HOUSE OF LORDS

Select Committee on Science and Technology

Corrected oral evidence: Life Sciences and the Industrial Strategy

Tuesday 13 March 2018

10.03 am

Watch the meeting

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

Evidence Session No. 27 Heard in Public Questions 286 - 295

Witness

Professor Tony Young PhD, FRCS (Urol), National Clinical Director, Innovation NHS England.

USE OF THE TRANSCRIPT

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

Examination of witness

Professor Tony Young.

Q286 **The Chairman:** Good morning, Professor Young. Thank you for coming to help with the inquiry today. Unfortunately, we have a strict time limit of 45 minutes. I hope that will be enough for what we want to explore with you, which is the role of the NHS in innovation. Would you start by introducing yourself for the record and saying what your position is?

Professor Tony Young: Certainly. I am a practising urological surgeon and consultant at Southend hospital in Essex. I have been there for the last 10 years. I am also the director and chair of medical innovation at Anglia Ruskin University. I am the president of the Institute of Decontamination Sciences, which is the group that represents most sterile services within the NHS. I am an independent commissioner on the Commission on the Future of Surgery at the Royal College of Surgeons. I am the national clinical lead for innovation for the health service in England.

The Chairman: So your main role is in innovation and entrepreneurship in the NHS and your appointment to NHS England.

Professor Tony Young: The beauty of my role is that I am still a front-line practising surgeon. I lead for innovation in my hospital, in my STP in a regional role and nationally, so I bring a perspective right across the health service.

Q287 **The Chairman:** I will kick off with the first question. We have heard time and time again in evidence that the NHS is poor at adopting innovations compared to other health services, and that might affect patient outcome. What is your view? Is the health service poor at adopting innovations?

Professor Tony Young: There are a number of levels and ways in which you can answer that question. It is quite a complex question. It is very easy to jump to a technical solution, by which I mean a cognitive rather than an adaptive solution. As an organisation, the NHS is the fifth largest employer on the planet. It has over 1.4 million employees. These are real human beings with thoughts and feelings.

Sometimes people put up technical solutions and say that the NHS is poor at doing this or poor at doing that. My experience as a clinician, an academic and a national leader in innovation is that if you win people's hearts and minds, things tend to happen and get taken up. I suspect that you could fill libraries with books written on innovation and failures of innovation, but I would direct you to what we are doing now actively at NHS England and give you some concrete examples of the NHS being world leading in adopting innovation. We will go on to those.

First, though, people say that the NHS does not have a track record of being an early adopter in taking things forward. Can we always do better? Yes, we can. Do we have a whole load of priorities, some of which are competing, that we have to deal with in delivering front-line services?

Yes, we do. Are the clinicians and managers who I know and work with in the NHS passionate and committed to driving change and improving patient care and the quality of care? That is why they go to work day in, day out. It can be quite easy to stand on the side lines and judge.

I often quote to my clinical entrepreneurs, which is the programme I run, Theodore Roosevelt's "the man in the arena" speech—I am sure you are familiar with it—in which he says that it is not the critic who counts, it is the man who rolls up his sleeves and gets in there and keeps going and going. I hope I am one of those front-line people who keeps going.

To give you a concrete example of innovation, last year we launched the innovation and technology tariff at NHS England. My chief executive Simon Stevens announced that just over a year ago and it started in April of last year. There is a device on the tariff called the UroLift. I am a urologist, so I am familiar with it. I call it a tieback for the prostate. As you grow older, your prostate grows into the middle and obstructs the water pipe. The prostate is a bit like a ring doughnut with a hole in the middle, and the hole closes up as you get older. It is not quite as straightforward as that, but that is how it looks. These ties look like treasury tags and they can be inserted into the prostate under local anaesthetic and they pull it open. This is an additive innovation, because we have a number of gold-standard procedures such as laser prostate surgery.

The Chairman: It is very interesting to go into the details about surgery, et cetera. However, the question relates to the fact that we have heard evidence of fantastic innovations that will change outcomes for patients, but there is no centrally driven strategy of any kind that identifies appropriate innovations and says, "Now we will roll that out across the NHS".

Professor Tony Young: I do not think that is correct, I am afraid. I would not support that and I am not involved in that, certainly. This UroLift device costs more. These implants cost, I think, £1,200 to £1,400 to go in. NHS providers will lose money, but this is a men's health issue, and men do not want to have the sexual dysfunction side effects that go with prostate surgery. This is the first device that offers a solution to that. We put it on the innovation and technology tariff, and, in the first six months, 50 hospitals across the NHS have taken up this new procedure, even though it is more expensive.

