HOUSE OF COMMONS

Science and Technology Committee

Oral evidence: Legacy—Parliament 2010–15, HC 758

Wednesday 3 December 2014

Ordered by the House of Commons to be published on 3 December 2014.

Watch the meeting

Members present: Mr Andrew Miller (Chair); Mr David Heath; Stephen Metcalfe; Stephen Mosley; David Tredinnick

Questions 1-90

Witnesses: **Jane Ellison MP,** Parliamentary Under-Secretary of State for Public Health, Department of Health, **George Freeman MP,** Parliamentary Under-Secretary of State for Life Sciences, Department of Health, and **Professor David Walker**, Deputy Chief Medical Officer for England, Department of Health, gave evidence.

Q1 Chair: Ministers and Professor Walker, welcome to this morning's session. This is the first part of what is intended to be our final inquiry—a legacy report—that is designed to leave messages for our successor body. We hope there will be few messages because everything we have recommended will have been undertaken. We want to explore with you this morning some of the issues we have dealt with over the course of this Parliament. Might I ask you to start with how the use of scientific advice and evidence is effectively and independently challenged and scrutinised in the Department of Health?

Jane Ellison: George, do you want to start? As the newest Minister, perhaps you bring the freshest perspective on that.

George Freeman: Thank you. Good morning, Mr Miller and the Committee, it is a pleasure to be before you. I hope it will not be my last time, but at the tail end of this Parliament it may well be. Perhaps it would be helpful to describe the responsibilities that I have been given in this new role, and then touch on the specifics of your question on research. As the new Minister for Life Sciences, as you may be aware, I am Minister in the Departments of Business and of Health. In Health, my responsibilities are for the drugs budget, including the cancer drugs fund, the National Institute for Health Research, genomics and the use of data in health research, the MHRA, NICE and a number of other items.

In terms of research, we have created within the Department a new directorate of innovation, technology and growth. The central mission is to further the use of innovation in the delivery of 21st century health care and the embracing of science and innovation, both deep research into new treatments but also research insights from greater

transparency in the use of data in understanding health outcomes across our health system. You will be aware that the annual budget of NIHR, of roughly £1 billion, represents an extraordinary platform for research embedded within our health service. At both ends of the spectrum, using that platform for deep research and the data we have at the heart of the health service to improve outcomes and drive best practice across the system, we are actively pursuing a number of initiatives on those fronts.

I want to touch on the data aspect because it has been the subject of a lot of public scrutiny. The Committee will be more aware than most of the difference between different types of data. By making available and transparent the health outcomes data—the episode statistics—and the longitudinal cohort studies the NHS has accumulated over the years, we are embracing a spirit of transparency in data to try to support both deep research for tomorrow's treatments but also improvements today in how we can roll out best practice across the system.

Q2 Chair: In terms of the move to a more open and transparent system, one of the issues we have touched on before is that in the Department of Health the roles of the chief medical officer and chief scientific adviser are held by the same person. Would it be more effective if they were two separate roles?

George Freeman: Perhaps I could invite the Minister for Public Health to comment on that aspect of it.

Chair: I like this passing around.

George Freeman: From my point of view in terms of research, I think it is a strength that the two functions of the chief medical officer and chief scientific officer within the Department are unified. There is huge strength from that.

Q3 Chair: You are seeing it as a strength.

George Freeman: Yes.

Q4 Chair: Explain why.

George Freeman: For several reasons. The most important core function of our whole research agenda is patient benefit: improvement in treatments and outcomes. In the 21st century model of life sciences research, the central focus is on putting patients right at the heart of that in understanding the progression of disease, through the use of patients and patient tissues and all the clinical insights we can gather from our privileged position as an integrated health service to support the research environment. It is crucial that the patient voice and patient benefit—mainstream front-line health—is at the heart of that. The chief medical officer being also the chief scientific officer enables us to put that absolutely at the heart of policy.

Jane Ellison: It is nice to be back in front of the Committee. I can give a practical example. Recently, I responded to a very good Back-Bench debate on pancreatic cancer, which is one of the most troublesome of cancers, inasmuch as it is one of the few where

survival rates have changed very little in 40 years. It is a real area of concern, and one in which many parliamentarians have shown a great deal of interest. We had a three-hour Back-Bench debate responding to a very well-supported e-petition. At the end of the debate I invited the two co-sponsors, Nic Dakin and Eric Ollerenshaw, for a meeting with the chief medical officer to talk about the research, because it emerged during the debate that the challenges in doing effective research in that area were not well understood. It also became clear that it was not that well understood that quite a bit was under way, albeit not yet bringing anything specific to the table. It was very helpful to have that meeting with the chief medical officer who could speak to the research and the science, in exactly the way George spoke about looking at it from a patient perspective, in that case often from a surviving family perspective, right the way back to the research.

Going back to your original point, I think the essence of your question is where the challenge is if one person wears the two hats. There is a lot of scientific challenge right across Government, and from without Government, on which we draw.

Q5 Chair: We will touch on that. Mr Freeman, we share your desire to have a more transparent system. There is a huge number of scientific advisory bodies operating within this Government Department—more than any other—but no scientific advisory council, which is a much more transparent process. Why not?

George Freeman: You are right. There are plenty of conduits—a plethora—for getting scientific advice right at the heart of policy making. I do not think anyone would suggest there is a shortage of it. Possibly the reason why there is not one central science council is that there is already such an extensive range of existing organisations. I have been in the Department for three months and I am acutely conscious of the need to make sure our systems are aligned and fit for purpose. I would be very interested if you felt there were any areas where you saw any disconnect. What I see at the moment is a huge amount of scientific opinion and evidence across the board, and I think the CMO is able to play a really important role in helping to make sure that is coherent.

Jane Ellison: The general principle we adopt, and the main reason we have not gone down that particular route, is partly a desire to remain flexible to whatever is the particular area of scientific challenge. The current system gives us that flexibility. In reality, even if you had a standing committee, if you were looking to produce rapid expert evidence and advice to Government on something in particular, it would be very unlikely that you could form a committee that encompassed every discipline and expertise in every area. You would still need to bring people on to it.

Q6 Chair: Except that the council would be there, as it is in other Departments, to help co-ordinate the overlapping work of the plethora of committees. Given the number of committees, it would seem to us that that is a missing part of the jigsaw.

Jane Ellison: Perhaps Professor Walker could comment, having been on some of them.

Professor Walker: The current arrangement whereby the CMO is also the chief scientific adviser has not always been the case. It is the case for this CMO but it was not for the previous one. There are a number of ways in which expert advice can get into the

Department. We have all the expert advisory committees, as has been said, but we also have a number of other mechanisms which improve transparency. One of them, for example, is the chief medical officer's annual report; the construction of that report brings together the views of literally hundreds of experts, not just from science but from the world of business and the clinical sphere, to focus on one particular thematic issue. In that way you get a much broader range of expertise and ensure that you are being much more comprehensive.

