Mark Walport: That is an important question. It goes back specifically to when I talked about the industry, emphasising the importance of the UK environment in being extremely good at health and biomedical research. I have had the privilege of going to Stockholm and seeing Richard Henderson awarded the Nobel Prize this year as one of three people who contributed to the development of cryo-electron microscopy. We fail at our peril to support the fundamental research that drives things forward. A key element of the Medical Research Council and all the other research councils—the Engineering and Physical Sciences Research Council, the ESRC and so on—is maintaining and protecting that very strong discovery base. If I could summarise what UK Research and Innovation is about it is the tagline of the Royal Society of Edinburgh: it is knowledge made useful. If we do not have the knowledge, we cannot make it useful. It is an important task for UK Research and Innovation to make sure that we continue that knowledge discovery engine.

Q244 **Lord Fox:** We have started to touch on this. There is this sense that the fundamental research base on the one hand, which John Bell highlights as being vital and which I think we all agree is the source of much of what we are talking about, and the industrial challenge fund is seen in a sense as a different activity. You started to allude to the two pulling together and that we would see UKRI, the research councils and Innovate UK as a group of organisations coming together. There is a finite resource. You have painted a rather Utopian picture of how this will all

feed in and magnify, but in the end you will have a lot of organisations scrabbling for that resource on the one hand, the fundamental end, and on the other hand you will have the challenge fund and the applied end. How are you going to balance the risk of starving one end or the other, or the middle, and who is going to oversee that risk?

Professor Sir Mark Walport: That is an important question. In a way, the good news is that it is much easier to create an organisation like UK Research and Innovation on a rising budget—and of course it is rising. The core has been over £6 billion a year, but as part of the Autumn Statement the Government announced, and confirmed with more funding recently, the largest uplift to research and innovation funding in more than 40 years. The funding of just over £6 billion will rise to just over £8 billion by 2020-21, and as part of the announcements over the past couple of weeks £2.3 billion will be added for the next financial year. We are on a growth trajectory. While the industrial strategy challenge fund is a very important part of that uplift, there is also money for talent and international collaboration. We are in a situation where we can protect the knowledge discovery while growing the opportunities to apply that for societal benefit.

Q245 **Lord Hunt of Chesterton:** My question carries on from this. UKRI is a mixture of research councils and UKTI, is it not?

Professor Sir Mark Walport: No. It is the seven research councils and Innovate UK, and the ninth organisation is Research England, which is part of HEFCE.

Lord Hunt of Chesterton: I was thinking of Innovate UK. How will they ensure that the necessary research infrastructure exists to support an uplift in the research spending that you referred to, particularly in the life sciences?

Professor Sir Mark Walport: The first thing to say is that one of the things we are doing and tasked with doing is providing an overall strategic framework for the work of UK Research and Innovation. The Science Minister, Jo Johnson, is kicking off a strategic review of our research infrastructure needs, which will take about 18 months to complete. We will do this very thoroughly. We need to deal with the challenge that an earlier Chairman of this Committee, Lord Krebs, has raised of the infrastructure battery not being included. We have to be very careful when we invest in infrastructure that we invest in the revenue to keep it going. Of course, when we think about infrastructure we also need to think not only about the physical infrastructure, such as the Diamond synchrotron and spallation sources, but about our data infrastructure. That is where we are particularly strong in the life sciences. We potentially have the best data infrastructure in the world, the big opportunity being to link it up to NHS clinical data, because that will deliver enormous benefit to patients.

Lord Hunt of Chesterton: Will UKRI have some kind of relationship with all the other big public sector research facilities?

Professor Sir Mark Walport: Yes.

Lord Hunt of Chesterton: How will that work?

Professor Sir Mark Walport: The short answer is that we have to be very cognisant of the overall strategic framework and that if you simply look through the lens of one part of it you miss the story. We need to see what is going on in industry but also, as you say, in the public sector research establishments. To give you one example, which is partly in the life sciences, quantum technology offers new imaging possibilities that could be quite revolutionary. The National Physical Laboratory is very involved in that. If we are to develop things, we think about innovation, but we need to think about standards and measurement. That sort of thing helps to create markets.

Lord Hunt of Chesterton: Will this be ad hoc co-ordination?

Professor Sir Mark Walport: I would use the phrase "variable geometry". There will not be one co-ordinating body for everything, but quantum is rather a good example; there are four quantum hubs. There is good co-ordination there and we need to get the geometry right in the whole system. It is the balance between doing something so large that it misses the target all together or having it too fragmented. We need bespoke models.

Lord Maxton: One of the problems is that everything you, the research and the companies are doing, quite rightly, is to make people live longer.

Professor Sir Mark Walport: Live more healthily, I hope.

Lord Maxton: That has enormous political as well as scientific implications, and it is what you are concerned with. Is the fact that you have to look at pensions and social care taken into account?

Professor Sir Mark Walport: At one level, our task is not life, the universe and everything. On the other hand, through the privilege of funding all the research councils, which generate knowledge around social policy, the Economic and Social Research Council will have an important role in supporting the social science that tackles that question. Of course, we also have a lot to learn from the Arts and Humanities Research Council. It is important that the overall industrial strategy has ageing as one of the cross-cutting challenges.

Moving to your specific point, the triumph of medicine has been to enable us to live longer, healthier lives. Perhaps the failure has been that we have not successfully compressed morbidity. We live longer, but we are ill for longer at the end of our lives, and that is putting challenges on our health and social care; you chaired the inquiry on the NHS, Lord Patel.

Lord Maxton: Even if everybody lived longer and healthier lives, there would still be enormous political challenges.

Professor Sir Mark Walport: Of course.

Lord Maxton: Are political parties involved in this? Are they taking any cognisance of it?

Professor Sir Mark Walport: In the Houses of Parliament, that is more a question for you than it is for me, if I may say so.