NHS England has rapidly brought in a new HRG code—HRG codes are the national codes we charge by—to allow that procedure to happen. There are concrete examples of us adopting new things—this one comes out of Silicon Valley—and taking them up at scale across the NHS. Can we do better? Are there examples in the past where we could have done a lot better? Absolutely. Do we have mechanisms and strategies in place to help take those things forward? Absolutely, we do.

Q288 **Lord Renfrew of Kaimsthorn:** Following on from that, could you say a little more about the specific steps that are needed to make the National Health Service more effective as an early adopter of innovation and,

indeed, to be innovative and perhaps to work more effectively with industry?

Professor Tony Young: A number of reports have come out. We have had the accelerated access review. You will be very familiar with that, and NHS England is very supportive of that document. I believe that the oversight group for that met for the first time just a couple weeks ago to look at implementing that and how it will take the steps forward as recommended in that document.

We have a whole team at NHS England. You had my director Ian Dodge speaking to you for his team. He looks after the innovation portfolio of people who try to put the systems and structures in place. We are responsible for the academic health science networks. There are 15 of them spread across the country. I like to call them open innovation platforms; places where clinicians, industry and academics can come together and talk about the problems and issues and try to find the solutions for taking that forward.

So there is a change going on in healthcare at the moment, moving from the supply side, where industry used to say, "You make these great products. Why don't you just take them up?" to the demand side, where we are saying in effect, "We have some real problems and issues here. We don't have all the solutions ourselves as a health service. We need to work with you in partnership to help us take those things forward and deliver them".

We are doing that through a number of initiatives. You could look at our testbed proposals, which are scaled real-life examples of the NHS working with industry and academia to test and trial things as we move them forward. You could look at our national innovation accelerator, our clinical entrepreneur programme, our innovation and technology tariff and our programme moving forward. We have a number of opportunities to work with industry.

Is it easy? Is it presented on a plate? The challenges we face in healthcare are not easy or straightforward. The challenges faced when the NHS was set up 70 years ago next year included a range of acute conditions. It was very different from the problems we face now, when 70% of our budget goes on the management of chronic disease and long-term conditions. We need new thinking and new action if we are going to address the challenges we face now.

I believe we have the right leadership in NHS England that provides that system-level permission. Granting permission to the system is one of the most powerful things you can do to help to take things forward. Our chief executive is very supportive of that and of working in partnership with industry. We have put a number of programmes forward that will help us to deliver on that.

Is it easy? No. Is it all going to be done tomorrow? No. Is it a work in progress that I am passionate about, as are the people I know at NHS England and the people in my STP?

The Chairman: I think Baroness Young has a supplementary question.

Baroness Young of Old Scone: I am very old, so I remember the health service from 45 years ago when I first starting running it. I was always very impressed by the fact that in managerial and organisational terms, the health service was bit like a bunch of lemmings; you just had to say, "We're going to restructure in this fashion", and the whole organisation ran towards the cliff and did not just jump off it but did double back flips to show how proficient they were on the way down. It was disastrous but nevertheless effective in terms of implementation.

Yet we seem to be drinking in the last-chance saloon at the moment when it comes to getting very simple, cost-effective innovations adopted universally across the system. Bearing in mind that the "N" in NHS stands for "national", should we not now have universal mandation of proven effective care pathways and technologies? It is too late to depend on hearts and minds. Discuss.

The Chairman: Or just answer.

Professor Tony Young: What you have outlined is what I would call a very technical solution. You would think that in a command and control system you can do that and it will behave like that. As I have already said, there are 1.4 million employees in the NHS, all of whom think and, importantly, feel about things, and they go to work in the NHS day in, day out because they really care about what they are doing and about taking things forward. If you have the approach of mandating something and trying to push it down, you may not get the outcome you were expecting.

For example, in the *Innovation, Health and Wealth* report some years ago, a number of high-impact innovations were mandated down to the system. Some of the professionals in the system turned around and said, "Sorry, we don't agree with that and we're not going to do it", so it did not have the outcome that was expected. Permission is the most important thing you can give to the system.

There are some really important things, such as the NICE recommendations that come through. The system should adopt those. There are mechanisms in place for provider organisations to report how they are complying with NICE guidelines. Your ultimate goal is to change the system and for it to adopt and take things forward.

Some 175 years ago, there was a British writer who was passionate about changing child labour. He was going to write a pamphlet on this and it was going to change everything. Instead he wrote a novel, *A Christmas Carol*. I would argue that he changed Christmas in the whole world for everyone, because he won hearts and minds. He could have come out with a technical solution and mandated on child labour, or he could have won hearts and minds. I see my job at the centre as about winning hearts and minds. We can do that. Mandation can assist in certain areas, but is only part of the overall solution.

The Chairman: We now get to the main part of your role in NHS England.