I share the Minister's view that the sort of issues we have to deal with often require us to bring together experts in groups to provide advice, which could not be done within the confines of a standing council. You would always need to bring in a lot of extra people because the expertise we need is so varied and diverse. Of course, it is one way to go, but I do not think there is anything wrong with the current system.

Q7 Chair: Finally, on probing the question of structures, health technology appraisal involves looking at the technology, its cost and clinical effectiveness. In the light of that, why is it that the Department's appraisal alignment working group is led by the Department's chief economist but does not receive any input, as far as we know, from Dame Sally Davies or her team?

George Freeman: That is an interesting question, which I will happily look into in the Department. I was not aware, and am quite surprised to hear, that there is no input from Dame Sally.

Q8 Chair: Interestingly, entirely unconnected with this inquiry, yesterday morning I happened to have a breakfast discussion with some of the organisations co-ordinating around rare diseases. One of the continual complaints is that people are looking at cost benefits purely from an economic point of view and are not looking at the clinical benefits. This seems to be another area. Is that not again a weakness in structure?

Jane Ellison: Would it be possible to ask which particular rare diseases?

Q9 Chair: My question was not about rare diseases. It just seems that there are similarities in the way appraisals are being conducted, in that case principally within National Health England, in a way which does not sensitively take into account the needs of patient groups and so on. In this particular case, the Department's appraisal alignment working group—I had to look at my notes again to check the title—seemed not to involve any clinical input.

George Freeman: Jane was looking at the specific detail of that working group just as you asked the question, Chair. If I may comment on the central premise, which is the need to try to streamline, accelerate and integrate the various mechanisms of appraisal, that point is extremely well made. That was why you will have seen that two weeks ago I launched a review of our landscape—our system—for assessing innovative medicines and medical technologies. Under our current system, MHRA and NICE have led the world in terms of assessments and health economics. The landscape is changing fast.

Q10 Chair: It would be helpful to this inquiry if you could keep us up to speed with that review.

Jane Ellison: It might also be helpful for the Committee to know that Public Health England is reviewing the remit of the rapid review panel, with a view to strengthening its role and promoting its work. That is a panel of experts that assesses innovative techniques and how they are introduced into the NHS and so on. PHE is reviewing that remit, and I am sure the Committee's recommendations can be fed into that review.

George Freeman: I would be delighted to share our progress on that. The central point I was going to make is that it is really about making sure we put MHRA and NICE at the beginning of the process for bringing innovation into the health service, and that there is better use of data for doing much earlier assessments of the innovation for patient benefit and clinical benefit, at the beginning of the process rather than at the end.

Q11 Mr Heath: Could I apologise in advance if I leave immediately after asking these questions? It will not be because of disgust at the adequacy of your answers—probably—but because I am serving on another Select Committee at the same time. Mr Freeman, who actually is responsible for aligning the Department's research priorities with the research budget?

George Freeman: The CMO and NIHR process, with which you are familiar, contains within it a series of mechanisms to make sure we are spending that research budget within the Department on appropriate priorities. Jane might want to comment on some of the public health priorities, but there is a mixture of longer-term deep science challenges being pursued through the biomedical research centres and the NIHR clinical research centres of excellence: some of the work on cancer and the long-term mechanisms of action. There are what one might call medium-term priorities around trying to accelerate new diagnostics and trying to bring in innovations and use our research platform to accelerate new treatments. There are more immediate priorities. I think we are going to touch on antimicrobial resistance. There are shorter-term priorities where the nation would rightly expect us to be able to move quickly and get priorities picked up. Perhaps I could invite Jane to say something about the public health aspects.

Jane Ellison: The only point I was going to make is something the Committee is already aware of. We welcome bids for research funding in all aspects of human health. With the exception of one of the Committee's areas of interest this morning, which is vCJD, we do not ring-fence in that sense, because we want to be open to the very best scientific bids for research projects. It is true that Government sends out signals about areas of interest. Clearly, this Government has made dementia a really important priority. In my field, with my responsibility for cancer, at the end of the debate on pancreatic cancer I wanted to signal that we had a real interest in this area, but there is a subtle process by which we say these are priorities. It does not extend to saying, "And here's a great big ring-fenced pot that we will only spend on that." My understanding—perhaps Professor Walker can comment in more detail—is that the danger of doing that is that you end up funding less good projects at the expense of very good projects that might be in an area that is not currently your priority but is a field of emerging excellence with the potential to be a game-changer in another area. That is why we try to retain a level of flexibility in terms of formal prioritisation. Occasionally, the chief medical officer will do a call to arms.

Sometimes we issue themed calls for research projects and submissions to signal a particular area of interest and priority, but we like to retain the flexibility to back the best bids for research funding and the best science. David, do you want to comment further?

Professor Walker: One further route that may be of interest to the Committee is when the expert advisory committees are in discussion with policy teams to identify gaps in our current knowledge which are relevant to policy, but are also emerging issues of concern to those expert advisory groups. That is another key way that priorities are fed into the system.

Q12 Mr Heath: Ms Ellison, you mentioned one area of interest to the Committee: bovine spongiform encephalopathy. Do you not think it would be important, as the Committee explored in its report, to know the potential prevalence risk of variant CJD in the UK's blood supply? It is a relatively modest proposal.

Jane Ellison: As you know, the Department has funded a lot of research in this area in recent years, and it remains the only ring-fenced budget, at £5.5 million a year. We have a range of projects. To remind the Committee of the current programme in that area, we have a range of surveillance projects looking at potential associations between all forms of CJD in blood donors and recipients. We have the appendix 3 prevalence study, which we talked about when I gave evidence the first time. That is looking for the potential presence of abnormal prion protein in appendix tissues collected before 1980 and for those born after 1996, where we are assuming those populations are unaffected by BSE-infected meat. We also have under way decontamination and protein detection studies. A significant amount of work is going on there already. We are currently funding 21 active research projects on CJD. That is a total investment of about £49 million, including £10 million on infectivity, pathogenicity, transmission and some of the other projects I have just mentioned. A lot of work is going on in that area already. I know the Committee remains concerned that perhaps not enough is going on, but my sense is that it is quite a significant body of work.

Q13 Mr Heath: We are not the only ones to be concerned. In this relatively modest area—maybe £750,000—a prevalence study of risk in the blood supply is not being done, nor a study of the potential misdiagnosis as Alzheimer's. I do not know whether the Department has estimated what the cost would be if the estimate of one in 2,000 people who carry the prions actually developed symptomatic disease, but it would be staggeringly huge. I think we can at least agree on that. Surely, this is a sensible use of a small amount of research money within those priorities.

Jane Ellison: We are very much steered by the expert advice we get. We take the advice of the relevant expert committees, in this instance ACDP and SaBTO, on the potential use of a blood prevalence study, but we need to think carefully about how we would use the outcome of that study. Any funding is dependent on the budget being available, and the views not just about the suitability but the utility of any proposed study. We look carefully at all these things. A representative of one of our expert committees is in the room today listening to the evidence. We expect our expert committees to look carefully at this and keep it under review. It is not something they have turned their minds against; they are simply looking very carefully at the various factors involved.

