



Committee for Enterprise, Trade and Investment

OFFICIAL REPORT (Hansard)

Life and Health Sciences:
Professor David Waugh (Queen's University Belfast)

9 December 2014

NORTHERN IRELAND ASSEMBLY

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Members present for all or part of the proceedings:

Mr Patsy McGlone (Chairperson)
Mr Phil Flanagan (Deputy Chairperson)
Mr Steven Agnew
Mr Gordon Dunne
Ms Megan Fearon
Mr Paul Frew
Mr Paul Givan
Mr William Humphrey
Mr Fearghal McKinney
Mr Máirtín Ó Muilleoir

Witnesses:

Professor David Waugh Queen's University Belfast

The Chairperson (Mr McGlone): Briefing the Committee today is Professor David Waugh, the director of the centre for cancer research and cell biology (CCRCB) at Queen's University Belfast (QUB). Professor Waugh, you are very welcome indeed. Thank you for giving your time to be with us today. I look forward to hearing from you. I know that you have briefed some of my colleagues previously. The format is that you give us a synopsis of your document and maybe add to it, after which there will be a question-and-answer session.

Professor David Waugh (Queen's University Belfast): Thank you very much, members, for inviting me here to present to you all today. The topic of discussion I want to raise is the transition towards a precision cancer medicine agenda for Northern Ireland that integrates implications for health, private enterprise and industry and the impacts that that will have on society in general.

I am the director of the centre for cancer research and cell biology at Queen's University. I represent 300 active researchers. I am also here indirectly in a capacity representing the health-care workforce in the Belfast Health and Social Care Trust, the Department of Health, Social Services and Public Safety (DHSSPS) and all the great work they do in front-line care for cancer patients. I am also here on behalf of cancer patients in Northern Ireland and all the families affected by this awful disease.

Over the last decade, the survival rates for cancer patients in Northern Ireland have improved, but we are at a significant crossroads now in the evolution of cancer services and how we build for the future. Northern Ireland has a very strong academic presence in this area, largely centred on our centre at Queen's University. There is also a burgeoning life sciences sector in Northern Ireland in which indigenous companies are starting to demonstrate commercial activity relevant to the growth of that sector and are starting to produce products that have global impacts. What is needed in Northern

Ireland now is an integrated vision, whereby academia, clustered around the cancer centre at Queen's, health care in the Belfast Health and Social Care Trust and other trusts with a research presence in cancer, and those indigenous companies come together to form an integrated framework by which we can use commercial activity and new products stemming from research to drive a research culture and a research prosecution of a cancer service, all dedicated to changing and improving outcomes for cancer patients. That is achievable, but it requires a dedicated and integrated commitment from you and a significant investment for delivery.

I would love there to be an opportunity to create an innovation hub in Belfast, where cancer and research at an academic level is appended to all the commercial activities of our indigenous companies. In creating that infrastructure, you provide an attractive opportunity for other individuals to develop spin-out companies from research knowledge, so we will have indigenous spin-out small and medium-sized enterprises (SMEs). We will have the framework to attract other small and medium-sized enterprises to relocate to Northern Ireland. That is already starting to happen, but we do not have the capacity for expansion. You will have the opportunity to increase the footprint of major multinationals in the pharmaceutical industry, because we will have the infrastructure to deliver personalised cancer medicine. On that ground, I believe that that expanded sector is critical to the further competitiveness of the cancer research community in Belfast and Northern Ireland. We will also be able to grow the sector so that it becomes a self-sustaining entity.

The evidence for that is founded on several measures of esteem that the centre has already created. We are a Cancer Research UK centre of excellence, of which there are only 15 across the country. Belfast competed for this and receives an annual investment of £2.5 million from Cancer Research UK to undertake these activities. It is a Movember centre of excellence — the first of its kind in the world — that focuses on innovative care in prostate cancer. It is starting to drive a clinical trials base, providing state-of-the art care to our local community based on assets and products delivered by academic and industrial researchers in Northern Ireland. I believe that we are starting to see a concept that I proposed when I first took over the directorship two years ago, which is a born-in-Belfast, led-by-Belfast personalised cancer medicine agenda.

