



Select Committee on Science and Technology

Corrected oral evidence: Life Sciences and the industrial strategy

Tuesday 24 October 2017

10.10 am

[Watch the meeting](#)

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

Evidence Session No. 7

Heard in Public

Questions 39 - 45

Witnesses

Keith Chantler, Director of Innovation, Manchester University NHS Foundation Trust; Dame Julie Moore, Chief Executive, University Hospitals Birmingham NHS Foundation Trust; Professor Bryan Williams, Director of R&D, University College London Hospitals.

USE OF THE TRANSCRIPT

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

Examination of witnesses

Keith Chantler, Dame Julie Moore, Professor Bryan Williams.

Q39 **The Chairman:** Good morning. Thank you for coming today to help us with this inquiry from the NHS side. Sir John Bell's report focuses a lot on the NHS and the important part the NHS will have to play in the delivery of the industrial strategy related to life sciences. Please introduce yourselves and, if you want to make an opening statement, please do so.

Keith Chantler: I am from the Manchester University Foundation Trust. I am the director of innovation at Manchester Hospitals and I am here deputising for our chief executive, Sir Mike Deegan.

Dame Julie Moore: I am the chief executive of University Hospitals Birmingham NHS Foundation Trust, interim chief executive of Heart of England NHS Foundation Trust and a board member of the AHSN and Birmingham Health Partners.

Professor Bryan Williams: I am chair of medicine at UCL, a clinician at University College London Hospitals, and director of research and director of their biomedical research centre.

Q40 **The Chairman:** Thank you. As I said, Sir John Bell's report puts a great deal of emphasis on the NHS being geared up in both supplying data and innovation. Do you think the NHS is good at adapting innovations and being involved in innovations, and do any of the NHS trusts work with industry?

Dame Julie Moore: It is patchy in parts. In Birmingham, we work quite closely with industry. We have an institute of translational medicine that invites industry partners, particularly small and medium-sized enterprises, to come in and work with clinical staff in development, but that is not widespread throughout the whole NHS and there is a lot more that we could do to spread that collaboration. In the new era that we are in of scientific advances, collaboration is the way forward. We have seen great advances in some of the collaborative work that we have done and we need to find a way of fostering that on a far greater scale across the NHS.

Keith Chantler: We are seeing a lot of examples of collaborations around, but, as Julie says, it is not widespread across the NHS and much of it is focused on the university teaching hospitals and those linked into biomedical research centres and academic health science centres. Industry is now offering different ways of working with us, moving from just a contractual relationship into more of a partner relationship, and we need, as a system, to mature and get better at getting real value for both parties out of those relationships.

Professor Bryan Williams: The partnership between higher education institutes and hospitals is absolutely critical to this. Our organisation is fortunate that we have UCL alongside, and over the last five years it has been transformative, particularly with the investment from NIHR coming into the biomedical research centres. It has enabled us to build the

infrastructure and invest in people who sit in the space between the university and the NHS. That space has been pretty much empty for a long time, and putting people and infrastructure into it has allowed us to pull through a lot of the science.

It is quite interesting that the leveraged income on that investment is running at around 5 to 10 to £1, so basically we are leveraging at 5 to 10 to 1. The initial leverage on that came primarily from an increased acquisition of grants that were in the system anyway, so we were more successful at getting MRC, Wellcome or charity support. In the last five years, I would say, we are seeing inward investment from venture capital and companies because of the infrastructure that allows them to collaborate more effectively. I recognise that this is different from the NHS across the board, but one area where we have seen a big change, and a very encouraging change in the context of this report, has been the NIHR investment into biomedical centres and clinical research facilities.

The Chairman: Are you saying that there is no issue with the NHS attracting innovations, or is it so patchy that only big hospitals and big academic centres do it?

Professor Bryan Williams: In the way it is structured at the moment it is heavily dependent on powerful universities in alliance with partner hospitals, which of course does not necessarily apply to the entire NHS. That is inevitable, because innovation requires skilled people and a culture of experimentation and innovation that you get in the higher education institutes, from which the NHS can benefit enormously, so you need partnerships between the health service and university-type structures to enable this to happen.

The Chairman: So if you, as a patient, end up in a big centre, you get treated with up-to-date innovations and products, but if you go to a smaller hospital you do not?