Baroness Morgan of Huyton: Professor Young, can you tell us a bit

more about your job? When you introduced yourself, it seemed that you do myriad stuff, including the day job. Clearly, this is all an add-on and an extra rather than the core of what you do, so could you first tell us a bit more precisely what you do and what you are trying to lead?

Professor Tony Young: I would not describe anything that I do as add-ons or extras. I am passionate and committed and driven to changing healthcare, not just for our population but for the whole planet.

When I was appointed to NHS England just under four years ago by Sir Bruce Keogh, the medical director, he asked me to look at a number of things, not just the inequality agenda but growing the life-science economy in the United Kingdom and being an adviser to government, to arm's-length bodies, to industry, small medium and large, and to foreign Governments, who often approach the NHS and say, "What are you doing about innovation?". He also said, "Tony, I want you to make England the go-to place on the planet for medical innovation. You don't have any money or any power. Now off you go". Of course, that is an impossible ask. However, if you empower our most valuable asset, which is our workforce, you can make the changes.

The Chairman: What was your background before that?

Professor Tony Young: When I listed my previous roles, I forgot to mention that I am an entrepreneur. As a junior doctor I had to re-mortgage my house and put £150,000 I did not have into my first company at the age of 30. I have created four start-ups since then. I have raised about £5 million of private sector funds and exited them all, alongside doing full-time surgical training and my research PhD. I think that is why Sir Bruce asked me to come to the centre: because I had worked on both sides—I had created the start-ups, exited, and raised funding.

Q289 **Baroness Morgan of Huyton:** It is obvious that you are an advocate and in your world you know how to do it. I suppose that our scepticism as a Committee, having listened to weeks and weeks of evidence, is about whether any of this will spread beyond the relatively small group of people who are indeed very committed to it.

Bluntly, it is a bit telling that NHS England did not mention you and NHS Improvement does not even mention innovation. It is quite honest about the fact that it is not on its agenda. Nor have we heard about the technology tariff, which suggests to me that something is not working and it is not joined up, even at the national level. I take your point that mandation does not necessarily work, but having looked at the life sciences strategy, we are anxious to know if the NHS will genuinely be engaged in a way that makes that real.

Professor Tony Young: Could we always do better and do more on communication and joining things up? Absolutely, that is my experience, and I hope that is one of the reasons why I am here today: to give you that information and inform you.

Specifically talking about my role at NHS England, I had fought the system my whole life, essentially. I wanted to change patient health and care through business and enterprise, because I saw what was happening. I have this wonderful role where I get to step out of my vertical and look at the horizontal and what is going on in healthcare and life sciences across the whole planet.

There is a big trend occurring in the disintermediation of doctors. Increasingly, industry and businesses will provide services directly to patients and citizens. I saw this when I started my first company 20 years ago. When I started at NHS England, junior doctors started to approach me. At that time, they were manning the barricades on strike and were really discontented about what was going on. Some of them were so passionate about changing healthcare, but they were having to leave the National Health Service to raise money for their start-ups and take them forward. I persuaded Sir Bruce Keogh and my director Ian Dodge that we should support these entrepreneurs. We supported leaders and educators and a whole lot of other people.

Baroness Morgan of Huyton: Just so we are clear about your role, it is not about the system buying in to innovation that has been proven; it is to support entrepreneurs initiating innovation, is it?

Professor Tony Young: I have a very broad role in the system. I suppose I am one of the few clinicians at NHS England who covers the whole portfolio of technology, life sciences, genomics—all those things.

Baroness Morgan of Huyton: So what is the output?

Professor Tony Young: As I explained earlier, I am an adviser and I look at how we contribute to growing the life sciences. One of my specific outputs is that we proposed the establishment of the clinical entrepreneur programme. I was given a very small budget and told to see how we could support entrepreneurial clinicians.

In our first year, we appointed 104 junior doctors to the programme. They started up 50 companies, and between themselves they raised over £50 million, mostly of private sector funding, to drive those forward. They impacted over 5.6 million patients and professionals, and we turned a brain drain in the NHS into a brain gain, with 34 doctors who had either left or were going to leave coming back to work in it. Those are some very specific deliverables and measurables. The most important thing is that some of those young start-ups—

Baroness Morgan of Huyton: Is that programme still going?

Professor Tony Young: In year two, we have expanded exponentially. We are up to 230 people, and we have opened it up from junior doctors to all doctors, dentists and clinical scientists. Year three applications are open now, and I anticipate that we will probably get over 400. So we are growing year on year.