This is significant, but, at the minute, the infrastructure that my team and I have at our disposal is the limiting factor. We do not have the physical capacity and footprint to expand these activities. Industrial companies want to work closely with us, because, if you put the industry companies between the researchers who do the innovative aspect of discovery, and put them in between patients, companies then have the ability to start to see a rapid translation of their products into patient care. That brings the commercial inflection value of the activities that they are undertaking. The benefits of this are clearly exemplified by some of the products that Almac, for example, has delivered in partnership with us. Other biomarkers are now being taken up by major US corporations. That is licensed out to them, and the research is done in Northern Ireland, bringing commercial value back into the company and our sector.

We know that we can do it. We have joined up the pipeline, and we can take the ALM201, which is an ovarian cancer drug, and it is the first cancer drug delivered and developed in Northern Ireland. It was discovered in a laboratory at Queen's, translated through Almac Discovery as a company and is now being pushed out into phase 1 trials, led by the Belfast Trust and the cancer trials unit in our centre. It is also starting to transition from treating not only Belfast patients but patients across the UK. We have demonstrated that we can join the pipeline up. I now need extra capacity in that pipeline and the infrastructure to deliver it so that I can oversee an improved cancer service that is focused on delivering these research assets into patient care. I believe that we will see improved cancer patient outcomes, but the connectivity is that you will have health and economic gains for the Northern Ireland life sciences sector — this Committee oversees this document that refers to innovation in Northern Ireland — and, as a result, you will have societal gain.

The Chairperson (Mr McGlone): Thanks very much indeed, Professor Waugh. Expansion is obviously the big issue for you. What are the obstacles to that expansion, what is the solution and how could we help?

Professor Waugh: Several areas need to be covered, the first of which is the physical infrastructure. The Northern Ireland cancer centre is a fantastic building that opened in 2006, and there is also the chemotherapy Bridgewater suite in the Belfast Trust. Our current infrastructure is just about sufficient to carry the burden of cancer care that the trust needs to deliver. The problem will be that, if we look into future-proofing that service, there will be concerns about whether the infrastructure is sufficient to carry the burden. It also means that the current infrastructure is not geared in the way that some of my academic colleagues, both on the clinical and scientific sides, and I would like to see us being able

to work, which is to drive research through the infrastructure of the trust so that we can improve and increase patient access to cancer clinical trials. The evidence for cancer clinical trials being so important is based on the fact that large studies show that, when patients have access to such trials, their outcomes are invariably better, as is the level of care that they receive. I believe that that is imperative to our mission, which we will all share in, to improve cancer patient access.

So I believe that infrastructure is critical, which means that I would love to see the expansion of a dedicated facility to allow cancer clinical trial activity to progress. The way in which that is integrated with diagnostics is important so that you can start to push precision cancer medicine. Precision cancer medicine requires diagnostics and new biomarkers to enrich patient populations so that you can tailor the right drug to the right patient. When you put diagnostics and innovative therapeutics together, you will have the framework and infrastructure to deliver an improved cancer patient service. I believe that a new hospital facility of some sort is required — a facility in which you can put together the footprint for cancer clinical trials on an outpatient basis and marry up diagnostic service and therapeutics delivery, and provide the surrounding infrastructure that will enable industry to get round that. That is how you start to provide an attractive framework for SMEs to spin out and exemplify their products. Infrastructure is the major barrier.

Commissioning is an obstacle that we need to look at and address, but that is an issue for a different Committee; I assume that the Health Committee would deal with that. We have to be more aggressive with commissioning activities in the health service sector, particularly in rolling out molecular pathology and diagnostics. That is an imperative way in which we can start to progress cancer care.

The Chairperson (Mr McGlone): What can the Committee do to help?

Professor Waugh: I would love the Committee to be the champion of this type of vision, whereby academia, industry and the health-care and trust organisations are brought together to map out a framework for the way in which we could change this. You have the ability, the power and, hopefully, the budgets to try to roll out and integrate this type of vision. It is imperative that we have political leadership in this space across all parties to help us to effect this change for the significant number of patients in our community who are affected by this disease.