Professor Bryan Williams: In the way the health service will evolve because of the nature of the innovation that is taking place in therapeutics, it is inevitable that we will end up with some specialised centres offering highly specialist treatments, but it does not mean that the patients receiving those treatments receive them only if they live in that locality. Our centre, and this is true of many others, is doing clinical trials on the latest advances in the treatment of cancer, and many other areas and patients from all over the country are involved in those trials, either in situ with us or remotely as part of collaborative centres. It is about permeating and disseminating this kind of approach across the country by creating clusters, which is one of the things that the report alludes to and most people would support.

The Chairman: How many hospitals or trusts have a director of innovation or someone responsible for adopting innovations?

Keith Chantler: In some form or other, many trusts certainly have a director of research. Sometimes that is R&D, sometimes it is research and innovation, so there is an implicit role in many hospitals for that type of activity. It is certainly not universal, and it is much more prevalent in

the university teaching hospitals. The director of innovation has a specific role in the majority of Shelford trusts, which recognise that innovation is crucial to their business.

Dame Julie Moore: But that is patchy, and often it is a part-time job with a clinician being given one or two sessions a week to undertake that director of research role. Universally, development of innovation and research is not always seen as a priority, and too often the urgent day-to-day drives out the important and long term. From my perspective, given that we are so busy and facing so many changes with demography and a changing disease burden, it is more important that we develop these kinds of approaches to look for answers to these rather than trying to firefight on a day-to-day basis. Too often, the focus is on ED and cancer targets rather than on how we develop systems and treatments for the long term to prevent these things happening. We have to do the two in parallel, and too often the emphasis is more on one side than on both together.

Lord Fox: That is straying into exactly what I was going to quiz you on, particularly the private sector and the SME relationships rather than the public to public sector relationships. Would you describe the relationships as predominantly strategic and structured or predominantly tactical and serendipitous, in the sense that you have created relationships either because people knew people or because they bumped into therapies, or are there strategies in developing relationships and creating new therapies?

Dame Julie Moore: From my perspective, all those exist for a variety of reasons.

Lord Fox: But which one, predominantly?

Dame Julie Moore: They started off being very tactical and serendipitous and have developed far more into longer-term strategic relationships, certainly with the big charity organisations, which take a longer-term view of it. We have developed some longer-term relationships with some of the smaller SMEs, but they are relatively small.

Lord Fox: I am trying to get a picture. Are you going out and looking for particular therapies with particular SMEs that deliver those therapies, or are you saying, "Oh, that looks like a good idea. Why don't we have a relationship?". Is it predominantly proactive or reactive?

Dame Julie Moore: From my perspective, it is much more the former.

Professor Bryan Williams: We are very proactive. A big strategic objective of ours is to engage more effectively with industry in a more fundamental and less transactional partnership. Industry is changing. Pharma et cetera is now structured in a way that shows that they have recognised that much of the innovation that is taking place now cannot be bought or hired in-house. It has to be in partnership with higher education institutes and healthcare providers. That allows them to do this in a more effective way.

There is a third element, which is home-grown industry. We are beginning to see real spin-outs coming from within the organisations. In our own structure, for example, we have two or three spin-outs which we are hopeful will become fairly major companies. They already have very significant capital investment outside the traditional grant support structure, so that is very much a strategic objective: bringing income into the system and developing our own science in companies as well as partnering with SMEs.

Keith Chantler: We reflect very similar circumstances. We are increasingly seeing a 180-degree turnaround from the technology push in that the NHS is starting to articulate to the companies, both large and small, the areas that we want particular innovations in. It is asking them to co-develop with us through programmes such as the small business research initiative or the i4i programmes. Where they have readymade innovations, we can evaluate them against criteria that we set, which helps us to make decisions about procurement and implementation.

Baroness Neville-Jones: I want to pursue what Professor Williams was saying. You used the phrase “we populated the gap”. What kind of qualifications do the people have who helped you to populate that gap? How did you get that going?