The Chairman: Some of us, including Lord Maxton, are examples of living longer and healthier.

Q246 **Lord Oxburgh:** The industrial strategy White Paper talks of the UKRI strategic priorities fund, which immediately smells of picking winners. Anyone who has come up through the academic world knows that the academic world depends on comparison and picking out the best. The White Paper goes on to say that this will support high-quality R&D priorities that would otherwise be missed. The implication is that these ideas, projects or initiatives lie outside the main scope of the industrial strategy. Am I reading this correctly?

Professor Sir Mark Walport: This is work in progress. Before the final details are agreed there will need to be ministerial agreement and the Treasury will need to agree. There are potentially three opportunities for the strategic priorities fund. Part of our job in UK Research and Innovation is to catalyse the research and innovation community to answer the sorts of questions that might not be answered simply by a programme grant or a fellowship programme. It is about how we stimulate the imagination of the community to come up with the big and important questions.

Baroness Neville-Jones: Give us an example, if you would.

Professor Sir Mark Walport: There are new ways of conducting chemistry. I will give you a very specific example, the human cell atlas programme, an international collaborative programme that is being developed at the moment. It has strong support from the Wellcome Trust in the UK and the Chan Zuckerberg foundation in the United States. It is the next stage in the genome project, which is how we can define the nature of each of the cell types in the human body. What is a hepatocyte, a liver cell? Ultimately, that can be defined by the genes that are switched on and the proteins that are expressed, and understanding that cell in health and disease in response to pharmaceutical agents and toxins. That can be done at a single cell level in a way that was inconceivable before.

That sort of thing does not fit through a typical grant. It is the sort of thing that you might say in principle—I will give this example, because you are asking for a specific example, and it is not a bad one—is a very important research and innovation priority because it will be important for all aspects of understanding human health. That is the sort of thing that one might consider supporting through that type of fund. It is allowing both the research and the innovation community to use their imagination to come up with the bottom-up ideas. As Lord Oxburgh has said, the winners there are picked by the process of peer review. Of course, peer review, which sometimes gets people hot and bothered, is no more and no less than expert review. We need expert review to decide.

From a more top-down perspective, there is a lot of emphasis on another of the cross-cutting activities in the industrial strategy White Paper,

artificial intelligence, and on data science more broadly. There is a skills need there. In fact, skilled PhDs have been identified as part of the response. There may be areas of research and innovation where there is a skills need. That sort of thing could, in a slightly more top-down way, be supported through that type of fund.

Lord Oxburgh: Would you include the role of discarded plastics in the environment?

Professor Sir Mark Walport: Conceivably, yes. The whole topic of waste is very important. These are critical for human well-being. That could be another example. You can immediately see, as we start talking about this, that the ideas for the sorts of questions will flow very easily. As I say, I cannot tell this Committee for sure how this fund will be used, but this is some of the thinking that is going on inside UK Research and Innovation. Ultimately, it will be for Ministers to decide.

Lord Oxburgh: You will have to have some kind of selection procedure.

Professor Sir Mark Walport: Yes.

Lord Oxburgh: That is not yet thought through. Is that right?

Professor Sir Mark Walport: That is not worked through in detail. Of course, you can immediately see that we are talking about the comparison of apples and pears, but that is what a research funding agency has to do when it is funding research. The quality of the team is at least as important as the quality of the question. When you have a good question and a good team, there is a compelling case for funding.

Lord Fox: Is it the sort of funding that in the past would have been chased through Horizon 2020? They sound like Horizon 2020 projects to me.

Professor Sir Mark Walport: Some of those projects could undoubtedly have been undertaken.

Lord Fox: In a sense, this is replacing what may well—

Professor Sir Mark Walport: No, I do not think it is about replacing it. It is about a complementary activity. The whole nature of our future relationship with European funding is very much up for discussion at the moment, and the Government have produced a paper in which they are looking for a strong mechanism association with European research and innovation going forward. Again, that negotiation is a bit above my pay grade.

Q247 **Lord Mair:** Can I ask you about HARP, the health advanced research programme? As we know, this is analogous to DARPA in the US. It is all about very high-risk, moon-shot programmes, and it requires a coalition of funders, multiple partners and large research infrastructure projects, with great ambition, creating entirely new industries. We heard from Sir John Bell last week that quite a lot of money is coming from industry and charities. I want to ask more about government funding. Something has been announced from the industrial strategy challenge fund. How do you see UKRI reacting to HARP? What will its attitude be to this high-risk,

moon-shot programme?

Professor Sir Mark Walport: The first thing to say, of course, is that the core of what UK Research and Innovation is doing in funding knowledge discovery is high-risk. By its very nature, it should be high-risk. It is, for example, giving the money to the Laboratory of Molecular Biology in Cambridge and letting it get on with doing very high-risk projects. It is not that the research councils do not have a very strong track record in doing that.

HARP is not established as an entity and will require many players. The charities, I know, are talking about this. The first programme that might fall under that banner is the industrial strategy challenge, which, as I have already talked about a bit, aims to build on our leadership in genomics and data science on phenotype in health and disease. There are other quite important areas in it as well, such as the application of machine learning and artificial intelligence in diagnosis using both radiological imaging and histopathology to look at tissue sections, which Virchow would still recognise as the tools to use; people looking down microscopes. There is some quite important and challenging stuff in that.

Of course, DARPA—the Defense Advanced Research Projects Agency—has the “D” bit. It has worked very well in the United States in the context of defence procurement, where it has tackled some very difficult challenges. One key feature of DARPA, and indeed of the other ARPA programmes developed in the United States, has been that it has to a significant extent been led and run by challenge directors. Individuals have been empowered to run programmes with, it has to be said, a fair degree of review of proposals. It is not done in an ad hoc way. The proposals are expertly reviewed.