George Freeman: Transparency in the setting of those research priorities is a really interesting question. I myself asked NIHR on a number of points how they determined some of the shorter-term priorities that appear. I think it would be a very helpful line of inquiry for the Committee. I am very conscious that there is a £1 billion-a-year investment in research in our health system and it is a really important question. Some of the charities I talk to are keen to make sure they are fully aware of what is being researched and where to avoid duplication. Transparency in how that budget is spent—it is all published, obviously—and perhaps making sure Parliament is more aware of that and how it can influence those priorities is a really interesting point.

Q14 David Tredinnick: Can you update the Committee on your discussions with the Care Quality Commission regarding the health service's implementation of decontamination guidance? Running on from that, will that implementation of decontamination guidance form part of the Care Quality Commission's formal audit procedures? At least once a year, the Health Committee looks at the way the Care Quality Commission operates, and I am sure that is something in which that Committee, on which I also sit, would be interested.

Jane Ellison: In the Government's response to the Committee, we said we would work with CQC and seek their support to ensure that health care providers are implementing best practice guidelines. We are committed to that, and developments on that will be included in the update we give the Committee before the end of the Parliament.

Q15 David Tredinnick: What is the priority for the Department: patient safety or hospital process?

Jane Ellison: The Secretary of State for Health has made it quite clear that patient safety and patient care is the absolute priority for all of us as Ministers and for everyone working in the health service. I do not think people would ever see it as an either/or. Patient safety has to come first, but, equally, there are processes. It is perhaps a boring thing to talk about, but sometimes we have to work through the process in a certain manner to make sure we get the right and safe outcome. Sometimes doing things quickly and following a safe process seem to be in tension, but our job as Ministers and the role of our experts within the system is to make sure that we pursue our objectives for patients as quickly as we can, but also as safely as we can. We would be disturbed if we thought that process for process's sake was standing in the way of anything, but very often we have to go through a necessary programme of tests before we can put something into effect at the front line. George can speak to his own post, but in part one of the reasons the role was created was to check that we are bringing things into play as quickly as we can and are being as responsive as we can be to emerging technologies.

Q16 David Tredinnick: Between you, are you confident that the health service is adopting new technologies, when they are available, that increase patient safety? When there are new technologies that can help with patient safety—better analysis of problems and better systems of providing care—are you confident that you are on the pulse?

George Freeman: Yes, I am very confident that we are on the pulse. There are two bits in the question. Are we confident that we are adopting them fast enough, and are we

confident that we are adopting them in a way that has patient safety right at the heart of it? On the latter, we are absolutely confident. I do not think there has been any sense that we are playing fast and loose with patient safety. I think the answer to the first question is: not fast enough. That was a central part of my appointment and the review I launched two weeks ago. Across the board, we can see innovations that have nothing but benefit for patient safety, not least the use of data, greater transparency, new diagnostics and new devices. If we can implement and adopt them more quickly in the system, they will have benefit for both patient safety and health outcomes.

Q17 David Tredinnick: We are coming to antimicrobial resistance in a moment, but the point of this question is to test whether you are actually looking around for the new systems and trying to find new approaches that might mitigate some of the problems we have with some of our current treatments.

George Freeman: Yes, and that is utterly central to my role. I was not sure whether your question was suggesting a tension between patient safety and innovation.

Q18 David Tredinnick: It was.

George Freeman: If you look at the use of patient data, we have been absolutely clear that patient safety and patient benefit is the determinant of policy, and in appointing Fiona Caldicott as data protection commissioner we are making sure that is four-square behind the policy.

Jane Ellison: It is also worth noting that in the recent "Five Year Forward View", Simon Stevens put innovation and bringing quickly into use things that can be of benefit, particularly things that can both benefit patient safety and save the NHS money, right at the heart of that forward view for the NHS. There is significant recognition that, where innovation can drive both of those twin goals, the NHS needs to do more, but the fact that they have put it as a central part of their vision for our future NHS is encouraging and important. It is right at the heart of that strategy.

Professor Walker: You specifically raised decontamination. We are undertaking a programme of research into that area, as well as protein identification. The Advisory Committee on Dangerous Pathogens has formed a working group to examine the results of that research and it will report back, so we are actively following that up at the moment.

Q19 Stephen Mosley: As David mentioned, earlier this year we looked at antimicrobial resistance. A few days before we published our report, the Prime Minister stood up and announced a review into the economic issues around antimicrobial resistance under Jim O'Neill. How is that review progressing?

George Freeman: Well, is the answer. I welcome the Committee's work on this, because it has helped to support the work the Department is doing and to signal round the world that this country is again stepping up to the plate and leading on this. You mentioned that the Prime Minister had appointed Jim O'Neill. His first interim report is imminent.

Perhaps I should say at the beginning that there are two parts to this. The first is to make sure we prescribe smarter and that we reduce the overuse of antibiotics to try to slow the rate of acceleration of antimicrobial resistance. The second part of it, which is the bit I am particularly focused on, is how we accelerate the landscape for the generation of new treatments and tackle some of the problems in that landscape, in which I know the Committee has a strong interest. A huge amount of work is going on both through the review and within the Department, working with the royal colleges and looking at Public Health England's infection control methods and the prescribing guidance. The Department is pursuing a whole series of mechanisms to try to reduce overuse.

On the development of new drugs side, which falls more within my purview, the Office for Life Sciences, for which I am responsible, is now running as a joint BIS and DH organisation partly for this sort of initiative, to make sure we are developing joined-up policy. We set up a working group to pull together the key stakeholders in the antimicrobial field. I know from bitter experience, having helped to start an antimicrobial company many moons ago, that it is a very long, slow and high-risk business to try to identify a novel pathway. The great problem in this sector, as you well know, is that we have seen new and improved compounds—drugs—for many decades, but they target the same essential pathway, which makes it very easy for bacteria to develop resistance. What we really need is a wholly new pathway.

There are some real challenges in this sector. Not only is the science hard but it is a particularly challenging business model. If you develop a new antibiotic, unlike in other drug areas, they are relatively short treatments. If it is a new target, it will probably be a last line of defence therapy; it will not be one we try to start with. We take the product, put it on the shelf and say we will use it when we have to, in relatively small batches and doses for quite short periods. Companies put in huge sunk investment costs, which they need to recover through the short period of patent protection at the end. It is a challenging business environment, and that is why I am pulling together this group at the Office for Life Sciences to look at whether, particularly in this sector—because those challenges are writ large across the drug discovery landscape—there is anything we can do to support long-term investment, use our NIHR platform, accelerate the use of data and genomics, and develop new treatments. We are looking at our health service platform but also our business environment to see whether we can make the UK the best place in the world to do novel antimicrobials.

To go back to the point about the CMO, through her leadership on this we have set up the global action plan. We managed to lead on getting the WHO to pass a resolution in May, following the 2013 summit which pulled together the Commonwealth heads on this. This is an area where Britain is leading in putting together what must be a global effort.