Professor Bryan Williams: That is an important point, and it has been most important, from our point of view, in relation to transformation. Ten years ago, if an industry partner wanted to engage with an organisation, it was extremely difficult for them to navigate the processes, and even when they did engage, the amateur nature of the commercial interaction with industry was, quite frankly, almost embarrassing, because we did not have the skill sets to proceed in the way they wished to proceed. We transformed that by creating tech transfer-type companies. A good example locally is UCL Business, which was spun out of UCL. It employs many people who have expertise in licensing, IP, venture capital and commercial transaction. They act on behalf of UCL and other partners, such as the University College London Hospitals and the Royal Free Hospital, and provide expertise at the interface between an industry partner and an academic or NHS organisation to try to make the contract work more effectively and to proceed at pace.

The second part of the infrastructure has been investment in people from industry who have had expertise in taking a molecule or a therapeutic innovation into a patient for the first time, developing those protocols, interacting with the MHRA and providing the professional level of organisation, which we call a translational research office. Once you put those structures in place, they allow an academic, who does not have the time, or quite frankly the desire, to get involved in these business interactions, to hand this over to a group of professionals who will do all the business work in the background and give us a better chance of appearing competitive. Because these industry partners are looking at people other than the NHS, they are looking outside the NHS, so we have to be competitive. That was one of the areas in which the investment has made a huge impact.

Q41 Lord Griffiths of Fforestfach: I would like to ask a question regarding regulation. In the evidence we received from the Shelford Group, I was very impressed by the following, and I would like your comment on it: "The regulatory approvals required, even for low-risk or non-invasive diagnostics, can often seem wholly disproportionate to the level of risk. We are currently at a disadvantage because it is easier to undertake animal research in other countries and pharma can more easily recruit patients to trials elsewhere". Could you say something about the burden of regulation and what you see as the prospect for deregulation that might come?

Professor Bryan Williams: What changed everything was probably the European clinical trials directive, which harmonised processes for approvals for clinical trials across Europe and had many good parts. The bad part was that it was a fairly inflexible structure, so it treated every intervention, however basic—even filling in a questionnaire—in the same way as if you were delivering a new medicinal product to a human being for the first time. Clearly, the risk is completely different, but the regulatory framework was not proportionate and has not changed. There is now quite a considerable effort to remove some of that regulatory burden, particularly for lower-risk processes, and to make it more proportionate. Perhaps one of the things that will come from the work on Brexit and everything else is an opportunity to try to create a trials framework that is more proportionate to the risk, because at the end of the day the regulation is all about protecting the patient, so it should always be proportionate to the level of risk. That has been a problem.

The Chairman: Are you saying that the UK has a different regulatory regime for clinical trials from Europe?

Professor Bryan Williams: No, it has the same as the rest of Europe.

Lord Griffiths of Fforestfach: So there may be a silver lining in Brexit.

Professor Bryan Williams: Maybe one.

Keith Chantler: We need portability of the development of medicines and diagnostics across Europe and into other markets. One of the things that the clinical trials regulation has done is set common standards across all types of products, from interventional medicines to diagnostics and data-driven innovations, but they all tend to lean towards the same levels of evidence, often randomised controlled trials, which, for many of the new types of medtech and precision medicines, are not necessary. We have to adapt the way we carry out the clinical trials and the evidence that we find acceptable on which we make decisions.

Lord Griffiths of Fforestfach: In relation to the US, does this put us at a significant disadvantage?

Professor Bryan Williams: Certain things in the US are more difficult than they are here. For example, going into man for the first time with a new innovation is often easier here than it is in the US, but it is very patchy and not easy to compare the two. We need to look at the fact that the regulation was developed on conventional old therapeutic moieties, and we are now looking at completely different approaches to treatment.

We have targeted therapies where we know that the therapy is more likely to target a particular pathway because of developments in precision medicine, so the safety profile is likely to be easier to predict. We also have computational modelling and other ways of looking at and assessing risk, so we can simplify trial regulatory processes going forward. This should be a major piece of work in the life sciences strategy. We have to try to make ourselves more competitive by having a more balanced and proportionate approach to trials.

Baroness Young of Old Scone: I am intrigued to hear about the comparison with the US issue but on a different strand. The model that we have here, which is of a tightly cost-constrained NHS service where the primary drive is to not to spend money on new things, with the needs of an effective research and innovation strategy to have that ready market to grab innovative stuff as it comes through is that the primary difference between us and the US? Do we have a model that is basically stuffed, if you will pardon the—

Professor Bryan Williams: Technical term.