Later this summer, I expect to be able to announce at our end-of-year event that our first unicorn has been produced from this programme, although we will have to see if the financing deal goes through. I suspect

that four or five others are brewing. I spent some time with Sir John Bell recently while visiting an industry in Northern Ireland. We talked about this and he really got it, understood it and supported it. So people say your vision, your dream of four companies with a £20-billion valuation. Certainly it is a dream, but I do not think it is unachievable at all. I think we might surpass it, actually, if we get it right.

Baroness Neville-Jones: Can I ask you a supplementary question on the basis of what you have just been saying? I am not clear whether you regard your role as being to get innovation spread through the hospital system of the NHS or whether you regard it as getting entrepreneurs set up and doing things. They are two distinct functions. I think that what partly preoccupies us is the apparent inability of the NHS to seize these innovations and make good use of them.

Professor Tony Young: Again, there are quite a number of questions there. My role is to be the national champion for innovation; to be a front-line clinician coming to the centre and saying, "It is possible to do these things". We have noticed with our entrepreneur programme that by giving people both a badge of permission and a badge of protection to be innovative in the system has been the …, so this policy that we have created and taken forward, whats happened is that not only do have they wanted to take their innovations forward, these individual entrepreneurs haven taken not just ownership of the innovation but ownership of delivering the change within the system as well. They are doing that at scale.

I have some very specific responsibilities in relation to the entrepreneur programme. When I was appointed, my role nationally was to be a clinical lead, a figure in the centre who could help to connect and network people across the system and who could help inspire people by saying, "Do you know that we have the largest and longest-established healthcare system in history. If there is a place on the planet to innovate at scale, the National Health Service is it. How can you come and work with us, and how can we work with you to unlock the real potential we have here?" No other country has it. If you go to the United States, it is a fragmented system. Private hospital groups cannot bring it all together. We now have the world's largest entrepreneurial training programme for clinicians from the National Health Service, and we should be celebrating this.

The Chairman: That all sounds good, but what should we be celebrating, because we do not innovate to the same extent as the United States, Japan or Germany?

Baroness Neville-Jones: The issue is adoption. That is my point.

Professor Tony Young: It depends how you define innovation and how you want things taken up. When you have such a large system, creating scale and innovation is not an easy, straightforward thing. If it was, the job would be done and we would not be meeting and taking this forward. There are a number of challenges that we face as we move forward. Is it easy? No, it is not. Am I committed and passionate and driven to making it happen? Yes.

Lord Hunt of Chesterton: You mentioned the interesting innovation in urology and said that you imported some key ideas from Silicon Valley. Is a significant proportion of these new innovations imported? My other question is: if they are so new, are you in fact exporting some of these new developments?

Professor Tony Young: That is a great question. In the NHS, a horizon-scanning centre has now been set up at the NIHR at the University of Newcastle, which is looking at the latest greatest things that may be coming forward. We get lots of approaches looking at these things. We have open calls for people to submit their ideas and they go through an assessment process. We will look at any latest technology from across the world and see how we can apply that and take that forward.

With regard to exports, when I started at Anglia Ruskin University we wanted to build some science parks in Essex because we had none. If we could create the translational infrastructure so that anyone from anywhere could come and we could help take their idea or process forward, perhaps we could help to change the healthcare of people on our planet.

I carry round my iPad in the FlipPad case, which is the world's leading sterilisable case for use with tablets—smartphones will come on board shortly. This came from the chief information officer at Broomfield Hospital in Chelmsford, and a factory based in Birmingham now manufactures them. In its first full year, which it has just completed, it sold, I think, 10,000 units, mostly to the United States, which means that over 80% were exported. This is the only one of these devices on the Apple store at the moment. They are fully useable. They have ion porous glass and can be sterilised, so surgeons can now use them in the operating theatre.

One of the most important examples came from a trial at Great Ormond Street in the chemotherapy suite. Children who were having chemotherapy could have access to an iPad. When I was asked by the CEO, "What do you think the children did in that study, Tony?" I said, "Well, if it was my lot they'd be on the internet playing a game, watching YouTube, surfing for something". He said, "No, they Skyped their grandmother", because what child having chemotherapy would not want to be comforted by their grandmother, and what grandmother would not want to comfort the child?

The point is there is an emotional connection with a piece of physical technology that enables it. The Texas Children's Hospital and a variety of other hospitals in the United States are putting in orders for hundreds of thousands of these things.

Q290 **Lord Mair:** In his strategy report, Sir John Bell talks a lot about incentivisation: incentivising clinicians, academics and scientists. Previous witnesses have told us that clinicians working in the NHS struggle to find the time to collaborate with academics and industry, because they are all incredibly busy doing their job in the NHS. How does your entrepreneur

programme address this? How do you incentivise clinicians to find the time? How can they do that?