The Chairperson (Mr McGlone): You mentioned money. This Committee, in particular, has devoted a lot of its time to R&D and innovation, particularly in the context of the Horizon 2020 funds. Has any work or potential sourcing been done on the types of funding that could help out?

Professor Waugh: Absolutely, Chair. It is an imperative and ever-present metric that I, as director, have to address. I can happily say that, over the past two years, we have more than doubled the research income that our centre takes in every year. We have also sourced from major national charities, the Medical Research Council and the Movember Foundation. The key issue is about getting into Horizon 2020, and we have started to address that area. We have submitted major programmes to tailored calls in which we think that we can be competitive. This is obviously a very competitive area in the European Commission. I believe that the quality of our work stands up. I believe that we are doing very impactful things and that the work that we are submitting is at the cutting edge and to the forefront of personalised cancer medicine.

As we all know, these calls are specific, and we have to make sure that the calls that are presented by the European Commission are the types of calls that we can compete in. That is a vital job that this Committee and, in particular, Invest Northern Ireland can do through the Brussels office. They can have greater representation to make sure that the types of calls put out by the European Commission reflect the type of innovative life sciences work that is going on in Northern Ireland. I am still confident that we will do very well in the calls that are currently out there and in the submissions that we are progressing with the European Commission. My goal is to tailor that, but I will say to you that the European Commission grants that are in Horizon 2020 are very heavily dependent on industry linkage and commercialisation activity. For that reason, I believe that the vision I am putting in front of you and discussing with you is exactly the way in which we will become increasingly competitive. If you grow your own companies indigenously but also roll out more SMEs, or have the infrastructure to enable other SMEs to come in, the onus is then on the Northern Ireland sector to be in the space that becomes attractive not just for organisations such as mine based in Northern Ireland but for other universities across Europe to come and avail themselves of the SMEs and commercial activity in Northern Ireland.

That is the challenge that we have. We have done very well in growing a life sciences sector from a baseline that was almost negligible 10 years ago to where we are having global impacts. In Northern Ireland, we have two of the largest diagnostic companies in Europe — Randox and Almac — both hitting and punching above their weight and doing great stuff, but we now need to broaden that base.

The Chairperson (Mr McGlone): You are, almost instinctively, taking me into an area where I was thinking of going later on, which is the lever of corporation tax to incentivise further input from the private commercial sector. Have you any views on that?

Professor Waugh: I guess that that would be outside the expertise that I can bring to the table. However, from any logical director's point of view, if you reduce corporation tax and the tax burden on a company, it becomes a more attractive environment. I believe that an SME will look at factors other than corporation tax per se. An SME will look at the infrastructure of the framework and connectivity that you can put in front of it to say, "This is somewhere where it is connected, and I can have delivery of any product that comes out".

The inflection and commercial value of any asset in the life sciences sector is wholly dependent now on exemplifying it in patient treatment. So, can you take a drug and push it into phase 1 and show that it is safe? If that drug has a safety profile and even efficacy at phase 1, its value is probably multiplied by 10, and suddenly large multinationals want to come on to the pipeline and avail themselves of that asset. That is how you start to build value.

The Chairperson (Mr McGlone): Just for the sake of a wee bit of clarity to end off the detail, have you met the Enterprise Minister or the Health Minister to discuss what you have told us?

Professor Waugh: I met Minister Foster at the Biotechnology Industry Organization (BIO) conference this year and presented this type of plan. I also gave a speech at a BIO breakfast that Invest Northern Ireland hosted, at which Minister Foster and Alastair Hamilton were present, as were members of the Committee. I think that that was well received by an American audience of businessmen, and the result has been that several companies have filed papers to relocate to Northern Ireland because of the vision that I sold. The issue now is that I need the infrastructure to be expanded to increase that activity.

I also met Minister Poots, when he was the Health Minister, shortly before he left office. He was very supportive of this type of vision. I have yet to meet Minister Wells to discuss this vision with him.