Dame Julie Moore: We welcomed evidence to that effect in the life sciences review and accelerated access review, but there are contradictions in some of the approaches. We all agree that accelerated access to new therapies with a proven benefit is great. I forget the exact name of it, but the cost cap that has been put on it—that if it costs more than £20 million in a year it is deferred—is a disincentive. So it is not accelerating at all. Instead of accelerated access it actually decelerates if it is going to cost more. We have to get far better at looking at a longer-term view of what it will do overall. We are very short term in the NHS and look at the current year's budget, but we do not look at the long-term implications of what is going on, so your point is right: there are contradictions there, but we would welcome it.

Professor Bryan Williams: In the US, they see innovation as a mechanism of increasing business within the healthcare system. We probably see it as a mechanism of increasing cost. That is the fundamental difference.

Q42 **Lord Hunt of Chesterton:** NHS England talks of “additive innovations” versus “substitutive innovations”, with the latter perhaps being more beneficial to the NHS. We have received evidence that even substitutive innovations are often not taken up due to “budget siloing”. How can this be addressed, and how do you budget for the adoption of innovations? I imagine that there is a training element and that academic and specialist staff will have to learn about these new approaches and how they work.

Dame Julie Moore: We are always grateful for the addition of new words to our vocabulary. Normally, most things that come along are additive—things are never removed but added—and we have to get better at that. There is an issue, and I welcome the introduction in Sir John Bell's report from NHS England's Simon Stevens that, “We welcome the life sciences review”, but often that does not filter down to what happens at the local level. You will get local commissioners talking about

excess costs when you introduce an innovation. When you are taking part in trials you might need additional scans, additional appointments or additional tests, and they are considered excess costs. Often, the commissioners are unwilling to support an organisation doing that, which is why the life sciences review and the accelerated access review talk about recognising that when you are getting something off the ground in that way, there is additional cost both in staff training, as you say, and in additional tests and investigations, so it has to be an overall strategy.

On the additive/substitutive bit, we are never very good at stopping doing things. We do more things and we still do the old things, which just happens.

Lord Hunt of Chesterton: There are hospitals all across Europe. When you have an additive innovation, do you immediately ring up X, Y and Z to find out what they are doing in this area, or do you proceed secretly because you hope to get some commercial benefit from it?

Dame Julie Moore: Mostly, it is not secretive. Clinical staff are, by nature, collaborative. Certainly, my organisation belongs to a lot of international organisations where we share best practice in medicines, research, surgery and a whole range of things, so we understand what is happening, but there are innovations that happen. I started my clinical career many years ago, and I remember the first time an MRI scanner was installed, which was about a mile long and weighed 15 tonnes. Now, nearly every patient gets a scan, because that is the way things have developed and the way medicine has gone. So some things are additive for the right reasons, and it shortens pathways in other ways.

Lord Kakkar: Would it be fair to conclude that the life sciences strategy has little chance of having the impact that it could have if there is no properly defined budget in the NHS for the adoption of innovation?

Dame Julie Moore: It is the budget and a strategy that encompasses it, and that it is not a siloed thing over here. We have had life sciences strategies before and we need to make sure that this one is real, is implemented and becomes a part of everyday life for the NHS.

Lord Kakkar: So what is the pathway for the NHS in getting to that place? What steps should be taken now, the report having been published, to achieve an understanding of the quantum of budget that needs to be made available, and over what period of time? How does that become not a siloed entity but a fully integrated part of the delivery of healthcare in the individual health economies?

Dame Julie Moore: I will let my colleagues answer that question, but I will say that we need to recognise that our current problems will not be solved by us all running faster and faster, doing the same things over and over. We have to invest in research and development if we are to tackle these problems long term. The urgent day-to-day problems cannot drive out the important work of developing new therapies, techniques and ways of keeping people healthy, so we need a strategy that recognises the importance of doing this and sees funding that helps to develop new therapies and techniques and that works in partnership, not as an

additional cost but as an investment for the future health and wealth of this country. One of the things that is very striking about Sir John Bell's report is that the life sciences industry is worth £64 billion to this country, yet we often think about the NHS, and it is often portrayed, as a drain on the taxpayer. It is actually a huge contributor to the wealth of the nation.