Essentially, we have two sets of challenge programmes at the moment. We have the global challenges research fund, which is ODA funding looking at some of the challenges relating to the sustainable development goals. When it comes to the industrial strategy challenge fund, we aim to have challenge directors. We will learn from the DARPA approach and will aim to appoint challenge directors who will have a significant role in the oversight of the programmes.

Lord Mair: You referred to peer review processes. Obviously, when one is looking at high-risk, moon-shot programmes it becomes a little more difficult. The normal peer review process may not be very well suited to that. What is your view?

Professor Sir Mark Walport: It comes down to picking the right experts to review programmes. We could have a whole discussion on peer review, and perhaps we will at some stage, but it is about choosing the experts who have the imagination and the creativity to be able to think through such programmes. Peer review is as good as the experts you choose to do it. I do not believe there is any alternative in a world where you have to choose whether to fund A, B or C. You need to take expert advice. Ultimately, it is about getting the best experts. As I say, it is not that DARPA does not make choices; it uses a particular form of experts.

Certainly DARPA projects are reviewed quite extensively, typically by experts working for the US Government.

Lord Mair: In terms of industrial strategy, as you say, DARPA is all about defence, so there is a ready-made mechanism for taking the research and applying it within the defence industries. How do you see that analogy working in the NHS, for example?

Professor Sir Mark Walport: An interesting and important question is the extent to which the NHS ought to see itself as procuring the research and innovation that it needs to look after the needs of us, the population. In a sense, that is what defence has always done. You cannot buy the products off the shelf. The market does not operate in that way. Defence has been forced to procure its R&D. Health—and this is not only in the UK; it applies right around the world—has outsourced more of this to the commercial market. Clearly, there is an important opportunity for the NHS and health systems around the world to think more about how they procure the R&D they need. It is worth saying in this context that a strategy has recently come out from the NHS on how it is going to move forward in facilitating some of this work.

The Chairman: You have said a couple of times, and others have said the same thing, that the key areas where HARP may well emerge are in AI and genomics. What does the UK have that others do not have that you think puts the UK in a stronger position on developing AI?

Professor Sir Mark Walport: There are two parts to that. The UK has enormous strengths in the very long history of cohort studies, some of which go back to the 1930s. There are very important Scottish studies, as you know. We have this very strong track record in building cohorts in both the social sciences and the medical sciences. The UK Biobank is far ahead of anything elsewhere. Of course, we have the NHS, a single healthcare system, even though it is fragmented between different trusts. When it comes to computer science and AI, this happens to be a particularly good area of UK research. We have some outstanding AI researchers and people like Demis Hassabis, who has created DeepMind. The UK is good in this area. There is an opportunity to put the AI together with the genomic data in relation to phenotype, the imaging data. There is work going on with Moorfields looking at how OCT—optical coherence tomography—in ophthalmic practices can be analysed using machine learning.

Lord Oxburgh: In a former existence I had quite a lot to do with DARPA and admired its procedures considerably. Individual programme directors had to make judgments, the outcomes of which caused their demise or their promotion. It looks to me—this is slightly unfair to say—as if the body in this country with the closest resemblance to that is the Wellcome Trust. The director has considerable authority and he has an advisory board, as you well know. Are there many things that this initiative will or might support that Wellcome does not or could not?

Professor Sir Mark Walport: I need to be careful, because, as you know, I directed the Wellcome Trust for 10 years.

Lord Oxburgh: Precisely. That is why I thought it was unfair.

Professor Sir Mark Walport: The important opportunity is for the sector to work together. The Wellcome Trust and government have worked together in the past. The UK Biobank is a very good example of that. That was a partnership between the MRC, the Wellcome Trust and the Department of Health. Rather than seeing these as competitive activities, it is much better to see the opportunity of complementary activities. Arguably, this is one of the areas where the UK has great strength. Very unusually, we have a strong public funding system with the Medical Research Council and the other research councils; the NIHR, through the Department of Health; and an extraordinarily strong charitable sector, not only with charities such as the Wellcome Trust but with the more disease-specific charities such as CRUK, BHF and all the charities in the AMRC.

Lord Oxburgh: The White Paper anticipates that the initiatives will need multiple partners and funders. If you get enough people to agree to something, is the project either so pedestrian or so ill-defined that it is not worth doing?

Professor Sir Mark Walport: One needs to look at the examples and say that that is not always the case. The Structural Genomics Consortium in the life sciences was a structural biology consortium that brought together an enormous number of both public and private funders, nationally and internationally. You are undoubtedly right that the opportunity cost goes up with every partner you add. You have to have a streamlined governance system.

Lord Fox: Would it be helpful if the comparison with DARPA was dropped and you explained what you were going to do, taking cognisance of international examples rather than keep—not you but government—talking about DARPA-esque activities?

Professor Sir Mark Walport: The point is well made. We will describe exactly what we do, and we should not be an ersatz version of something else. I may not have brought out strongly enough that a very important component of UK Research and Innovation is our board. We have an extremely strong board and we are accountable, as the executive, to the board, chaired by Sir John Kingman, which brings together an excellent range of people who will be very good at holding us to account. We have already had a discussion at the board on the governance of industrial strategy challenges, and everyone is keen to see the money spent as wisely and as adventurously as is appropriate to deliver the outcomes we want.

The genomics and phenotype work is challenging in terms of the informatics, because the scale of the informatics is very large indeed—there are an enormous number of variables—and finding the needles in the haystack is not a trivial thing to do. It is at least as much a delivery challenge; how we bring together sensitive health datasets with information about genomes and everything else in a way that maintains public confidence, is secure, does not breach people's confidentiality and delivers all the benefits for health we will all benefit from.

Baroness Young of Old Scone: I may have missed it in the plethora of documents, but where is it envisaged that the HARP initiative will sit?

Professor Sir Mark Walport: It will have to sit as part of the life sciences sector deal and be under the Government's mechanisms for that. It is part of the life sciences strategy. As I say, the details of HARP are yet to be worked out and will require partners in addition to government funding.