The Chairperson (Mr McGlone): Thank you for that.

Mr McKinney: I was one of those who visited San Diego and saw at first hand the extent to which there is global interest in the issue. However, coming back to home, funding will be a crucial issue against the backdrop of cutbacks and so on.

Clearly, those who would be instrumental in making decisions would have to be assured that the investment risk was reduced. I imagine that, when we get into this later, there will be more cross-departmental thinking rather than a single Department, but it would not be without this Committee championing it. How do we assure Departments, Ministers and so on that the risk is reduced?

Professor Waugh: In defining risk as being whether commercial activity will happen, you have to speak to people in that sector. Through our partnerships with Almac, it has benefited tremendously from being part of that hub on the CCRBC campus. Randox has spoken to me extensively. There is no question that there will always be risk in life sciences, and it is about how to manage that risk. What we are trying to do and to effect has international and widespread support. I am in advanced discussions with a company currently based at the University of Southern California that wishes to relocate, and it has had its international advisers go through our centre and say, "This is exactly where you need to be, because it has the right mindset". It is like anything else: you have to walk before you run, and you need to demonstrate and have the evidence that you can deliver. I do not think that the meeting in San Diego would have gone so well had it not been for the fact that I can stand up and honestly say, "Here is the evidence that I can take academic research and push it all the way into a phase 1 trial". Once you provide the evidence, it becomes an area that companies look at and say, "We have to come and investigate". I am in discussions with academic leaders in the US. I have talked about the vision that I have put in place and the evidence and measures of esteem that have happened in two years. They have said, "We need to come and look at your centre, because that is

exactly the model that I need to put through in an American institution. I do not have that, and I need it".

I have talked to major pharmaceutical companies like GlaxoSmithKline (GSK), which was part of the Association of the British Pharmaceutical Industry (ABPI) visit in September. When its representatives looked at what was happening with the cancer programme and personalised cancer medicine, they said that they had to come back and talk about how they expand their clinical trial footprint in Belfast. I believe that the pharmaceutical industry works in well. If one company starts to do that, others will follow. It is just a case of growing and mitigating the risk.

Mr McKinney: If we do not do what you are asking government to do, would we miss the curve?

Professor Waugh: Yes. It is not only missing the commercial curve but missing an opportunity in which we have invested a lot of effort. We have delivered and brought a number of academic leads from across the world to Belfast, and the evidence is that all those individuals are delivering. I am in advanced discussions with other academic leads across Europe and the UK to relocate to Belfast. Every time you start to bring in more talent, you increase the capabilities and the capacity to deliver world-class health care, research and commercial activity in the Province. If the infrastructure becomes limiting, the budgetary support becomes limiting and the tap is turned off, those individuals, world-class as they are, can easily leave Northern Ireland. Difficult as it is to bring them here, it is easier for them to leave. That is the risk that I see in sustaining growth.

The life sciences sector in San Diego — I think that several of you visited it — was not built in a day or a year; it was built as a result of long-standing investment in that sector. It is now probably second only to the Massachusetts cluster. This is a long-term game that the Northern Ireland Executive committed to in life sciences many years ago, and you must stay with it. You cannot now turn off the tap. It is an important aspect for Invest Northern Ireland support. It has been critical in building academic/industrial partnerships. It has been critical in developing the biomarker programme, the drug delivery programme, the drug discovery programme and the opportunities that we now have for SMEs coming to Northern Ireland. There will come a time when that sector will reach such a size that companies start to feed off each other. Companies work with other companies in Northern Ireland, and the money, health and opportunities will all become self-sustaining, but it is not at that time or point of evolution yet. Our infrastructure is still 20 years behind relative to several UK areas.

Mr McKinney: It is clear, from what you said in your opening remarks, that the partnership between academia, health care and pharma companies is important. Are you seeing that reflected across Departments?

Professor Waugh: From my conversation with Minister Foster, I was left with the clear impression that she understood the importance of cross-departmental working. I believe that Minister Poots also registered that comment with me when I met him in June. I cannot comment beyond what I have witnessed face to face. I have not been privy to discussions here, but I encourage you to think about that type of activity. It is really important.