Professor Bryan Williams: It is probably the key issue. I have a helicopter view of all the innovation that is going on across a number of organisations, and you can see the potentially disruptive transformational changes that could result from some of the things that are happening, and they are happening very quickly, yet you wonder where the horizon-scanning in the health service is going on that should be saying, "This is coming down the track. How we will adapt to this? How will we cost this into our future projections?"

The second issue is what industry would say: "Even if we give you something, work together and develop something that is truly transformational, somebody down the track will say, 'We're not going to pay for it', because they do not share the same ambition or the same focus on change as perhaps the people who are driving the change at the other end of the pathway".

One way in which you could approach this, and the report alludes to it, is the innovation cluster-type model. For example, you could have a medtech cluster, a diagnostic cluster or an advanced therapy cluster and say, "Within those clusters, we will both invest in the science and the infrastructure that is necessary to take this to patients and commit to investing in taking this right through to development in a defined number of centres to fully evaluate whether it will be cost-effective within the health service and allocate budgets that can be competitively bid for to allow that to happen". In other words, you have to inject cash into the system that will allow this innovation to be translated through to the broader system. Then, of course, it will be up to politics ultimately to decide whether they want to pay for that on a bigger scale, but it has to be a scaled process.

Keith Chantler: The original Accelerated Access Review talked about innovation hubs—and this was reiterated in Sir John's report—that would bring together a system of tertiary hospitals, primary care, secondary care and social care. Many of the innovations that we seek to bring in have impacts along the patient pathway, and trying to innovate in one particular organisation ignores its implementability and the impact and consequences downstream. Funding into systems, ecosystems, innovation hubs or clusters is generally a more productive way to get innovations embedded and working in practice.

Lord Vallance of Tummel: We are getting the picture that this is a short-termist organisation that is cash-constrained, and that although additive innovations might give you a better return than substitutive innovations, they are not necessarily taken on because of the cash constraint. That is the key thing. If it were a commercial organisation, you would borrow against that. If you have things that have good returns and you are cash-constrained, you will borrow. Is there an argument perhaps for borrowing

in a relationship not just with a cluster but with particular trusts or perhaps numbers of trusts working together to finance innovation? If you were a university, you could borrow.

Dame Julie Moore: There are very strict rules on NHS trust and foundation trust borrowing. I was sitting here dreaming of the ability to borrow and invest in things that I know would have real patient benefit, but I cannot borrow at the moment. As a nation, we must consider how we do it, because we are talking about long-term investment, and the point is made in one of the reports that many times the origins of chronic disease start many years before patients develop symptoms of them. So we need to go back 20, 30 years for the benefits to come through in some things, but that is a worthwhile investment that as a nation we need to make.

The other investment that we need to make is in the workforce, because there are significant changes for our clinical staff in the changes that we are talking about now, and we have not recognised that in workforce planning for the future. There are significant implications for, say, pathology staff in the new genomics and artificial intelligence technology that is coming along, which we are not planning for in our workforce planning at the moment.

Lord Maxton: Does this go back one stage further from you? Yes, you have the problem of not being able to borrow, but Britain has a finance system that does not allow money to be invested in innovative industries. Is that right?

Professor Bryan Williams: Five years ago, we were having huge problems trying to get venture capital into what were really very exciting innovations coming out of the biomedical centre. We knew they were going to be potentially capitalised in the future once we had de-risked them, but high-risk investment was very difficult in the UK. In the US, it is completely different; they have many different structures to fund and de-risk projects and they come in with much less dilution. Where we were able to get investment, which was investing in something that had a 50:50 chance of succeeding, it was a very diluting investment. In other words, they were reducing their risk by taking a much greater equity share, so these were challenges. It is changing, and because of the success of some of the innovation that is happening, more and more investors are coming in.

The other thing you need in healthcare are evergreen investors, people who do not want to make a fast buck. These things take five or 10 years in evolution, so we are looking for some of the evergreen investors to come in and recognise that they are in for the long haul when it comes to getting a return on investment, but the return on investment is potentially spectacular if some of these things come to fruition. We have to look to fiscal policy when it comes to how we incentivise people to take a risk with investments, particularly on British innovation. We need to get fiscal policy to recognise that ultimately there is a potential huge return on investment for the system if we can get investors to put money in at high risk.