Professor Tony Young: There are two parts to that that I would like to comment on. I think you heard from Chris Whitty at the Department of Health. I am sure I recall him saying in evidence that we are the most research-active healthcare system on the planet. We are certainly one of them, if not the most. Therefore, clinicians are finding time to take things forward.

Clinicians do not go into medicine—I did not and I cannot think of a colleague who did—because they want to clock in and out. We are passionate and committed about changing healthcare and improving things. I think we are the most research-active nation, so we are finding those ways forward. Are there barriers and impediments? Yes, there always are, but we are smart, committed people and we find ways of working with the system to take that forward.

On the entrepreneur programme, dealing with your point specifically, I had to win the hearts and minds of Health Education England. Doctors are trained in a very fixed way, and being an entrepreneur in the system was not in the *Gold Guide*, which is the national tome by which postgraduate medical education is regulated. By suggesting we should have time for entrepreneurialism in the NHS, we won the hearts and minds of Health Education England. It has become our partner on the programme and our ardent supporter. Now, clinicians who come on this programme, if they are in training, can say, "Could I take three months, six months, a year out from training to concentrate on my enterprise? Could I work part time clinically while I am doing that?" The most important thing is, "May I have permission?"

The Chairman: When they step out to do this entrepreneurial thing, who fills their clinical job?

Professor Tony Young: One important aspect of the programme is that we do not guarantee people the ability to take time out. This has to fit in with the clinical rotas and service provision where they are. Our entrepreneurs are quite understanding of that. We have a flexible approach. We allow flexible training for a whole variety of reasons so that people can develop their careers moving forward, whether that is education, training or leadership, and we are now allowing that for entrepreneurship, too. That is fantastic. We are the only country I am aware of that has done that nationwide.

Lord Mair: Can I pursue this a little more? When I asked that question, you said that lots of clinicians are doing research. That we understand. The real question is: how many of those clinicians have the time then to collaborate with industry, and indeed with universities, take their research into commercialisation? That is the real question here. What proportion of those many clinicians who are doing research have the time and opportunity to collaborate with industry?

Professor Tony Young: I am afraid I do not have the answer to that question. I am unaware whether a national survey has been done looking

at that interface. The NIHR looks after our academic and research community, and the question as to how much of the work is funded and how much support gets translated might be best addressed by it. I am afraid that I do not have that figure.

The Chairman: Does this programme apply only to doctors in training?

Professor Tony Young: It applies to all clinicians in the NHS. We have opened it up to nurses, allied health practitioners, pharmacists, clinical scientists, dentists. Anyone who is a clinician in the NHS can now join us. Applications are open until 31 March.

The Chairman: And they can all take time off work.

Professor Tony Young: That will vary. It is negotiated on a case-by-case basis. Some young entrepreneurs have gone in and tried to say, "I'm an NHS England clinical entrepreneur and you need to give me the time off". They have tried to mandate something, and antibodies have been raised in the system and they have been pushed back. I have taught them to go in and win hearts and minds, and more and more of them are getting the time to be able to be entrepreneurs within the system.

Baroness Morgan of Huyton: Listening to that, I would say that it is great where it works, but the problem arises in it moving beyond a few centres of excellence and really being prevalent throughout the system.

Professor Tony Young: Our clinical entrepreneurs are present in almost every provider organisation across the system.

Baroness Morgan of Huyton: To what extent do you think they are really having an impact? To what extent do you think that trusts that are under great pressure are going to give people sufficient resources and time? That is the problem faced by clinicians with regard to clinical research as well.

Professor Tony Young: Yes, I understand that, so let me give you an example. One of the most hard-pressed areas of the country that has been identified is my patch in Essex, the Mid and South Essex STP. My chief executive, Clare Panniker, has stepped forward and said, "Innovation is paramount if we are to deliver on the commitments we have made to our patients". She has launched an innovation fellowship which national clinical entrepreneurs can apply for. We will probably appoint about 15 of them and find innovations and enterprises that match with our priorities. We will see how we can support them to test and trial them safely and scale them within our system. Then we will work with our academic health science network partners to see how we can scale them across the country. So we are doing that.

Baroness Morgan of Huyton: Equally, we know that some academic health science partnerships are great and some are not. With great respect, you make it sound as though they are all marvellous, and we know they are not. How can we drive the system so that things happen faster and deeper? That is our anxiety. When we had Sir John Bell in front of us, he was really clear: he thought there was a limited time period in

which we had to take a step up as a country on this. If it is well meaning and very successful but in small pockets, how is that going to provide what is needed to really push the life sciences sector?