Mr McKinney: I will put it another way, then, if you feel that you cannot critique the existing arrangements: would it benefit more from greater cross-departmental thinking?

Professor Waugh: Absolutely.

Mr McKinney: And that would not necessarily just be in the Health and Enterprise Departments; it could be others.

Professor Waugh: There is a massive role here for the Department for Employment and Learning. The education aspect that Queen's University is striving to progress has world-class research in its infrastructure and its organisation. It is about how DEL can provide funding streams for innovative thinkers in medicine, clinical sciences and all the attributes that we need to build this sector. I totally agree that it is about how you train and use this infrastructure to train a workforce, and that is important for the employment and learning sector and for the Department.

Mr McKinney: You are aware of, and we are all involved in it to a greater or lesser degree, the requests for greater provision of cancer drugs etc. Can you briefly spell out the advantages? You

touched earlier on the advantages for pharmaceutical companies coming here and progressing that. What is the latest thinking on that?

Professor Waugh: The cancer drugs fund, as we are all aware, has been a major political and societal issue this year. For those of you who have not been fully briefed, it is about access to 38 cancer drugs that are available to patients in areas of England but are not available in Northern Ireland. Obviously, my belief is that access to cancer drugs and innovative cancer drugs is essential, but it is also about how we use those in an informed manner.

What I believe we are trying to achieve with this vision is to match up biomarkers, diagnostics and therapeutic provision and push that into cancer clinical trials. Where you start to increase your clinical trials portfolio and you increase the number of patients going on to trial, those innovative trials invariably bring access for those patients to many of the cancer drugs that we are trying to get into Northern Ireland. It will not always do that, but the vast majority of them could go into the framework of clinical trials, and that becomes a very important aspect of how you work with the pharmaceutical industry in the context of research and research discovery as an enabling tool to increase the availability of these agents to your patient population. That is how I see this vision being wrapped up in another way with the discussions around access to cancer drugs.

Mr Dunne: David, you are very welcome. We all appreciate your work, the enthusiasm that you show for cancer research and care in Northern Ireland and all the good work that you have done. Fearghal and I appreciated what you did in San Diego when you addressed the conference at the breakfast. You sent out a clear message that Northern Ireland is open for business and that we want to push forward the whole idea of cancer research and drug development. Can you elaborate a bit more as to how you see precision medicine being the way ahead?

Professor Waugh: Take a cancer patient population at the minute and use the terminology "standard of care", which is a term that, as academics, we frown upon. If you use "standard of care", you are invariably treating patients with cytotoxic chemotherapy agents. Cytotoxic chemotherapy agents are not only toxic to cancer cells; they are toxic to your normal cells, and they do damage to your body. However, there is a therapeutic window in which they kill more cancer cells than normal cells. That is why, in some cases, they are effective.

If you use "standard of care", the best ratio that you are likely to receive in terms of treating a cancer population is one in four. In other words, one in four patients would be likely to have any clinical benefit. Therefore, for three of those four patients, you are giving them a drug that they will not respond to but which will cause significant impairment to their quality of life and make them very ill.

Personalised cancer medicine is a different approach. The theory is that we can start to tailor the right drug to the right patient at the right time. That is done by having a broad range of knowledge about the genetic and biological basis of a tumour that a patient is suffering from, having the knowledge of the driving biology there and, therefore, where the right therapeutic intervention would be and providing the diagnostics and the therapeutics together to put them on the right treatment regime. Invariably, precision medicine has the promise of a greater chance and the probability of clinical benefit in the patient but sparing them the toxicity that we would achieve using "standard of care".

Cancer patient treatments are about getting that balance right: optimising the clinical benefit and reducing the side effects and the toxicity. That is what personalised cancer medicine is. We are trying to fashion a framework by which you empower the diagnostics piece and the requirement for new discoveries of new diagnostic tests; commission those that are available and roll them out so that we are treating our patients in an informed manner; use clinical trials to expand the armoury of drugs that we have available from existing stocks within the pharmaceutical industry; and empower new and existing SMEs to deliver new, tailored therapies that can be brought into clinical trials. That is what this vision is about.