Lord Fox: In a debate last night, the Minister highlighted institutions trying to hold on to too large a share of innovation. You talked about dilution. He was talking about it the opposite way as one of the things that slowed down innovation. Do you accept that analysis and that in a sense you are trying to hold on to too much, which inhibits the venture capital drive that would speed things up? In a sense, that is the opposite of what you just said.

The Chairman: This was particular institutes of higher education.

Lord Fox: Yes, it was. You are right.

Professor Bryan Williams: One thing that we discussed earlier, which is important, is that the contribution of the NHS to scientific innovation is undervalued. Generally you have a higher education institute and an NHS partner working in close unison, and the higher education institute will have developed some of the discovery science, but the ultimate prize is dependent on both working together and assets within the NHS being utilised to deliver that to the market and create a value. For many years, the IP was held almost exclusively by the university. Through the biomedical centre, and again driven by the NIHR, we have created a 50:50 arrangement in that if it is based on translation into patients and there is tremendous involvement of the NHS organisation in that process, the equity share should be shared between the higher education institute and the NHS because they are working in partnership to deliver transformational science, and one cannot do it without the other. We need to get the NHS to begin to realise some of the value of this innovation flowing from universities through having a shared IP.

Q43 **Baroness Young of Old Scone:** You have already answered some of the issues about the accelerated access review, although a moot point might be why it has taken the Government a year to come back on it, which does not seem very accelerated. The question that fascinates me is that if the accelerated access review were accepted and implemented, and if somehow the changes in the approvals process that have resulted in the budget impact test getting in the way and going in the opposite direction of acceleration were resolved, would there still be the problem that individual trusts decide whether to implement whatever it is, or does the accelerated access review mandate trusts to implement, and should trusts be mandated?

Dame Julie Moore: I do not think that trusts would be mandated, but we are increasingly seeing defined clinical pathways being set where, if the patient has condition X, this is the pathway and these are the drugs to be tried. I do not think anyone would ever move away from clinical judgement for individual patients. Increasingly, as Keith said, when you get into the personalised, stratified medicine, a whole range of choices is opened up to people. One of the other problems with accelerated access to some medicines though is that if you are looking at a medicine that will have a long-term impact, you might have a double running while that one picks up and another one comes down. We have to recognise those costs in what we are doing, and I am not sure that has been recognised yet. I am not sure about mandating that a patient with this condition should

always have whatever drug as people are too individual for that, but I am not a prescriber.

Keith Chantler: The accelerated access review does not stand alone; it is a mechanism where some high-impact or transformational innovations might be identified and then introduced to the system for uptake. There are other schemes around such as the NHS Innovation Accelerator, the NIHR Test Beds, a whole slew of programmes pushing new innovations and new opportunities towards NHS Trusts, primary and social care. We have to manage expectations, and we cannot do everything. If the AAR starts to cohere, coalesce and integrate some of those innovations into packages for us, we will be able to deal with them, but we still get this scattergun approach of pushing everything towards the system, which will be overwhelmed.

The Chairman: What will the effect be if the accelerated access review is not implemented?

Keith Chantler: We would miss the opportunity that it offers to put focus and resources into innovation that might help us to get a system change. It is not about the individual innovations that come down; the AAR introduces the potential for system change.

Professor Bryan Williams: Culturally, the external perception would be very difficult, because industry has been looking at this and was heavily involved in the development of this concept. If it felt that there was backtracking away from recommendations that had been endorsed and accepted by a broad group who want to see this happen, it would send the wrong message about the system in which we operate and its acceptance of innovation.

The Chairman: That is an important point.

Baroness Neville-Jones: I just want to clarify the point about mandating. My understanding of mandating is not that clinical judgment would be interfered with and you would be obliged to prescribe it, but that it would be available for prescription and for use. In other words, the issue is availability.

Dame Julie Moore: Yes, that would be fine.

Baroness Neville-Jones: At the moment, for NHS trusts with day-to-day budgeting and so on, it simply does not get the money behind it, even though it has been approved. Does that not happen?

Dame Julie Moore: It happens, and at times it happens differently in different parts of the country, as there are still different mechanisms sometimes for how things get approved.

Q44 **Lord Fox:** A lot of store is being set on the ability to marry the industry with data in the NHS. With this level of innovation in patient data, is the NHS prepared to release data to businesses undertaking health research, and frankly, if it is not, what does it have to do to get there as quickly as possible?