Q248 **Lord Borwick:** What role will charities play in delivering the life sciences strategy? Would an increase in the charity research support fund stimulate more investment by charities? Who decides the size of that fund? Is it healthy that charities should be isolated from the overhead costs of research?

Professor Sir Mark Walport: I do not think they are completely isolated. The first thing to say, as I have already said, is that the charity sector is extremely important in the life sciences. "Unique" is a strong word, but we have one of the strongest and best systems of life sciences charitable support in the world. The second thing to say is that, of course, that has been recognised by the creation of the charity support fund as part of the QR. HEFCE has been responsible for that until now. It has protected the value of the charity support funding stream while other areas have been squeezed in recent years. The relative value of the funding stream has diminished. In 2007-08 the charity research support fund was 30p in every £1 of charitable support and in 2017-18 it is worth 20p in every £1 invested. That is still a significant amount of support. The responsibility for this will move to Research England after April. Research England and HEFCE consult closely with the sector, so there are frequent discussions with the charitable sector, and ultimately decisions about the scale of the charity research support fund will be made by Research England in consultation with the UKRI board and Ministers.

To be honest, there is insufficient evidence as to whether any change in the level of the charity research support fund would result in any difference in charitable funding. Of course, charitable funding has been on an increasing trajectory in the UK. We recognise the importance, and government provides 20p in £1. It is worth noting that charities are also supported through a wide range of other measures, including gift aid tax relief and relief to charities on other taxable activities. This is not the only support the taxpayer provides to help the charities.

Baroness Young of Old Scone: There is a subtle difference, however, between the money that helps the charities fund research and the money that oils the wheels within the NHS to ensure that those collaborations can take place, is there not? That is my understanding of what the charity research support fund does. There are signs of the NHS in some places being psychologically less willing to take part in research collaborations with the charities because they feel that the CRSF is being squeezed.

Professor Sir Mark Walport: That is an interesting question. The charity research support fund is part of the QR. I am not sure it is so important in charitable interactions with the NHS per se. I do not know of

any evidence on that point. It is more part of the QR, and that is mainly to do with the full economic costs of research in relation to universities. I will check that, and if I am missing something I will write to you.

The Chairman: Yes, please.

Q249 **Baroness Neville-Jones:** We are now on to the money. You said earlier that one of the things we are not so good at in the UK, having created a nice little company, is developing it, creating scale and getting innovation commercialisation out of the original activity. I have two questions to ask you. What do you think the key will be this time round to dealing with that problem, which seems to be of very long duration? It seems partly to be built into the national behaviour. How do you see us improving our performance in this area? Secondly, when it comes to money, you mentioned the patient capital review. Do you see that as being a key element? What do you think it is likely to produce? How we put the money together, how we psychologically move from science to innovation and how we get business involved seem to be key elements in this grand design.

Professor Sir Mark Walport: I would answer that in several parts. Obviously, part of the motivation in relation to UK Research and Innovation was to have Innovate UK as part of the organisation sitting alongside the research councils. The point I want to make and have made before is that the job of Innovate UK is not simply to be the commercialisation arm of the research councils; it is a business-facing organisation and works directly with the business sector. Innovate UK clearly plays a major role when it comes to promoting innovation and helping companies to grow and innovate when the market alone will not do it. That is an important activity in and of itself. The catapults are also an important part of the ecosystem.

Baroness Neville-Jones: That is all existing geography, if I might say so.

Professor Sir Mark Walport: The industrial strategy challenge fund will build matters well, because it is setting up clear partnerships between industry and academia where the challenges will solve problems that are important for innovation. A good example of that, although not in life sciences, is the Faraday challenge on battery technologies. There are important questions in electrochemistry and material science that are very important to developing the next generations of batteries, some of them through incremental improvements and some of them potentially disruptive. The model of the industrial strategy challenge is to create partnerships between industry and academia that will help, where there is industrial pull from the innovation as well as the push from the research community.

I go back to something I said earlier. The challenge, which is not purely a UK challenge but will be recognised across many parts of the world and certainly in most of Europe, is that we are good at starting but not so good at growing. On the one hand, that is to a significant extent about skills. The person who discovers is not necessarily the person who can

innovate. The innovator is not necessarily the entrepreneur, and scale-up requires management skills that are different yet again. It is a mixture of growing skills on the one hand and of providing the capital resources needed on the other. A lot of work has been done by the Treasury, and there has been widespread consultation and a group led by Sir Damon Buffini. Certainly in response to the capital review the Government are establishing, through the Treasury, a lot of new investment that hopefully will leverage private investment to provide some much-needed growth capital so that companies do not sell out too early. This is partly about science and innovation but at least as much about finance and management.

Baroness Neville-Jones: It is curious, is it not, that a country with a very large financial services industry should not be able to master this. One of the things that has been said to us is that the investment community is not nearly as well versed as it could and should be—again, a comparison is made with the United States—in understanding where the opportunities lie, where the investments should go and where you can get accelerated development. Is there any dialogue going on about how we try to develop a better-informed investor community?

Professor Sir Mark Walport: That takes me back to my last role as the Government Chief Scientific Adviser. This was one of the things that was discussed in quite a lot of detail in the Council for Science and Technology. This was identified as one of the major issues: that we lack the analytical capability that you would find in Silicon Valley, for example. If you look at the capital markets in the UK and the stock market, we have all the mining expertise in the world, although we do not have many mines here, but the amount of particularly science and technology is much less. There is a need to grow that expertise as well.

This comes back to place and clustering and how you build expertise in particular areas in particular parts of the country. If you look around Cambridge, for example, there is increasing expertise and high technology companies. Lord Mair will know that better than I will. A lot of these are not spin-out companies from the universities; they build on the fact that the university produces this great expertise and there is a community of entrepreneurs and people with money who can support growth. That is the way clusters develop.