Mr Dunne: OK, great. Thank you.

You have strong links with Queen's University and so on.

Professor Waugh: Yes, I am a member of academic staff at Queen's.

Mr Dunne: How do you see it moving forward in the further development of cancer care and research?

Professor Waugh: I can only praise Queen's University for the support and prioritisation that it gives to cancer services, cancer care and the cancer research programme. We opened a state-of-the-art research building in 2007. We have had enormous support from the organisation through having access to recruit new chair positions, new academic leads in various areas that are essential to providing the framework for precision cancer medicine and the human capital that will deliver that. However, like anything else in these times, we cannot rely solely on the university. The university is under financial pressures, as you all know. The university has been a champion and a leader, and, as a result of its investment in and prioritisation of cancer research, it has really brought this to the fore. It needs to continue to be supported to see this through, because the academic centre is the heart of this. It is the cluster and the area that is going to bring forward the innovations and link with companies so that the companies can then prosecute them. Academic organisations are great at discovery and acquiring new knowledge, but it is the industry piece that helps deliver that knowledge into the asset that can be tailored into patient care. So, the university is the lifeblood and cannot be cut off from this. It must be an integral part.

Mr Dunne: Finally, how helpful has Invest NI been in getting new funding and new leads for your project? Are you aware of the Connected Health initiative?

Professor Waugh: I am aware of the Connected Health initiative. It has probably had less of an impact on cancer services per se. I will speak only in positive terms on the support that I have received from the life science sector and Invest Northern Ireland. They have, in their own way, seen the importance of what we are trying to achieve. They have invested in the academic industrial partnerships that we have fostered with Almac. Other colleagues in the respiratory medicine programme are working actively with Randox in those regards and Invest Northern Ireland. As we speak, Invest Northern Ireland has several proposals on the table from companies that we have spoken to at BIO conferences. I think that they have done a commendable job.

Again, I would caution that cuts to the Invest Northern Ireland budget will not be helpful in trying to grow the life science sector. It is a very valuable way of enticing other companies to relocate here. The key is that, once they have relocated, we use the expertise in a very strategic fashion to actually then leverage more funding from the European community. I would argue that all the entities — the academic sector with Queen's University, the Belfast Trust, the Health Department, all those companies and Invest Northern Ireland — play a vital part in getting everybody together to build this sector. The sector will not grow if one of those entities is in any way compromised. They must all be supported.

Mr Agnew: Thank you, David, for the information so far. You mentioned the magic formula of industry, government and the university working collaboratively. Obviously, it is a very difficult time to ask for additional resources from government. You mentioned particularly the challenges for DEL. What about the industry input into infrastructure? Does it contribute in that regard?

Professor Waugh: Yes. We have embedded two companies in our building. They have contributed to the programmes in their own way. They have contributed to elements of estate and infrastructure. That is part of the terms and conditions of the investment and support that they receive from the university and Invest Northern Ireland. Yes, industry does contribute, but, at the same time, I think that the onus here is on all parties to get round the table to secure the sums that are required. I do believe that infrastructure is essential for Northern Ireland to be competitive on so many different fronts. It is really about how the Government prioritises where they want to invest in order to have the infrastructure to be internationally competitive. We cannot be good at everything. We have to be good at some things. You have already invested in life sciences. Now, we have got to an evolution point where we need more infrastructure to actually deliver on the promises and the evidence that has been attained through the phase 1 investment in and prioritisation of this sector.

Mr Agnew: I am just wondering about doing that strategically. Obviously, it is a very competitive global industry. You have got some of the biggest companies in the world. Certainly, GlaxoSmithKline is one. I remember that, when I was doing business studies, it was always top of the charts of profitable companies around the world. If we ask for more from industry, do we risk losing it? Or, once companies are here, do they commit and can we ask for more?