The Chairman: You might add to that if you think the NHS widely is

digitised.

Professor Bryan Williams: The NHS is not very digitally mature, but the opportunities from digital maturity in the NHS are enormous. We talk all the time about having a unique system. It is unique in the sense that almost the entire population is covered by a single healthcare provider from birth to death, and we have comprehensive records somewhere on everybody. The ability to utilise that for drug discovery, monitoring the effectiveness of treatments and understanding the underlying basis of disease is enormous, and we have not realised that potential.

One comment to make about data is that a huge education piece on NHS data is needed. There is a sense that there is something special about NHS data as opposed to any other private data that we all have available to us. To give an example, if you were banking and buying something, and you were contacted by your bank to tell you that an unusual purchase had been made against your account, you would not throw your arms up in the air and say, "How did they get access to my data? How are they aware of what I'm doing?". You would see it as a valuable contribution.

Unfortunately, I do not think we have yet won the argument about utilising NHS data to learn more about the population and public health and the effectiveness of treatments to help develop new treatments, and the benefits of utilising that data in that way have not been articulated effectively. There is almost a visceral resistance whenever you talk about utilising data for purposes other than the individual care of that patient. As long as we put appropriate governance and safety around it, we are sitting on an enormous asset capable of improving health and generating a life science economy.

Lord Fox: Is that asset in itself an inhibitor because it is such a big asset and such a big hill to get over in order to digitise it that we never get there, whereas if we were to start afresh now we would stand more chance of having digitised data than if we headed off trying to deal with the legacy information?

Dame Julie Moore: I speak as one who is considered in the NHS to be digitally mature.

Lord Fox: Congratulations.

Dame Julie Moore: Thank you. We have been running electronic systems for some time and we have all that data, and there are several points to say about it. One is that we have not won the public argument about NHS data, and we need to. We run completely electronic systems for our outpatients and we treat over a million outpatients a year through the QE. Each time we ask consent: "Are you prepared for your name to be used and put up on all the tables?" In all that time, we have not had one person in about five million patients say no.

Lord Fox: Was that starting afresh, or did you upload what was there already?

Dame Julie Moore: It is hugely complex and we do not have time, but we run a completely electronic system, so we have all the patient data that comes in there and data going back 15 years of every patient treatment that has gone on, and the rest. When explaining to patients why we are doing it, we have never had a patient say, "I don't want that done with mine". If you explain to people the danger that clinician A having this information but clinician B not being able to see it might put you at risk if you are ever admitted, people understand that, but we have created this scare story—I do not know how or why—about digital data. There is huge potential. We have 15 years of data on every patient and every drug given every time for researchers to use, and they use it all the time. People are very accepting of it and accept that it is not just a good thing and a way of writing things electronically but that there are huge research benefits, and that it changes the way you can do research.

Lord Fox: You do not have to convince me.

Dame Julie Moore: No, but we have to convince the public, and I do not know why we have made such a bad job of it, because when we deal with individual patients in a hospital, we do not have an issue.

Professor Bryan Williams: The utilisation of data will be more transformative than anything else in the life sciences document.

Lord Vallance of Tummel: It seems to me that you are suffering from all the disbenefits that we have been talking about without getting the benefits that you should have as a national organisation. You have touched on one element, which is anonymisation. Anonymisation is not too difficult, and if you know what Google or Facebook have on you versus whatever could come out of the NHS, it pales into insignificance, so I would have thought that you could get over that hurdle.

The next hurdle is that you must have common platforms and you do not, but you could plan for it. The next hurdle is that you need common codification of whatever you are trying to codify and you do not, but you could plan for it. If you had those three—anonymisation, common platforms and common codification—you would be sitting on a gold mine. The issue then is: do you commercialise the gold mine or not? Perhaps the benefits of that gold mine should go to the NHS or perhaps the NHS should be free at the point of delivery.

Professor Bryan Williams: The concept of commercialisation is interesting in itself in that you can gain huge efficiency gains from working with partners to help you use data to improve systems. We are working with a number of organisations with expertise in artificial intelligence and machine learning to try to completely transform some of the things that we do in hospitals, which will also, incidentally, transform the roles of doctors and others in organisations. That can be done in partnership with both sides valuing the contribution of each other, so I agree with you that this is potentially transformative.