Baroness Neville-Jones: Perhaps it stands out by its exception rather than being the more general rule, sadly.

Professor Sir Mark Walport: Yes, although if you look to the United States you would say that it is by exception there. Only a small fraction of the United States has the expertise as well.

Baroness Neville-Jones: We still have to grow, do we not?

Professor Sir Mark Walport: Yes.

Lord Hunt of Chesterton: On this point, I talked to a senior person in Coca-Cola last night. Fortunately, we were not drinking Coca-Cola. He commented on the breadth of education in America, where people do arts and science. We now have one university, UCL, which gives you a degree

in arts and science. It seems to me that the entire intellectual academic establishment in Britain accepts that we will continue in future to have this rather narrow “either science or humanities” approach. Your commission has never discussed this point or considered it a problem. The academic world has not moved very much at all.

Professor Sir Mark Walport: I should give you a personal view here, because I am not sure that UK Research and Innovation has a position on this. The liberal arts approach—mixing the arts, sciences and humanities—is a very important one. When we look in the context of UK Research and Innovation, one of our big opportunities is the fact that we have the arts and humanities. One of the challenges around the industrial strategy relates to domestic technologies and the creative industries. The UK has a very important opportunity to humanise technology. It is about designing technology so that it works well for humans. Who made Apple its money? It was probably Sir Jonathan Ive at the University of Northumbria. It was the design that made the iPhone and the Apple products so successful. That is our unique opportunity, and it is how we bring engineering together with the arts, humanities and social sciences so that we can understand how humans interact with technology at a time when technology is changing the world on a most extraordinary scale. That, again, is one of the opportunities for UK Research and Innovation, because our brief covers everything from the arts, history and design right through to the most detailed technology, the design of chips. Personally, I agree with you, and I think that UKRI has the opportunity to help. When it comes to the education system, that is not us.

The Chairman: Coming back to Baroness Neville-Jones’s question about this gap in the funding for the venture capital, because UK science is now recognised as pretty high up in the world and at the same time we have resources such as data in the NHS, are we not running the risk that the outside world sees this as an opportunity to come in, pick on the good ideas and, when it comes to large-scale innovation and commercialisation, take it away? I give you the example of yesterday’s announcement in the *Financial Times* of a company coming in to work with 30 key NHS trusts to innovate, and the funding is coming from US venture capitalists. I cannot imagine that the US venture capitalists will put all their money in the UK and allow it to go. Do you think we are running that risk?

Professor Sir Mark Walport: There is quite a lot of politics in that question.

The Chairman: We are in a political environment.

Professor Sir Mark Walport: We have a thriving automotive industry, but the majority of it is owned internationally. DeepMind is still very much in the UK, although it is owned by Google. It will grow here, because it depends on people. Knowledge is fungible, and we need not only to grow the knowledge but to have the skilled people. A very important part of what UK Research and Innovation will be doing will be growing and developing the skills, graduate and postgraduate, that we

are going to need to anchor these businesses in the UK and help them to grow. It is about people.

Q250 **Baroness Morgan of Huyton:** You mentioned a couple of the catapults in one of your answers. Obviously, you are aware of the EY review. It seemed to us that it strongly endorsed the concept of catapults and the fact that they promoted innovation, but it was very critical of oversight by Innovate UK and the lack of consistency in particular between various catapults. What is your view of that report? What will its impact be? How do you think things will change?

Professor Sir Mark Walport: It will be the job of UK Research and Innovation to implement the recommendations of the report. Of course, in the life sciences sector, the Cell and Gene Therapy Catapult was very strongly reviewed. On the whole, it was the longer-established catapults that came out more strongly. They are where the majority of the catapult funding is, so it is quite important to look at that review in the context of where the money is spent.

On governance, catapults were originally set up as independent research and technology organisations. They are overseen by Innovate UK but were structured to operate as private sector organisations at arm's length from government. As the main shareholder in the catapults we are working with them to strengthen governance and exert the shareholder responsibility that the public sector has for being one of the major funders. The model, as you say, is a good model. If we did not have catapults we would invent them. They are going to be very important in the health sector. Indeed, the Cell and Gene Therapy Catapult is already very helpful, and there is expansion of its activity at Stevenage.

Baroness Morgan of Huyton: Do you think we were not tough enough on choosing how many and which ones to have?

Professor Sir Mark Walport: I was not involved in the decisions in the past, so I do not think I can answer that question.

Q251 **Lord Vallance of Tummel:** I would like to come back to patient capital and its commercialisation, because industrial strategies are about commercialisation. The life sciences strategy is very ambitious. It suggests creating four UK companies valued at more than £20 billion in 10 years and a whole string of smaller ones. That is a paradigm shift. Do you think the patient capital review is capable of making and supporting that paradigm shift?

Professor Sir Mark Walport: The first thing to say is that I am not a financier by background. You will have had the opportunity to read Damon Buffini's review and will have seen the quality of the input to the patient capital review. The Government's response has come out. I have it here. It talks about establishing a new £2.5 billion investment fund incubated in the British Business Bank, and they aim to leverage that twofold on top, so it will be £7.5 billion.

Lord Vallance of Tummel: I think you can assume we have read that.

Professor Sir Mark Walport: Will it work? I do not honestly know the answer to that. It is a very substantial investment of public money, hopefully bringing in private money. Hopefully, it will also deal with the question of the expert analysis that will be needed. It seems to me these are steps in the right direction. It is the biggest push on this front for a very long time.

Lord Vallance of Tummel: It is a very good review, but it requires the other things that go with it, which we have touched on to some extent. The Americans have a big pool of money for scale-up. This could produce a big pool of money for scale-up, but the scaling-up requires the skill and the management, which we have touched on. Running a very big business of scale-up is very different from running a little one. Unless you can do that, unless you can get that ingredient in, the scale-up will not happen. How does one do that? How does one create that kind of skill? Is it for business schools that are sitting within universities, for the most part? Is there a role for those to train scientists in business at the same time, or to do their MAs and MBAs immediately after?