Jane Ellison: The last time I gave evidence the Committee was concerned that in the period when we were waiting for the O'Neill review to report, a little way distant, we did not do nothing. We can give the Committee an assurance that plenty is going on in the meantime. George mentioned the Office for Life Sciences, which is his area. The Department of Health is working with them, pulling together key industry stakeholders and other people to look at what more can be done in the interim. It is not just a case of waiting for the O'Neill review to report.

Q20 Stephen Mosley: To turn to a slightly wider issue than antimicrobial resistance, what is being done to ensure that the NHS is more receptive to trialling and procuring innovative technology?

George Freeman: I hope you have seen—you may not have received it yet—a formal letter to you with all the terms of reference of the review I launched two weeks ago, which is precisely to your question. It is looking at how we can better align our landscape for bringing innovative medicines into the health service for patient benefit, and use our profound global advantage through the jewel that is the NHS—an integrated health system with an NIHR platform at the heart of it. The review is looking at how we can use that NIHR platform to bring innovative medicines and medical technologies—devices and diagnostics—to patients much earlier, and move away from what I call a 20th century model of development, which is deep research in universities, which, if you are lucky, is licensed or spun out into a venture that raises money and is then acquired by a bigger company. They take it through phases one, two, three and four and bring it back eventually to the patients waiting patiently.

In the new landscape, as this Committee well knows, the key is not to develop blockbuster one-size-fits-all innovations that are claimed to work in everybody or can be shown to be safe and work in everybody. There is always a bell curve of impact in different patient groups. The revolution in genomics and data now allows us to work out much earlier which drugs will work in which patients. We have an extraordinary ability in the NHS, which is why we are investing in genomics and data, to become a partner in the development of new targeted therapies. That means working with patients much earlier in that NIHR platform.

The review is about how we can use the early access to medicines scheme, which we launched earlier this year, to allow us to do heavily supervised research medicine with volunteer patients and research clinicians through the NIHR, to put innovations into patient groups—small cohorts of highly monitored and supervised patient studies—and use those insights to work out with NICE and MHRA what the appropriate roll-out would be into wider cohorts. It is a different model of research. We are genuinely hoping that industry, big and small, and charities and patient groups will come to the table with us. We are doing it as an external review; it is not something where we think we have all the answers in the Department.

Q21 Chair: Mr Freeman, before we move on from the question Stephen Mosley raised, you mentioned in your response that the business model for antimicrobials is a difficult one. It is fairly obvious. We want to create a silver bullet that we will not fire very often. It is a difficult model. How far is your review digging into that business model? For example, I know there has been discussion before with the Department about moving to a licensed model rather than a procurement per pack model.

George Freeman: We are very keen to invite comment across the board in different disease areas. Cancer has very much pioneered in a lot of the genomic treatments and companion diagnostics. Rare diseases are a particular challenge. We have small patient cohorts that often make that model of very long-term, expensive and highly-regulated development non-feasible, but where there are possibly off-label drugs we can use data to see whether they might have a beneficial impact in a particular patient cohort. While the

review is open and spans all therapeutic areas, I take this opportunity to signal that particularly for AMR we are interested in ideas about how we might use that platform to accelerate innovative medicines. That is absolutely what this is about.

Q22 David Tredinnick: Wearing the hat of the chair of the all-party group for integrated health care on complementary and alternative medicine, as well as being a member of the Health Committee, I know that Dame Sally has written a book entitled "Drugs Don't Work" and you, George, have told us how difficult it is to find new pathways, so don't you think we should be making greater use of properly regulated complementary and alternative medicines? The landscape has changed. For most acupuncturists regulation is overseen by the Professional Standards Authority. Lower back pain is one of the main problems in the health service. The Society of Homeopaths, which is the largest group of homeopaths, is now regulated by the Professional Standards Authority. Doctor homeopaths have been regulated by Act of Parliament since the Faculty of Homeopathy Act 1950. I put it to you that with patient choice at the heart of the health service, which Ministers keep repeating, and personal budgets that allow patients to choose whatever they like, we cannot put all our effort into developing new drugs. Some of it should be looking at existing systems: acupuncture; herbal medicine; homeopathic medicine; aromatherapy; tai chi; shiatsu, and all that stuff. There is a whole raft of them which goes on into the distance. Why do we not use more of it?

George Freeman: Perhaps in a minute I will invite Professor Walker to say something about some of the specific areas you mentioned. I think the general point is extremely well made. The more we look at data and outcomes across the whole disease journey, and the whole patient journey and experience of disease, one of the things we want to uncover through the release of data on health outcomes and on episode statistics are the wider patterns. Often quite low technology interventions and lifestyle changes have very profound impacts and benefits, particularly in obesity, diabetes and some of the dementia insights. As well as deep science for a biological cure, there are things we can be doing now that will help delay onset and progression. These are very low cost but very high impact in terms of helping the system deal with the chronic disease burden that is coming. It goes back to the earlier questions of the Committee about science and the importance of evidence at the heart of policy making.

The reason I am so excited about the opening up of outcomes and clinical information in the system is that it will quite quickly drive some new thinking about low-cost innovations that have a much bigger impact on health. It is absolutely vital that the public know that we are using our privileged access to system-wide information to help generate new insights which do not necessarily all have to be very expensive new drugs or white powders. They are just as much going to be low or high technology devices and diagnostics, or even just changes to lifestyle or many of the complementary therapies you have discussed. It links to the wider agenda of research-based medicine, and how we make sure we are looking at what really changes a patient's experience of disease. That is why I think the NIHR platform embedded at the heart of the system is so valuable.

Jane Ellison: We have always said that we are interested in evidence of efficacy and cost-effectiveness. That is a reasonable place to start in terms of looking at the potential of anything to affect human health for the better, but from my own point of view I would look to be led by the evidence.

Professor Walker: I agree with that. We have a responsibility to ensure that treatments offered on the NHS are both safe and effective, because there is competition for limited resources. We could not stop using something that was safe and effective in order to use something that was not. The same evidence barrier should apply to any therapy that is being considered. There is no particular reason why we should not use complementary medicines, but they have to go through the same process and be as effective and safe as the alternatives.

Q23 Stephen Metcalfe: I want to go back to antimicrobial resistance. Minister, you talked about the challenges of both the pipeline and the prescribing sides. We all understand the issue about getting the pipeline to work, but there is also the trend in prescribing. It is pretty widely recognised that, if we want to preserve what we have, we have to prescribe less of it, and that is part of the Government's approach. However, between 2010 and 2013 consumption in England increased by 6%. Why is that?

Jane Ellison: You are probably referring to the figures that came out of the most recent Public Health England survey. We had an interesting debate in Westminster Hall where we touched on some of this. In truth, that provided a solid platform of the actual picture. I do not think we ever had a full picture of the prescribing landscape and I think we now have that. You are right; it is a concerning picture and we have to do better from here, but in part what might have looked like a deterioration is just the fact that we now have a complete picture; we did not have that before. We have to use that as a baseline from which to move forward. A number of pieces of work are under way to look at prescribing practices. They are very variable. If you look at the map that came out of that, there is enormous regional variation. We cannot take a one-size-fits-all approach to digging down into that to understand what is going on there, even to the extent that within different NHS areas there are different GP practices and very varying rates of prescribing. There is quite granular work to do on that, and now we have that baseline of knowledge, we can go forward.