Professor Waugh: Again, it is getting to the point that you need to have the infrastructure that industry looks at and says, "Yeah, we've gotta be a part of that". Currently, we have an element of the infrastructure, but it is not at a sustainable capacity to excite the large pharmaceutical companies of the world to make them say, "We've got to base all of our clinical trial activity in Northern Ireland". They want to work with us more closely — I think that was the message — simply because of the evidence that they saw that the centre, working in partnership with indigenous companies, had taken that pipeline all the way through. The fact that we have a patient population that is crying out for increased clinical trial activity is something that becomes attractive for them. You need to have the infrastructure to deliver clinical trials on a scale that we currently do not have.

Mr Agnew: So, really, we need to put in the investment first, and then industry will follow.

Professor Waugh: It will come. That is the key message. It is about having something that you can walk it around, show it and say, "So here's what our indigenous companies are already doing in early phase clinical trials. Here's how we're already working with several elements of your peer group in the multinational pharmaceutical industry". We are doing that, but we can increase the capacity so much more. As I said, it is about how you bring that footprint to us while taking the assets the companies bring and using them for the health and societal well-being of patients and Northern Ireland in general.

Mr Agnew: Going down a very different track, how prevalent is the use of animal testing? What investment is being put into innovations to move us away from animal testing?

Professor Waugh: This is a really important issue in the life science sector. I am of the opinion that animal research is an essential element of translating academic discovery from a laboratory to patient care. You are absolutely right: we have to start to look at alternative replacement models. The life science community is wholly committed to doing that. For example, instead of using xenografted models on nude mice in laboratory colonies, we are starting to use patient-derived xenografted models; we can take patient material, which is more representative of the patient's tumour, and use it on a mouse model. You may say that that is not reducing the use of animals in research, but it is making the research models that we use more closely aligned and of greater value to patient care.

Unfortunately, at this point, the life science community has not come up with alternative strategies that enable you to translate discovery into patient care without going through pre-clinical models. All our [*Inaudible.*] and drug toxicology has to be done on those living models.

Mr Agnew: How much is about the needs of science, and how much is legislation? I receive examples of repeated trials etc where, to me, as a layman in this subject, it seems like the unnecessary repetition of trials. It may not be specific to cancer, including some of the examples I am thinking of, but how much are you being required to do tests that you, as a researcher, feel are unnecessary? Can you say that every trial that you have conducted —

Professor Waugh: I take the point. I can speak only on behalf of the research team that I represent in the centre for cancer research and cell biology and those in the school of medicine at Queen's University. No researcher actively desires to pursue research on animals.

Mr Agnew: I was specifically asking whether you are required to because of legislation.

Professor Waugh: If you are asking whether we do due diligence in seeing whether the experiment that we wish to perform has been conducted elsewhere before we start, the answer is that we absolutely do. We are compelled to do so by the law. We abide by that. If we are trying to do something completely innovative, we use all the legislation and the guidelines to reduce, refine and reuse, so that we reduce the numbers of animals we employ in those experiments. Unfortunately, if you want to progress anything into patient care, those are the steps that you, or, indeed, other organisations, must take. What we have tried to do is take an absolutely compassionate role but through the essential legislative role of how we need to progress the translational research at Queen's.

Mr Agnew: Finally, just on that issue, how much protection is there of intellectual property rights when it comes to medical research? You said due diligence. Can you get access to other research? Is there a time limit before that research is published? How open is access to such research?

Professor Waugh: Again, intellectual property acquisition and protection is absolutely integral to the vision that I talked about today, because, without it, you will not see the commercialisation agenda or,

indeed, the industry or company engagement. In the partnerships that we have developed between Queen's and Almac, for example, we have very rigid and robust intellectual property registrars so that we can actually follow the prosecution, delivery and acquisition of intellectual property. Then that, in its own right, becomes part of the due diligence process that any company outside wanting to avail itself of Almac products and Queen's products would go through. So, all that has to be secured, because we are acutely aware that that is where the commercial value of any product will stem from. As I said, the way in which we have achieved that is reminiscent of the way in which Almac in its own right has been able to commercialise some of the elements coming from its pipeline.