Professor Sir Mark Walport: That is certainly one of the things that has been talked about. There is another issue, the culture, which is the ambition to create very large companies. If you are offered £25 million or £50 million, that is a lot of money, so the temptation is quite high. People in the United States have learned to resist that temptation and be more ambitious, although that is not universally the case. It is a complex mixture of culture, skills, money and analytical capability.

Over the last few minutes we have touched on many of these issues. We will not get it through any single intervention. Money alone will not do it. Management alone will not do it. Of course, you are absolutely right that the skills you need for a growing company are different from the skills you need for a starting company. It is a complex mix. Do business schools have the opportunity to play a role? Absolutely they have.

Lord Vallance of Tummel: I have one finicky point. In the patient capital review, one of the major levers to be brought into play is the British Business Bank. How does the British Business Bank relate to Innovate UK? Does it? Should it? They are in a similar area.

Professor Sir Mark Walport: They certainly talk to each other. I cannot tell you about the detailed level of interaction. Clearly, they need to talk to each other, because Innovate UK is supporting the sorts of firms that the British Business Bank ought to know about.

Q252 **Baroness Morgan of Huyton:** We come to Brexit, inevitably. Can you talk to us a bit about what UKRI sees as the challenges of Brexit—and the opportunities, if you see them? I suppose the obvious starting point in the Committee's level of concern is skills. Do you think that UKRI knows enough about the potential impact of Brexit? Has detailed work been done? If so, is that publicly available?

Professor Sir Mark Walport: Let me start on the principles, perhaps, which is that research and innovation are global activities. We know that researchers, when they work as part of international partnerships, tend

to produce papers that are better and more highly cited. One has to be careful to distinguish between correlation and causation. It is not simply a magic cause that if you collaborate with someone from wherever you will automatically produce a good paper; it is just that the best researchers know they need to work with their best colleagues. Having been in Germany recently and in Sweden over the weekend, for the UK our number one international collaborator is the United States and our number two is Germany. Germany's number one collaborator is the United States and its number two is the UK. At the Karolinska Institute in Sweden, about 20% of its papers have one or more British co-authors. Innovation, again, depends on international value chains. We are in a world where all this activity is global. Global is the word. The US is the number one partner in terms of volume, so we know that we can do it across the world.

The Government have been absolutely clear in their paper, as I have said already, about the importance of participation with European partners. As part of the provisional agreement reached last week, to be ratified by the Council of Ministers, there is the potential to fund our collaborations to Horizon 2020 until 2020. That will provide quite a lot of reassurance to the community. The nature of our relationship to framework programme 9 is yet to be determined, and that will be the subject of negotiation.

It is clear that these are important. It is clear that the Government recognise them. For a number of months, Minister Jo Johnson has had a working group that has been collecting evidence on the implications of Brexit for higher education and research. It has met regularly, and it has strong participation from both universities, research councils and industry. The Government are very well aware of the issues, and UKRI has been party to that. We know what the issues are. Skills are an absolutely crucial activity. There is a skills programme. The industrial strategy White Paper announced a £300 million investment in research and innovation talent over the next three years. It is clear that not all our skills will be home-grown. We will have additional PhDs, knowledge transfer partnerships, fellowships, the Rutherford fund of £180 million to help bring people here, and the national academies are working very strongly in this area. I would say that we have pretty good evidence on what are the implications but not, at this stage, certainty about what the future relationships will look like.

Baroness Morgan of Huyton: On skills, do you think there is sufficient understanding of the length of time that people often need—I am sure there is in parts of government, but is there generally in government?—if they are coming to the UK to work on research projects? Do you think there is sufficient understanding that it is not a three-year programme and that people are certainly not going to move their families for a short-term move? In this House we have had some slightly unhelpful replies in relation to understanding the length of package that you need for proper research projects.

Professor Sir Mark Walport: There are two different issues here. One is the length of time that you need for a research project. You are right that if you are going to make a contribution to the Laboratory of

Molecular Biology, it will take you many years to do it. The question is: what are the regulatory requirements in order to do that? The Government announced in the Budget that they would change the Immigration Rules to enable world-leading scientists and researchers endorsed under tier 1—exceptional talent—to apply for settlement after three years. In some senses, the question is whether people will have early certainty that they will be able to stay for long enough. The evidence is that that is moving in the right direction rather than the wrong direction.

Lord Vallance of Tummel: Reading the publication last week on the life sciences strategy on skills, it seemed to major on apprenticeships. I do not know if you picked that up or if you had any comment on that.

Professor Sir Mark Walport: I did not pick that up, but I think that is only part of the story. In the life sciences, it is all about skills, from apprenticeships right through to the highest level. I do not think there is that focus.

Lord Hunt of Chesterton: We heard, I believe last week, about the critical need to have people who are clinically qualified and work in research. Many people with this dual qualification are coming from abroad, and it seems, as we heard, that there has been a considerable decrease in the number of this vital element, which is important for the application of research.

Professor Sir Mark Walport: That was my career trajectory. I was a clinician/scientist. The issues for clinicians moving internationally have changed over many years. I do not think this is particularly a Brexit issue. It is, to a significant extent, a licensing issue, which is that over the years the licence to practise internationally has become harder and harder in almost every direction to get. Lord Kakkar will have views on this. This is an issue at least as much about clinical practice in a country where you did not train—

Lord Hunt of Chesterton: It is critical, as I understand it, for the application of the science.

Professor Sir Mark Walport: There is no question that people with clinical qualifications working in research are an extremely important component of health research. Obviously, they understand the problems from a clinical perspective.

Lord Hunt of Chesterton: Is this something that we should put in our report?