Q24 Stephen Metcalfe: When would be a good time to look again at the numbers? We have a baseline established in 2013. Obviously, you have to take measurements as well to determine if prescribing is going up or down, to work out whether your approach is working. How long do we need to leave it before we can see whether the approach is working?

Jane Ellison: We have already committed to Parliament and this Committee. We have an AMR strategy. All up-to-date prescribing information would always be part of our annual updates in that strategy. To that end, we are hoping to have the first update out very soon. It is a little bit delayed, but it will be out soon. We will be looking to give the Committee 24 hours' advance notice of that. That would be the point at which we would monitor our progress in that area, among others. I am sure there will be intervening moments when we get the data, but I would see those annual updates as a point at which we would monitor our progress in a key area.

Q25 Stephen Metcalfe: We will be able to draw direct comparisons in the update against this report, this baseline.

Jane Ellison: What we have now is something from which to move forward. I do not know whether David or George want to say something more, but we now have a much more stable baseline from which to move forward, and we will be measuring progress.

Professor Walker: We will have even more granular data in the future. We have now started to publish prescribing data by NHS England area for primary and secondary care. I think there will be a lot more opportunity for deeper analysis of what is happening.

Jane Ellison: That is already part of the Government's commitment to more transparency. That sort of data is relatively uncomfortable if you have an AMR strategy and you are trying to reduce unnecessary prescribing, but the fact that it is in the public domain and we take it as a baseline from which to move forward is important in facing up to the scale of the challenge.

George Freeman: That is why we are taking the unusual step of supporting Jeremy Lefroy's private Member's Bill, which is about patient safety, transparency and accountability. If it does not get on to the statute book, the Department is signalling very strongly that it would seek to do that in a different way. It provides for the electronic health records of patients to be maintained in a way that shows their prescription and compliance history, and integrates social care with primary care and hospital care data. This is one of those areas where understanding what the levels of use and compliance and outcomes are and how they are related is incredibly important to driving policy, picking up best practice and exposing worst practice.

Jane Ellison: There is an important interaction with the public here as well. That is one of the most challenging things. Many doctors will say to you that the pressure they are under to prescribe is enormous. We need to understand those pressures and respond to them. Even since I last gave evidence to the Committee, the profile which AMR has started to build in the public's mind, with the Longitude prize being awarded or whatever, is a helpful step towards getting a public dialogue which allows us to have those conversations. We have just had the European-wide antimicrobial resistance day of action, which was on 18 November, when material was circulated through health service outlets to highlight that to patients, but they need to be part of that dialogue too.

Q26 Stephen Metcalfe: You talked about working with doctors. The chief medical officer said that the Government needed to support not just doctors but all other prescribers as well. Can you tell us a little about what you are doing specifically on that? You talked of public awareness. One suggested example was the post-dating of prescriptions for three days from appointment to prescribing in case the problem clears up without the need for antibiotics. Has any of that been implemented?

Jane Ellison: The NHS is taking some of this forward. It is something on which I would like to write to the Committee. When we provide our update there will be more information in that. If the Committee would like specific examples of some of the work going forward at that level of detail, I am happy to write.

Q27 David Tredinnick: I want to ask a question about clinical trials. What action have the Government taken to increase public awareness of and participation in trials, and have you any evidence of success?

George Freeman: I can give you the latest data, which are incredibly encouraging. Only yesterday I was in Liverpool with the National Institute for Health Research, launching the north-west coast clinical research network, which is about getting patients into research. David may have the latest numbers. The NIHR's rate of patient recruitment into trials this year is up 24% or 25%, which is a significant increase. Really encouragingly, we are beginning to see the UK rise up the league table in terms of first in man, first human studies, so we are leading in the sense of getting treatments into the UK for patients.

The NHS runs an active programme of promoting patients' engagement in research within hospitals. We are investing through the NIHR in clinical trials research nurses and front-line staff in hospitals. All the evidence is that when patients are engaged in research they feel more supported; there is more information; they are positive about the experience; and they feel as though they are getting, rightly because they are, access to the very latest treatments. There is a very strong message. If you go back to the NHS founding charter, research was always right at the core of it as a national public health system, using its privileged position to support the prevention of disease. We are seeing it in genomics where NHS patients are coming forward to volunteer to be part of pioneering research work. I do not know whether David has the latest figures.

Professor Walker: The figures for recruitment to trials through the NIHR clinical research network show that in 2009-10 we had 450,000 people recruited; in 2013-14, that had risen to 600,000, which is a significant rise. We also have a lot more interest in our online resources. The UK clinical trials gateway visits online rose from 60,000 in 2011 to 170,000 in 2013. We are seeing a lot more interest from the public.

George Freeman: One of the first things that we are hoping will be the consequence of releasing to patients from this spring free of charge on-demand summary care records is that many of them will plug that information into research charities. Some may be interested in being first adopters of health apps and the whole revolution in that area, but we hope that the big change will be patients actively engaging through charities in research.

Q28 David Tredinnick: You paint a very rosy picture, which is good, but do you think you have done enough to increase the profiles of the Health Research Authority in the clinical trials gateway? It has been suggested to us that the new Health Research Authority approval process may be putting patient safety at risk. Is that right?

George Freeman: I am surprised to hear that. I am not given to rosy gloss on all things but to being quite rigorous about where we are failing. I think that on this one it is a pretty good story. The Health Research Authority is setting very high ethical standards and regulatory reassurance around research. The data suggest that patients are responding and becoming engaged; the numbers are up very significantly; and we have brought down the time to first patient enrolment in trials. I keep my foot to the floor, but I think that generally we are doing reasonably well in this space. There is always more to do.

Q29 David Tredinnick: How many visits does the clinical trials gateway receive each month?

Professor Walker: It is about 14,000.

Q30 David Tredinnick: Are the Government doing all they can to make sure that the clinical trials listed on it have lay summaries, which I think is the jargon?

George Freeman: I will happily look into it. It is a really good point.

Jane Ellison: Can I chip in quickly on clinical trials as we are waiting for the next question? At some future meeting, the Committee might be interested to look back at the work that has taken place and is taking place on Ebola—that has been one of the areas in which there has been very swift work across the globe—and how some of those vaccines could be accelerated into possible clinical trials. The interest that the public have had in the progress of that has been enormous. At some future point, hopefully when this dreadful outbreak is behind us, it would be an interesting area of inquiry to look at what has been done in terms of global co-operation to accelerate that process, because some quite exciting work has been done, and the UK has been at the heart of it.

Q31 Stephen Metcalfe: We did a report into medical implants. One of our concerns was that the evidence base for some of them was not as good as it could have been and they were approved on equivalence data. Can you talk a little bit about what the Government are doing to increase transparency as regards how implants are approved, and also what they are doing in terms of using the black triangle scheme, and what recommendations they give on that?