Mr Agnew: In that regard, I understand, from the business side of it, why it is almost essential to protect your intellectual property rights, but does that mean that research on animals is being repeated in different labs across the world because the evidence coming out of that research is not being shared?

Professor Waugh: No, I think the pressure is on academia to always push the publication of results, so I believe that, if data is available, having been pushed across animal models, it will ultimately be published. When it is published, we become acutely aware of it. Also, when patents are published, you have access to understanding what has been achieved, what has been protected and what the evidence for that protection is. So, if animal experiments have been used in patent protection and intellectual property protection filings, we have access to that.

Mr Humphrey: Thank you very much for your evidence and your presentation today. The work that you are involved in, David, is absolutely invaluable, because every home is touched by it and every family is impacted by it. Particularly in Northern Ireland, we know how important that work is. You said that we need political leadership around the issue. What does that political leadership look like from your perspective?

Professor Waugh: I think it is about cross-party support; I am not saying that it is about one or two individuals. It is about using the Executive as a vehicle for delivering the essential infrastructure that I believe is vital to the health of the vast majority of our population and the well-being of our population. That, to me, is delivered across all parties. There is also the fact, which Mr McKinney raised, that it goes across a majority of Departments. We talked about Connected Health; I think it is about connected government being able to deliver on the issue.

Mr Humphrey: Following on from that, key to your work and your vision, which I commend absolutely, are academia, business and government — DETI, DEL and the Health Department of Health — working together.

Professor Waugh: Education as well.

Mr Humphrey: Yes, OK. In your experience, how good are we at doing that in Northern Ireland? Have we improved?

Professor Waugh: As I said, I see positive developments in all areas. However, again, I cannot say that I have evidence that various Departments are talking to one another and coming forward with an integrated plan. I may be wrong on that; do not quote me. There are things that I would love to see. I would love to bring members from my own centre and academic leads in various disciplines together with industry leads and the various Departments and for them to sit down and work through how to deliver this vision. You probably have better knowledge of whether Departments are working together to achieve these types of major enterprises and activities.

Mr Humphrey: You mentioned Randox and Almac, and I remember doing business with Galen before it was Almac. You mentioned the cuts and the economic climate in which we operate. Getting joined-upness of government and between the Departments and having companies like Almac and Randox and academia working together is absolutely essential, especially when money is tight.

Professor Waugh: Yes.

Mr Humphrey: I detect from what you have said that we are in a better place but that we are not in the place that you would want us to be. That is probably the view of everyone around the table. Have you put forward suggestions? Is there some way that we can get that? Do we need a tsar or somebody to champion it?

Professor Waugh: Sometimes a small committee is more effective in being able to deliver a vision. With wider committees, trying to get consensus across too many people can sometimes be difficult. If you were able to identify key leads within each of those key sectors — two or three from Health, two or three from industry and two or three from the academic sector — you could come forward with a vision that enables delivery of this type of vision. I think that it is achievable. We have to make this achievable.

There are things that we can use this for that go beyond the cancer programme. It could provide a true, evidence-based example of how you innovate in Northern Ireland and how you use all the commendable individual sectors and bring them together to achieve some very meaningful outputs. I spent 10 years living in the US, and it was a transformative period of my life. One of the key things that I learnt is that Americans are great at selling good news stories. We need to get good news stories out there. We would then have the ability to sell something and show that this country can do some major activities with a global impact.

Mr Humphrey: Thanks for your reply, and good luck with it all.

The Chairperson (Mr McGlone): Professor, that concludes this session. Just so you know, picking up on what William said about what we do about this, we will get a retrospective Hansard report of the session. The Committee will then look through the items and issues that have been raised and produce an action column or a list of stuff that we and other Assembly Committees should have responsibility for advancing to add that bit of joined-upness that William was talking about. Thank you very much indeed for your time.

Professor Waugh: Thank you all for your time this morning. I invite you all to come and visit the centre for cancer research and cell biology in 2015. I would love to offer you the opportunity to have one of your Committee meetings there and to learn at first hand of some of the other really significant work that we do.

The Chairperson (Mr McGlone): That would be very useful. Thank you for that invite.