Professor Sir Mark Walport: Emphasising the role of the clinician/scientist is always one that I would support.

Lord Hunt of Chesterton: Very good.

The Chairman: Several of us are biased towards that.

Professor Sir Mark Walport: Indeed.

The Chairman: The important point made in one of the evidence sessions is that one reason why it is easier for us to get scientists and

clinical scientists from EU countries is because there is no barrier to recognising their qualifications. A great number of barriers are set up by our regulatory authorities to recruiting people from outside the EU, such as the United States. If an academic from the United States were to come here as a researcher, you know the barriers that would be put in the way by our regulatory authorities.

Professor Sir Mark Walport: Yes, that is true. I know of anecdotal examples of extremely senior professors in surgical subjects hired by universities who found that it took about three years to get their registration. It is not a UK Research and Innovation issue.

The Chairman: Would it not be a UKRI issue if we found strength in the scientists we wanted to recruit here but could not recruit because of regulatory barriers?

Professor Sir Mark Walport: That would become an issue, and we would want to be one of the parties talking to the General Medical Council and others. We will be one of many voices, and I imagine there might be some quite strong voices around this table.

The Chairman: Perhaps we will move on to other similar areas.

Q253 **Lord Fox:** We come to the NHS. We have skirted around the issue, and it would be good to try to investigate the role and how you see that panning out. It is obvious from all the evidence we have received that the NHS is central to delivering this strategy. You threw in the line, and it would be helpful if you could expand on it, about the NHS as a procurer of R&D, because it is also a provider of data and a deliverer of the results of the R&D in terms of early adoption. Perhaps you could start by talking through those three roles which the NHS should or may play and how you think it is equipped to deliver on those.

Professor Sir Mark Walport: If you step back to what the National Health Service is about, of course one of the challenges is that to a significant extent it becomes the national disease service, because it is treating ill health rather than maintaining health. I was very struck by the report dated November this year by NHS England in partnership with the National Institute for Health Research, *12 Actions to Support and Apply Research in the NHS*. That is an example of joined-up thinking. You could also look at Genomics England as an example.

Lord Fox: I wrote that down as an example. There is an awful lot of the NHS that is not as well organised or as well structured as Genomics England.

Professor Sir Mark Walport: That is true, which is why I think this is quite an important report. Again, I do not want to read you something that you can read yourselves, but it talks about simplifying the NHS research processes—managing excess treatment costs better and eliminating delays in confirming multisite trials: “Articulate the NHS’s own research priorities better: set out research priorities for national NHS programmes; increase research focus and capability of value and cost;

set out ... research and innovation priorities of Academic Health Science Networks”.

The Chairman: Would it surprise you, reading those fantastic words, that we had no evidence that presented us with how this will be done in practical terms?

Professor Sir Mark Walport: I probably should not comment. You heard the evidence. This is a new document and it gives a framework to hold the system to account, if I can put it that way.

Lord Fox: How will UKRI help the NHS along this practical path?

Professor Sir Mark Walport: That is where it comes back to OSCHR. OSCHR was formed with the specific focus of increasing co-ordination between the MRC, other funders and NIHR. That provides a forum.

Lord Fox: With all due respect, it is clear that a bit more needs to be done. What bit more would you be able to add?

Professor Sir Mark Walport: This will be a critical part of our work stream. If we are going to be able to deliver the industrial strategy challenge fund, the NHS will have to deliver its part. We will not be able to do it without the NHS. There is an imperative for us to work extremely closely with the NHS for this to happen. Reflecting Lord Patel’s comments, there are cultural issues. I would not pretend that this is going to be easy.

Baroness Young of Old Scone: In the document you referred to on the 12 things that NHS England is going to do, it was very clear about the enhanced role for AHSNs, co-ordination across the country and the role of AHSNs in promoting implementation and adoption. Do you think that is the right solution, bearing in mind that it implies one NHS, whereas, as we know, there are a very large number of NHSs in each locality?

Professor Sir Mark Walport: That is the nub of the problem. The AHSNs—the academic health science networks—form a geographically widespread hub and spoke model in England. There is a big opportunity to use those. The question is who ultimately has the lever to ensure that the AHSNs can have an effect in NHS trusts that are not directly under their control. There is a big governance question, which I cannot comment on. The AHSN network seems a logical network to work with.

Lord Kakkar: I want to come back to the co-ordination between UKRI and the National Institute for Health Research. It is very clear in the way that UKRI has been constructed—bringing the research councils, innovation and Research England together—that there is a clear strategic and operational pathway for delivery. NIHR sits outside that. How is that co-ordination for delivery going to be achieved, which is fundamental to the life sciences strategy, with the two being independent? You speak about OSCHR. Will that be sufficient?

Professor Sir Mark Walport: At the end of the day, it is about how people work together, and it will be extremely important that both UKRI at the top level and the MRC works with NIHR. It is worth saying, of course, that Dame Sally Davies is an observer on the board of UK

Research and Innovation, so there is a good link there. It raises a broader question, which we have not discussed, which is the important role of UK Research and Innovation working with government departments, a number of which have significant R&D funds and which between them have many important questions for the well-being of the nation where we need to work together.

There is a broader question about how we co-ordinate effectively with government departments. That is worth thinking about very carefully. Clearly, the Department of Health and NIHR, in the context of this morning's discussion, are extremely important. We start with good relationships.

Q254 **Lord Kakkar:** Finally, I come back to the question of health data and the opportunity for the NHS to exploit this effectively, principally for patient gain but also for the economic benefits that could flow. What role will UKRI play in that? Does more need to be done now to achieve that beyond the role of UKRI?