George Freeman: I will invite David to touch on the detail of those two schemes. The Committee's work on this is incredibly helpful. It is worth highlighting the big picture. The regulation of devices is an area where the European Union, and Britain in it, has been very forward looking. We lead internationally on it, and it has been a reason why we have had very strong investment in Europe and the UK in devices. We have brought innovation to patient benefit.

Recently, I was in the US, where there are huge complaints about the FDA holding up the bringing forward of innovation, and the EU, the MHRA in Europe and in the UK were congratulated. We recognise there is a problem. While the notified bodies procedure system is a huge strength, the variation across the ever-widening European Union is a challenge. We have been pushing very hard to make sure that ELA tightens up on it and that the discrepancies in the system are ironed out. You may have seen last night a "Panorama" equivalent in Dutch—I shall not attempt to translate the Dutch for "Panorama"—which looked at some of the issues across Europe. The European Union, encouraged by us and others, is bringing in new regulations on notified bodies. We are taking what is basically a strength in our system and making sure that shopping around for easy jurisdictions and low barriers is ironed out, and we have a genuine common market and single standards, but with the flexibility that is a real strength of our system. David, do you want to comment on some of the detail of what is going on?

Professor Walker: I do not have detail about the specific issues, but I would be happy to write to the Committee if there are specific details that you need.

Q32 Stephen Metcalfe: Minister, you have set out very well the landscape about how things are improving, but how do the public know? How do you make that information more available? Are you aware of the black triangle scheme, and how has that been received?

George Freeman: I am very aware of the black triangle scheme. It is an interesting question. I do not have the data and figures here on public awareness of it, but I will go away and ask for them. These schemes are all about making sure that we build public trust and reassurance, and people need to know how to follow up and make inquiries. I will happily look into that.

Q33 Stephen Metcalfe: The other recommendation in our report was that, when implants are explanted, there should be an analysis and collection of data to see how they have been performing. I think the Government said it would be very difficult to do that. Have they had any thoughts since the report was published?

Professor Walker: I have no knowledge of that.

George Freeman: This is a very technical issue. We wholly support the recommendations that you and others have made. It is not just a question of doing the procedure; you then need to look at the data and the information. There is active work going on to make sure that we are doing that, and I will happily write to you with the detail of where we have got to.

Q34 Chair: It would be helpful to know that. We are aware that at least one heart device has been withdrawn because of a technical failure that was not spotted in the trial procedures. It could be an incredibly serious issue for a patient, so any information you have would be helpful.

George Freeman: We would be delighted to do that.

Q35 Stephen Mosley: In the Government's response to our report, they said that the MHRA was looking at the culture of medical professionals reporting problems with implants. Has there been any indication of a change of culture among medical professionals, and are we seeing more problems being reported?

George Freeman: I am glad you raise this because it is a really important point. The MHRA has been actively supporting voluntary initiatives for much greater collaboration and sharing of information between manufacturers, regulators and clinicians. One example, which was briefly highlighted in the Government's response to the Committee, is the beyond compliance initiative which has been established to increase the availability of short and mid-term clinical data. It offers advice to medical device manufacturers on the design of post-market clinical follow-up studies. The MHRA has also begun developing a voluntary UK vigilance transparency scheme. Quite a lot of work is going on in granular

detail and, if it is helpful, I will happily drop the Chair a line on the MHRA's work on that and the progress with it.

Q36 Chair: Thank you very much for your responses this morning. It is a fascinating area about which we will undoubtedly be leaving reminders for our successor Committee. It is one where both Parliament and Government have a public duty to get it right and to try to co-operate with each other on incredibly important issues.

Jane Ellison: Absolutely. We will be writing to you ahead of the public update on the MHRA strategy. We will write to the Committee as we said we would.

George Freeman: This is one of those areas where it is absolutely essential to have public trust and confidence. The public have every reason to have strong trust and confidence, and these sessions and our transparency in revealing what is going on in Europe and the UK regulators are incredibly important and helpful in maintaining it.

Chair: Thank you very much indeed.

Examination of Witness

Witness: **Mr Nick Gibb MP**, Minister of State for School Reform, Department for Education, gave evidence.

Q37 Chair: Minister, good morning and welcome. We are thin on the ground because all sorts of other things are happening in the House today, as you are aware. In fact, you were almost whizzed off to another Committee; I think your officials were trying to put you into the Education Committee as well. There is a lot happening in the House, and I apologise that we are a little thin on the ground. First, can you explain to us how the Government's policy of "exhortation and facilitation" has worked out in relation to science education?

Mr Gibb: If you look at the take-up of A-levels, for example in the sciences, in biology they have gone up from 52,000 in 2010 to 55,000; in chemistry from 40,000 to 47,000; and in physics from nearly 28,000 to 31,000 between 2010 and 2014. We are certainly seeing a higher uptake in A-levels of these key sciences. The Your Life campaign, which is designed to encourage young people to continue taking science at A-level, was recently launched. I think that is going to be very successful, so the exhortation is working. The other statistic is that maths is now the most popular A-level choice for sixth formers.

There is a key role for Ministers to play in sending a message from the centre that sciences are very valuable. One of the key messages we have tried to repeat time and again is that those who have advanced level in maths will, on average, earn 10% more than similarly able people who do not have that particular qualification. We continue to press the message, and I think it is having some effect.

Q38 Chair: We are on board with the message, and we want to explore some of the details as this session develops. Have you any evidence that that drive—exhortation and facilitation—has increased the number of field trips, or improved the provision of practical science education in schools?

Mr Gibb: In revising GCSEs, as well as making them more rigorous academically and bringing more mathematics into the GCSE sciences, we have a clear expectation. For example, I have in front of me the combined science GCSE subject content. It has things such as "apply a knowledge of a range of techniques, instruments, separators and materials", and "carry out experiments appropriately, having due regard to the correct manipulation of an apparatus". If you look at the changes to the A-level, there is now a requirement, which there wasn't before, of 12 practical activities that you need to carry out as an A-level student: things like "use qualitative reagents to identify biological modules" in biology; in chemistry, "filtration use, including use of fluted filter paper, or filtration under reduced pressure; titration using a burette and a pipette"; and there are similar requirements in physics. Over those three A-levels there are 36 requirements for practical activities, whereas under the previous A-levels you could get away with undertaking just two particular practical experiments.

Q39 Chair: As part of that, it is obviously important that we improve the scientific knowledge and skills of teachers. Can you point us to any evidence of success within teaching schools?

Mr Gibb: The teaching schools are a recent innovation, but what we have sought to do is fill the gap in specialist graduates coming into teaching with those degrees. It has always been very difficult, over many years, to fill all the target number of graduates coming into teacher training, but we have been successful in raising the degree level. There is a higher proportion of 2.1s and first-class degrees coming into teacher training now, and we have given very generous bursaries—£25,000 for firsts in those key subjects, £20,000 for 2.1s and so on—to encourage more high-quality graduates in those shortage subjects to come into teaching.