Professor Tony Young: I agree completely with Sir John Bell that there is probably a once-in-a-generation opportunity in the life sciences sector now. We are seeing this disintermediation going on in medicine, as I said. Ten to 15 years ago, there was a corporate fight over a number of things, and now there is one dominant search engine on the planet, one dominant marketplace on the planet and one dominant software provider for most computers on the planet.

Will there be one dominant provider in healthcare on the planet? Might many of the services that the NHS currently offers be offered by a technology company that is not based in the UK in the future? That is a possibility. There are some really big areas occurring, and you have spoken about them here, whether it is digital radiology, pathology or predictalytics. How can we bring the genome and smart data analytics of information from our big dataset and use those insights? How can we deliver public health in primary care, which is largely information exchange and knowledge? I think that a number of large corporates will arise.

That is the opportunity that we have to step up to at the moment. How can we do that at scale across our country? Our academic health science networks are in their infancy. They are four years old. In my view, they are the right thing. If we did not have them, would we invent them now? Yes. We need to support them more and drive them harder, and that is one of the things I do.

Q291 **Lord Griffiths of Fforestfach:** Professor Young, unlike you and some members of the Committee, I have very little knowledge of the NHS and how it works. Listening to the evidence that we have received, in my mind there is on the one hand the NHS, this huge national entity, broken down into regions and different functions, and then there are individual firms, entrepreneurs, basic science departments in universities, research institutions and so on. The question, which we have asked, is: how do we take what is being innovated here and apply it in this very strong and maybe somewhat rigid structure? You come along this morning and say, "Well, that's one way of looking at it", but to be effective we need to let a thousand flowers bloom, and if we can have entrepreneurs all over the place, this will shake the system up from the inside but at a very granular level.

The question going through my mind, therefore, is that the NHS needs about 100 clones of Professor Young throughout England who can do this. Clearly, you are brilliant, there is no question about that, and you are very successful in business. I take it that you are also a very good doctor, and you clearly have a mission. On the other hand, down in Cornwall or up in Northumberland—it is great to have you in Essex or in Southend doing this—the question we face is: how can we replicate everything you are doing and the energy and vision you have? Clearly, you have a

following. How can we take that nationwide and roll it out?

The Chairman: I am sure you have a simple answer.

Professor Tony Young: I do actually. That puts the onus on you, because I need your every blessing and support to make this happen. If you are standing next to me when we are lined up with people in the system who are saying, "No, this can't be done", and you are saying, "Yes, it can be done. We're supporting this, we are backing this, we want this to happen", that is the single most powerful thing you can do in your position.

My wife would probably have a heart attack at the prospect of 100 clones of me across the country, but my job in leadership is to create leaders of the future. Some of our clinical entrepreneurs are the most inspiring young clinicians you will ever meet. When junior doctors were manning the barricades on strike, 104 of them stepped forward to become the new entrepreneurs in our system. They are spread right across the country; four or five of them are based in Cornwall. One of them was the leader of a GP federation. He was an established GP and said, "I've not been taught any commercial skills or knowledge or given any experience in all my training. I've come on to your entrepreneur programme and it's changed the way I look at setting up our collaboratives in primary care down in the south-west. It has transformed the way we're delivering services".

We are creating what I call multilinguists. We are creating a cadre of people within the system who understand the science and the medicine, the commercial world and finance. We are putting them into the NHS to help us create the leadership cohort that we need to transform the system.

Q292 **Lord Vallance of Tummel:** You touched on multilingualism. Members of the Committee know I have a bit of a hobby horse on this particular type of multilingualism between science and commerce, and indeed politics, but that is another matter.

Can I come back to the motivation of a clinical entrepreneur? You can have a motivation that is patient care through innovation and you can perhaps have commercialisation of innovation. The two do not necessarily sit comfortably; there may be tensions between them. How does one resolve that? What is the objective function? What are you trying to optimise and what is the constraint? I do not think you can optimise both at the same time.

Professor Tony Young: Sometimes creative tension within systems help us to deliver something that we were not initially anticipating. There are reasons why creative tensions arise in these things. Our entrepreneur programme is also for intrapreneurs; it is for individuals within the system who want to learn commercial skills and knowledge to try to change the system from within. Not everyone is spinning out a business. That is why we had 104 entrepreneurs but only 50 start-ups. When I looked at the publicly available information from the Ivy League group, I

think we beat them in our first year of running in the life sciences space, although I would have to go back and do some proper research. We are doing something amazing in that space. There is that tension between the commercial sides of a business and stepping forward and physical patient care.

The world has changed and moved on from the position we were in when the health service was founded 70 years ago. I see people setting businesses up that have the noblest ambitions at their heart. Some of them are social enterprises. One of our companies, Touch Surgery, which is on the programme, is going to democratise access to knowledge of surgical training across the planet for everyone. That company is in negotiation at the moment for the next fundraising round, which we hope will be announced in the summer, ready for our end-of-year event, and it is looking to raise between £100 million and £500 million. This is democratising access to surgical training so that everyone on the planet could have that knowledge.