Professor Sir Mark Walport: This is an important activity. The NHS digital research advisory group is co-chaired by John Savill from the MRC and Louise Wood from NIHR, so there is joint working on this. There is, of course, NHS Digital, and there is Health Data Research UK, which is a successor body to the Farr collaboration, with a substantial amount of MRC funding. It is a question of how these join up in what is, of course, a very sensitive area of research. We have to make sure that public engagement, the legal issues and everything else are dealt with in the best possible way. The potential is enormous and it would be a tragedy if we missed the opportunity.

Lord Kakkar: I think everyone agrees about that. Is enough being done practically to address the legal issues and facilitate the joining up of those different entities, or is there more that this report should identify to drive that process forward at pace to deliver what everybody has clearly agreed is quite extraordinary, if achieved?

Professor Sir Mark Walport: Data regulation is being implemented. I think we are now in a position where all the legal frameworks have been sufficiently defined, and we need to get on and do it.

Baroness Morgan of Huyton: Listening to your list of all the various bodies that are involved in moving the hugely important data work forward is not terribly reassuring. Is there not a case for looking at what happened with genomics, where a separate body was established that pulled people together properly and moved the thing forward fast?

Professor Sir Mark Walport: The bodies are more clearly defined than they were. NHS Digital has an absolutely key role. There is a research advisory body, which is the one I talked about, which John Savill and Louise Wood co-chair. In terms of funding the research activity, Health Data Research UK, chaired by Graham Spittle—the chief executive is Andrew Morris—is quite a good structure. We need to build on it. The challenge now is to deliver.

Baroness Neville-Jones: You paint a picture, which I do not disagree with at all. In order to make this work requires extraordinary orchestration.

Professor Sir Mark Walport: Yes.

Baroness Neville-Jones: It is a big leap forward, I think. I suppose my question is whether we are capable of it, but do you think there is sufficient understanding across the political spectrum in this country that a change of Government would lead to continuation of this effort? We will not be able to do this overnight. Therefore, it being in the accepted bloodstream of the leadership of the country seems to me to be very important. I do not know, but I do not have the feeling that this is understood as being important or that people have grasped its implications for the longer term and that they should be part of it. What are your thoughts on that? What would you try and do to embed it?

Professor Sir Mark Walport: In one way or another, I have been involved in this for about 15 years, from starting at the Wellcome Trust through to being the Government Chief Scientist and now through UK Research and Innovation. I have never seen anything other than the strongest support for this at very senior political level, and some degree of frustration that it is not quite delivered.

Baroness Neville-Jones: That may be because it does not go wide enough.

Professor Sir Mark Walport: It comes back to Baroness Young's point about the challenge of delivery in the NHS, where governance of the individual components of the NHS is quite devolved. This more of a delivery problem than it is a problem of political will, if I can put it that way.

The Chairman: Who, in the NHS, should lead on the life sciences industrial strategy?

Professor Sir Mark Walport: On the basis that accountability starts at the top of an organisation, my answer is obvious.

The Chairman: You mean by that the Secretary of State.

Professor Sir Mark Walport: Also the chief executive. Ultimately, it is i government. It is Ministers and the chief executives of the different organisations who have accountability.

Baroness Neville-Jones: As you said, there is a fragmentation in the trusts, which is part of the problem. The CEO cannot dictate how the annual budget is spent.

Professor Sir Mark Walport: This is a difficult and intractable problem. It is one that has left many people frustrated. You have worked on it. On the optimistic side, we are a lot further forward than we were 10 years ago. Some of this data science was much less tractable in terms of the informatics. Now it is much more tractable. Again, you can see when you look at Genomics England and some of these big initiatives that the

danger is of a cup being half empty. Our cup should be half full, but there is definitely the other half to fill.

Baroness Young of Old Scone: Going back to NHS England's statement on the 12 things that it is going to do, is there a fundamental tension or even a dysfunctionality in that the life sciences industrial strategy and sector deal have as their end objective the objective to create a thriving, global, UK-based life sciences industry?

Professor Sir Mark Walport: Yes.

Baroness Young of Old Scone: The objective of the paper on the 12 things NHS England is going to do is to create a set of technologies that will save the NHS money, or at least not increase its budget. You can see that some of the things we are likely to be most good at could in fact be across the NHS's bat, because it cannot afford to buy them.

Professor Sir Mark Walport: With respect, the strategy is about health and wealth, and the two are not incompatible. If we apply informatics properly, it will make the logistics of the health service work better, it will avoid the unnecessary use of treatment, it will help people to make sure they take their tablets on time. There are so many ways in which both health and wealth would benefit. I do not think there is a fundamental incompatibility between them.

Lord Fox: The observation from outside the NHS is that it is an organisation that is absolutely stretched to deliver what it is seeking to do each day. Do you honestly believe it has the capacity to be able to take on the challenge that you have described for it?

Professor Sir Mark Walport: It will only be able to do its job well if it takes advantage of the technologies that are becoming available in order to look after our health, stop us getting ill and treat us in disease.

Lord Fox: That is not quite the question I asked. I agree with your answer, but the question is: capacity-wise, can the organisation, culturally and physically, do that?

Professor Sir Mark Walport: I do not think the chief executive of UK Research and Innovation can answer that question for you.

Lord Hunt of Chesterton: We have had some political remarks from the other side of the room. You could say in a way that Beveridge socialism plus AI is just as attractive to the left as to the right. In a funny way, it is a new area that is helping the National Health Service and science to move forward in that way. It is very interesting and positive. I thought your analysis of that was very good.

The Chairman: This Committee, of course, operates on a neutral basis, not a political one.

Lord Hunt of Chesterton: We have some quite political remarks from time to time.

Professor Sir Mark Walport: As you know, Chairman, I stay entirely out of politics.

The Chairman: Sir Mark, thank you very much indeed for coming today.

We are very appreciative of it. If you want to send any further material, please feel free to do so. We may want you to come back and talk to us about your new, official role, starting in April, as chief executive of UKRI.

Professor Sir Mark Walport: I cannot wait, Chairman.