Q40 Stephen Metcalfe: I want to touch on the practical exams in science. We heard evidence earlier this year from a large number of people, and although they recognised the improvements that had been made in the way A-level science was examined, and that the 12 activities were now mandated, there was some concern. Can you give us an update on how the exams are going and on Ofqual's examination guidance for practical science, and when you will judge whether this has been a success or a failure?

Mr Gibb: That is a good question. This is a matter for Ofqual, as you indicate in your question. They were concerned about the previous way practicals were assessed. They felt they did not discriminate properly; that there was a clustering of gradings towards the top end; that students were over-prepared for those assessments; that they narrowed the range of practical work being performed during the two-year course; and there was not a correlation between the grades awarded for practicals and the grades similar students achieved in their written exams. They felt that it was not a reliable process. We gave Ofqual clear independence—we strengthened their independence and their objectives—so we have no power to intervene to change their judgments.

Q41 Chair: Of course you have power to intervene; you are a Minister. You appointed Ofqual, so you can do other things as well.

Mr Gibb: Yes, but we gave them very clear independence because they are a regulatory body. We want them to have that independence. We are talking about assessment, not subject content, and it is important that we do not interfere in how they judge, using all their expertise, that subjects should be examined and assessed. They had a concern. We have a policy imperative, which is the same as this Committee's, that we want students to be equipped and skilled to perform experiments. We are sensitive to the concerns of the universities that too many undergraduates are starting university ill equipped to conduct scientific experiments—ill equipped with bench skills—so we want to ensure that they have those skills.

In answer to your question, the way Ofqual decided to assess those skills at A-level is for a pass/fail grade to be recorded on the certificate, based on teacher assessment of those students over two years of those 12 practical activities, and to have a written element in the A-level exam questioning how they would conduct experiments, but no actual practical assessment as such.

Q42 Stephen Metcalfe: I think we all recognise the fact that there was going to be a mandated element to this, which was welcome, but there was a lot of concern about the way it was going to be graded and examined. Ofqual said that no alternatives were proposed, but we heard quite a lot of evidence that alternatives were proposed. I hope you have seen our video letter to you with various other suggestions. Don't you think we should be listening not just to Ofqual but to the wider scientific community as well when it comes to how we assess practical science skills?

Mr Gibb: I do. I have very frequent discussions with Glenys Stacey and her advisers and I have challenged her very strongly on this issue, because the policy imperative from the content point of view, which we are responsible for, is to have children leaving sixth form equipped to undertake undergraduate science degree study. But there were difficulties with all the alternatives put to Ofqual. For example, I discussed anecdotally with someone how it was assessed in the past. You could bring in 30 dead frogs to be dissected, and measurements had to be recorded. Why can't you do that? There are all kinds of practical reasons why that cannot be done. Once it becomes clear that 30 frogs have been sent to every school in the country, it is clear what is going to be assessed, and there is a danger that the surprise element of the exam—the unpredictable element—is lost. There are real practical difficulties with that approach. At every stage, we have challenged Ofqual, but at every stage they have given very clear guidance that their judgment, based on their evidence, is that the solution they have come up with is the best approach, and I think it probably is the best approach.

One of the changes we made to the key stage two assessments in reading and writing was that the writing element for young people would be assessed by teacher assessment over year six. I think the quality of writing has risen as a consequence. There is a case that having 12 practical skills that young people need to learn in the sixth form per scientific subject will result in young people leaving school with better skills than they would have had if we had retained the assessed practical skills in the previous A-levels.

Q43 Stephen Metcalfe: As you are fully aware, the scientific community outside Ofqual does not agree with that. I understand that reforms are now being proposed for GCSE science

practicals. Do you think they are along the same lines? Can you explain the process that you will go through to decide whether or not to do it in the same way as has been done with A-levels?

Mr Gibb: Ofqual consulted on this last year and they are now considering the responses to those consultations, and also their own position as a result of the research and evidence on the A-level. We are waiting to hear from Ofqual what they have decided for the GCSE, so that question is still open. We await their advice.

Q44 Stephen Metcalfe: But if the changes go ahead as proposed, will an A* fail be better than a B pass?

Mr Gibb: I hope that all young people will pass their practicals if that is the approach taken, whether it is at GCSE or at A-level.

Q45 Stephen Metcalfe: That is not the approach adopted in most other examinations; there is always a degree that has to fail to make the pass valid.

Mr Gibb: Not necessarily. The aim in the driving test is for everybody to pass, albeit that some fail—rightly so, for the safety of our roads. I am hoping that young people will be properly taught how to conduct those practical experiments. Of course, there will be some who do not pass. Schools tell me that practical experiments are a motivating factor in encouraging students to knuckle down on the written element, the academic side of scientific study. I do not think we will see schools skimping on the time devoted to the practical elements at either A-level or GCSE.

Q46 Stephen Metcalfe: From a ministerial perspective, recognising Ofqual's independence and despite all the objections from all the other organisations, groups and individuals, you are not minded to ask Ofqual to have another look at this; you are supporting them.

Mr Gibb: That is a different issue. We continually challenge Ofqual on a range of issues, but I am always very careful not to step beyond the red line on the ground where we begin to undermine Ofsted's credibility and independence.

Q47 Chair: Ofqual.

Mr Gibb: What did I say? Ofqual and Ofsted, but in this instance it is Ofqual's independence as an assessor—a regulator of the assessment process.

Q48 Chair: We are going to explore this a little further during the course of the morning. At the end of it, hopefully we can all agree that there is a strong message out there from groups with far greater expertise than you and I have that there are alternatives Ofqual ought to consider. It is our contention that they have a duty to consider them and give adequate responses to them.

Mr Gibb: The people you are talking about are experts in science.

Q49 Chair: Science education.

Mr Gibb: Yes, but they are not necessarily experts in what motivates schools and they are not necessarily experts in assessment.

Chair: But the point that cannot be avoided is that, if you follow this logic with science practicals, you have to do the same with music and other things that have strong practical elements to them. That does not seem to be in the game, and that is why we are somewhat frustrated by the responses we receive.

Q50 Stephen Mosley: Staying on practical science, should all schools have practical science facilities that are fit for purpose?

Mr Gibb: I think they should. Considerable capital has been allocated to schools in this Parliament, despite all the austerity and the problems we have inherited with the public finances. How that money is spent in building, repairing or refurbishing schools is a matter for the school, but as a Minister I believe very strongly that all schools should have libraries and all secondary schools should have very good quality science laboratories.

Q51 Stephen Mosley: We have seen evidence that that is not the case. We heard from SCORE. They published a report last year which said that "many state-funded secondary schools and sixth form colleges lack sufficient equipment for basic practical work". What are you doing to make sure that all of them have fit for purpose science facilities?