Lord Vallance of Tummel: It is doable.

Professor Bryan Williams: Absolutely.

Lord Vallance of Tummel: I have done it in a big organisation before and it is transformative.

Lord Kakkar: To come back on Lord Vallance's point, why cannot NHS organisations agree on a common platform and a common approach?

Dame Julie Moore: Somebody once said that there has never been a business plan for the worldwide web or the internet, but all the providers make sure that everything is interoperable. I do not need to say to you, "I'm on Gmail and I can't email you if you are on Yahoo", as they all relate to each other. With quite a lot of the stuff we are sold, there are often commercial issues behind it. One of the problems that we have with IT in the NHS is that we had Connecting for Health, and it was such a big programme and seen as so complex that it has frightened people from going down the path of trying to digitise and be electronic and get all the rest in, because people are scared: "If such a big, high-profile organisation with so many experts in it did not deliver, how can I, as a chief exec in St Elsewhere, implement a system?" I see chief exec colleagues who are scared of IT and big systems because it has been such a big national failure, but it is not that scary and we use it in every other aspects of our lives. You do not say, "I'm not going to buy a plane ticket because I can't walk in and get a paper ticket any more". We have made it a big ogre and we need to take the frightening bit away from it and show people that it has so many patient benefits. It is the patient benefits that drive me in developing this and it is not as hard as it seems for some people, but we need to make it easy for people to understand it.

Professor Bryan Williams: It is not just about the systems either. Patients now are all using wearables, and we are only a few years away from people having self-monitoring devices at home and various things. This will have to be integrated into healthcare systems. The only thing that will not be digitally mature is the prime system itself, which is the NHS.

Dame Julie Moore: But we have to make sure that the whole system recognises it. We now have some kind of digital tariff, but when we started doing virtual outpatient appointments using video-conferencing with patients we were told, "The patient has not turned up and we are not paying for it", so the system has been slow to respond to digital innovation. We let patients access their own records and do a whole pile of interaction, but we have had to develop that out of research and other funding; it does not come via the NHS. As a tertiary centre, patients travel many hundreds of miles, as you are aware, and if we can save a patient making a journey, when we have lots of reports about pollution and diesel particles, it contributes overall to the nation's health anyway. If we do not recognise that and incentivise trusts to do that, people will be slow to take it up. In the first year after we introduced virtual outpatient appointments, we lost £400,000.

The Chairman: Because the commissioners would not pay for it.

Dame Julie Moore: Yes. They now pay for it, but they did not in the first year we did it.

Q45 **Lord Renfrew of Kaimsthorn:** Do you feel that financial incentives, such as best practice tariffs, could be useful for National Health trusts that show rapid adoption of innovations?

Dame Julie Moore: Yes, that is a way forward.

Lord Hunt of Chesterton: I am an academic and I know about consulting. You have this discussion between an academic and industry: "Will we pay you as a consultant or will you take equity?" It strikes me that that creates difficulties, because the moment you start having an interaction between the NHS and some private sector company, pretty soon, presumably, the conversation arrives: "Shall we pay you for your work or do you want equity?" Do you have a general principle for that, or do you have to go through negotiations every time you talk to a private sector person, and does this not often lead to a slowing down of the application?

Professor Bryan Williams: We have those discussions all the time, as you say, and no one outcome is identical to another; it often depends on the individual arrangement between an academic and a company. The important thing is that it is all done under an appropriate governance framework and is completely transparent, and that there is a policy for managing conflicts of interest. If, for example, you are the inventor, you have your equity and that device or intervention will be tested in the NHS and you can have no part to play in that process of evaluation and testing, so all organisations have those processes in place. The advance that we have had is the sense that people who are innovative and come up with ideas that are potentially transformative should be rewarded. In the past, scientists and innovators in universities got a very poor return on their own individual contribution to innovation, but that has changed and the balance is now much more in favour of the investigator and the innovator than it used to be.

Keith Chantler: That is starting to play out equally with the NHS in parity, and it brings us back to the question you asked before, Chairman, about the distribution of equity and whether our institutions are holding on to too much. Sometimes they do, but increasingly they are starting to share it with the innovators as well as the institution.

The Chairman: Thank you very much, all of you, for coming and helping us. It has been most helpful.