The Chairman: Okay. Did you say they are trying to raise £500 million?

Professor Tony Young: Correct.

Lord Vallance of Tummel: Let me put it in a slightly cruder way. If you had the opportunity to set up and run a £20-billion innovation enterprise versus doing your surgery and doing something relatively smaller, or a string of small things, what would you go for? What is your driver?

Professor Tony Young: My driver is to be not the richest man in the graveyard but the happiest one. Why are we on the planet? Why do we have a society where five billion people on our planet do not have access to basic modern healthcare? We are a country that has changed the world in the past. We have the largest unified healthcare system on the planet. I think we can change it again and I am passionate about doing it.

Q293 **Lord Borwick:** I am very impressed with your salesmanship and drive and everything else; it is absolutely great. But some of the evidence we have received is that in America they have a rather more successful innovative culture and greater ease with which to raise money and more ways of starting £20-billion companies, yet you are suggesting this is the very best system. What does America have that gives it the ability to have an innovative culture that is not normally associated with the NHS?

Professor Tony Young: First, I am not sure if I expressed myself correctly, or whether I said that we are the most innovative and have the best innovation and adoption culture across the planet. We are certainly aspiring to be that and are changing and improving day on day as we move forward.

If life expectancy is an outcome of how great and innovative a society is, I can tell you that we in this country spend less than half what the United States spends, but people live on average more than two years longer in the United Kingdom. A paper from Don Berwick from the IHI and *JAMA* in 2013, I think, showed that of $3 trillion spent on healthcare in the United States, $1 trillion served no useful purpose.

Does spending more money solve the problems? I am not sure. Does it deliver better healthcare, that you want for your population? How can we learn the lessons from the United States? Are they better? Are we selling this FlipPad idea more in the United States than we are here? Absolutely. It is already in 10 NHS hospitals, but we are going to start expanding that and looking at more. So what can we learn?

This is the history of our country. Let us pick the light bulb. In 1809, incandescence was demonstrated by Humphry Davy at the Royal Institution, but it was Thomas Edison, the American, in 1879, who invented the light bulb. I could have picked the computer, the TV, the CT scanner or the MRI scanner. They were all invented in this country and all commercialised and developed, and innovated if you like, abroad. This is the history of our country.

How can we change that around? I think we have put some ideas and processes forward to show that we have unearthed something here. I have not just said that people can be entrepreneurs and press-ganged them into becoming that. This change was going on. If you look at the figures in the United States—

The Chairman: We need to move on.

Q294 **Baroness Neville-Jones:** Can we come at this from another angle? We have heard quite a lot in evidence about the accelerated access review. Sitting where you do, what is your assessment of the challenges it faces in implementation? What would you see as being the benefits of its success?

Professor Tony Young: If I had to pick one word to say how we are going to transform the NHS to deliver on innovation and our aspirations, it would be "culture". If we get the culture right within our organisation, other things should follow.

The accelerated access review is a statement from the leadership, the thought leaders in our country, supported by the NHS, with a response from the Government, who are supportive of that, saying, "This is saying the right things. These are the things we should be taking forward". If we were to renege on the commitments made in that review and not deliver on that, how would people in the system ever believe us? We have to step up to the commitments made in that and we have to look, with all the issues and challenges we face in healthcare, at how we can deliver.

Baroness Neville-Jones: What are those challenges? How would you define them?

Professor Tony Young: You have to look at the commitments of people face who are on the front line, because that is where these things occur. They face a number of assumptions on the front line that they assume are the priorities, but what the accelerated access review makes clear, and what I am saying at NHS England, is that innovation is the key priority. We need to take forward not just anything but things that are proven, that are cost-effective and that will be of benefit to patients.

Baroness Neville-Jones: What are the obstacles? I am asking you the

opposite question—not what you want to do but what you have to overcome to achieve it.

Professor Tony Young: There are a number of core assumptions in the wider NHS that are very important key priorities, such as front-line service delivery and balancing the books and the budget, which are both paramount in moving forward. Where are the repercussions, let us put it that way, from following custom and practice? If you do something innovative, there may be some quite serious consequences down the line for that.

There is another core assumption. If we are going to deliver a healthcare service that is fit for the future and that will deliver a sustainable, high-quality, safe healthcare system for our nation, innovation also has to be at the forefront of what we do. Those assumptions are really important, but, you know, innovation is important too. By addressing those and by doing that, we can help to ensure that things like the accelerated access review are delivered.

Baroness Neville-Jones: I am still not clear what you see as being the challenges. I am quite clear about what you see as the opportunity. We live in the real world, and we want to know what you have to cope with in order to get to where you want to get to.

Baroness Morgan of Huyton: Can I add to that? I do not want to put words in your mouth, but it sounds to me that you are describing some great stuff but that it is an add-on. What we have heard pretty clearly up to now is that the core drivers—the core institutions, if you like—are not central to the NHS's way of thinking, and unless that happens it will be very difficult to get innovation to really flower.

Professor Tony Young: It is not my view that innovation is an add-on.

Baroness Morgan of Huyton: I am not saying that you think it is an add-on, but how do we make sure that it is not seen as an add-on?

Professor Tony Young: If you look at the five-year forward view, innovation is the golden thread that runs through everything, joining these things up to help us to deliver a new, transformed health service that can help to deliver the recommendations of the accelerated access review and the growth in our life sciences and benefit our economy.

I am not suggesting that I have all the answers. You have to remember that I am a plumber from Essex. That is essentially what I am. It is a great privilege to be here and tell you some of the things I am really passionate about. I do not pretend to have all the answers. Can we work together to work out what they are and to look at the key challenges and problems that we face in taking those forward?

This is not about a technical solution that identifies the barriers and problems and then takes them away. If you do not address the underlying assumptions that sit within the healthcare system that cause those barriers to come up, more will pop up later. You have to address the fundamental things. Having a statement that says that innovation is at the heart of what we do, having an accelerated access review, which is

important and at the forefront of what we are doing, is a statement to the system that we are giving this our permission and our blessing and that we want this to happen. It is about winning hearts and minds.

Baroness Neville-Jones: You appear to be saying that it is an attitude of mind that you have to try to convert. But there are concrete difficulties in life, and I am trying to probe you on what those are so that we can see some success, particularly of the accelerated access review, which is obviously important to the kinds of things that you are doing. I still do not have an understanding of what you see as being the practical day-to-day issues that you cope with in order to promote entrepreneurship and innovation. It is not just a question of doctors doing brilliant things; it is also the system of adopting them.

Professor Tony Young: Absolutely. I hope I have been able to give you an example of one of our new organisations—an STP—stepping outside those front-line, core delivery, day in day out pressures and stepping forward to say, "We're setting up an innovation programme to bring some of that national-level learning from entrepreneurs to our system to make it work".

The Chairman: The jury is still out on whether the STPs can do that or not. It is one thing to say, "We're doing this", or, "We intend to do this". It is quite another to do it and to show that it has been done.

Professor Tony Young: I hope you have seen from what I have said to you that my track record shows that if I say something, I will put the policy and the strategy forward and then go and deliver it. We have delivered the world's largest entrepreneurial training programme through the NHS.

Q295 **Lord Hunt of Chesterton:** Our last question concerns data, which we have not talked very much about. Is the effective use of data strongly connected to your innovative enthusiasm? It is partly empirical. It is not just the machine use of data but data used in a very creative way. Is that part of the scene that you are developing?

Professor Tony Young: It is, absolutely. May I make a couple of comments on data? One of them comes from looking at the world. Whether I am travelling across the United States or to Moscow—I was there just before Christmas—or looking at things in European countries or broader than that, the NHS dataset, as you have heard in this Committee, is probably the richest healthcare dataset on the planet. How do we access that?

May I give an example of a large dataset if you have a moment? Drayson Technologies is working with the University of Oxford on a system in four hospitals across Oxford of monitoring vital parameters while patients are there in the night. Once they got to about 10 million records, they started to notice something in the data. When blood pressures were measured at 4 o'clock in the morning, they saw that there were certain groups of people who had a big spike in their blood pressure, and they could not work out why that was. They followed them up afterwards and those individuals went on to develop high blood pressure. So we have found

something in the data that allows us to predict a disease that has not yet happened.

What other things are we going to find as we uncover the big dataset that we have and look at that? The opportunity is enormous for us. Lots of companies across the world say that they want to come and work with the NHS. In the next five to 10 years, one, two, three or four companies might become pre-eminent in their fields, as happened with search engines, marketplaces and other things, and they realise that they can get ahead of the curve if they come and work with the NHS on that.

If there is a priority for our nation, it is about asking how we can utilise the data for the benefit of our population. Imagine predictalytics and if we could predict what is going to happen to our population before it happens. We have the dataset. It will be a failure of leadership in our country if we do not find a way of making the insights that we can gain from that available to our population.

The Chairman: Professor Young, thank you very much indeed for coming today. I am sorry that our time has run out. It has been an interesting session. One thing we cannot doubt is your enthusiasm.

Professor Tony Young: That is very kind of you.