Mr Gibb: All we can do from the centre is exhortation, but we also provide the capital for schools to improve the fabric of their buildings and facilities, and a considerable amount of money has been allocated for that over the last four years, despite all the public financial constraints in the public sector. It is very clear from the new curriculum, at both GCSE and A-level, that practical work is a requirement in the content, and that is something we can determine from the centre. If schools want to do well in performance league tables and want their students to get the highest grades, they will need to have these facilities. That is the way we have to operate from the centre. What we cannot do from the centre is have a dirigiste approach to how every school will be built and operated. That is not the school-led autonomous system we are trying to create in this country. The way to get the best out of our professional teachers and head teachers in this country is to give them autonomy and to have a school-led system. Having said that, the curriculum is very clear, and capital, to the extent that it can be, has been made available to schools to improve their facilities.

Q52 Stephen Mosley: If there is a school with inadequate practical science facilities, that is the fault of the head teacher and governors; they are spending their money on other things.

Mr Gibb: It may not necessarily be their fault; they may have inherited poor facilities, and they may be seeking to improve them. If they want to achieve the best Ofsted grade and the best exam results, they will know that the only way to do that is to have good facilities, whether it is in science, literacy or the arts.

Q53 Stephen Mosley: When we were speaking to Ofqual about the reformed science practical examinations we were told that, effectively, they had to be dumbed down to accommodate schools with the least resources. As a Minister, should you not be exhorting schools to improve school laboratories that facilitate excellent science practical teaching rather than dumbing down practical examinations to accommodate schools that have not made that investment?

Mr Gibb: I saw Tim Leunig's evidence, which made that point about pupil referral units. I do not think that is where Ofqual is coming from. Ofqual's concern is about the reliability of directly assessing practical skills. The difficulty in distinguishing different levels of ability by assessing it in that way is what drives Ofqual's decision to have a pass/fail approach, and to have this assessed by the teacher over the period of a two-year course.

Q54 Stephen Mosley: On a slightly different issue, in 2011 we looked at the pay, conditions and career structures of science technicians and came to the conclusion that they must be improved if we wanted high quality science practicals in schools. The latest report we have seen suggests that problems still exist. What are you doing to try to address that issue?

Mr Gibb: Again, this is not a terribly satisfactory answer from your point of view. Technicians' pay is a matter for the school. We believe in school autonomy, but we have given schools greater flexibility in how they pay their staff, whether it is teachers or technicians. If schools want the best facilities and the best exam results and if they want to encourage parents to send their children to the school, they will want to make sure they have good quality science facilities, including properly rewarded lab technicians.

Q55 Stephen Mosley: From your personal perspective as a Minister, can you reassure us that you appreciate the situation lab technicians find themselves in and that you recognise the important work they do?

Mr Gibb: Absolutely. They are very important. I do not know how any secondary school would be able to function and provide good quality teaching in the three sciences if they did not have well-motivated and skilled technicians ensuring that the laboratories are properly equipped.

Q56 Chair: As part of your exhortation you could, for example, encourage schools to ensure that technicians had the opportunity to gain charter status. That would be a good initiative, would it not?

Mr Gibb: It would. They certainly have access to CPD through the National Science Learning Network.

Q57 Chair: There is the other side of the coin—it comes back to the same problem. You explained to Stephen Mosley what was happening with investment in buildings, but if I was a head teacher, and Ofqual say that science practicals are nowhere near as important as they used to be, why the heck would I invest in laboratories? Why the heck would I invest in

giving CPD to my technicians when I need them to do jobs in the school? There seem to be some countervailing tensions.

Mr Gibb: It is schools that are exhorting us about the importance of practicals. They are telling us as Ministers that it motivates young people to knuckle down and focus on the academic side of science. Given that schools want to do this, I do not believe we are pushing at a closed door. The issue is how you assess it.

Q58 Chair: I am sure you did not mean to say what you just said, because it came across slightly wrongly. You are implying that practicals are not academic.

Mr Gibb: They are.

Q59 Chair: They are very academic.

Mr Gibb: I agree with you totally, and I stand corrected.

Q60 Chair: Our problem is that people are devaluing what is a critically important part of science education.

Mr Gibb: I meant "paper based" for the non-practical academic side.

Q61 Stephen Metcalfe: I'd like to move on to the teaching of engineers. I think it is pretty well established that we have a shortage of engineers throughout our economy. Whose responsibility is it to ensure that that gap is filled? Is it the Government's or the market's responsibility?

Mr Gibb: It is obviously a combination of both, but clearly the Government have a crucial role to play in ensuring that we have young people leaving the school system and our university system who are properly educated to fill that role. We have a massive shortage and requirement for engineers in this country. One of the key things to do is ensure that young people are better educated in terms of mathematics at primary school level, secondary school level and sixth form. That is a key driver of all the reforms to the primary curriculum.

People are not totally aware of what the changes have been in the primary curriculum in raising the standard of mathematics. There is a very significant difference from the previous curriculum. That came into force this September. Even though science has always remained compulsory to 16, we have still seen a rise in the numbers taking sciences at GCSE, and we have seen a huge rise in the numbers taking biology, physics and chemistry at A-level. We have also improved the quality of engineering qualifications.

Q62 Stephen Metcalfe: I accept that more people are doing science, and there is generally a greater focus on science in schools. What I am concerned about is that that does not seem to be translated directly into engineers. While there is greater focus, we are perhaps not focusing enough on the engineering aspects. Is that because in schools the careers advice that is given,

where it is, does not necessarily highlight the potential opportunities that engineering brings? Do you think careers advice in schools can bridge this gap?

Mr Gibb: That is an important point. As part of the Your Life campaign, which is about encouraging year 11 children to opt for sciences at A-level, one of the issues that came up in our discussions with the business leaders leading that campaign was the image of engineering: that you will get oil all over your hands if you become an engineer, whereas the truth is that engineering has a vast array of very well-paid careers. It is a messaging issue. We have to get it across that engineering is a lucrative, interesting and demanding world, and we want to encourage more young people, particularly girls, to go into it.

You make an important point about careers advice. There is a duty on schools to provide good quality careers guidance, but I know that the Secretary of State wants to do more to ensure that it is of proper quality and that it is available. She will have more to say on that later.

Q63 Stephen Metcalfe: I think Ofsted reported in September 2013 that schools were not fulfilling their statutory obligation to provide good careers advice. Do we know whether that has improved in the last year?

Mr Gibb: We have given the National Careers Service a new role to help schools by providing links with employers. That came in this October, so it is fairly new. We have also revised statutory guidance on the issue to emphasise the importance of face-to-face careers guidance. I think you are right—there is more to do, and that is something the Secretary of State understands. We want to make sure we improve careers guidance in schools, because it is important that students are made aware of every opportunity there is.

Q64 Stephen Metcalfe: My opinion rather than the Committee's is that one of the ways things might be improved is if we could have greater links between schools and people already working in engineering, doing exciting, fascinating and well-paid things, and getting them systematically into our schools to inspire our young people, whether that is at primary or secondary level. We have put into a number of reports that learned societies, trade bodies and so on should encourage or obligate their members to get out into schools, maybe for half a day a year, as part of their membership, to try to make those links. Perhaps one way of achieving that—it happens, but it tends to happen in already good schools—would be if Ofsted were to assess a school on its external engagement, something like, "We can see that you have externally engaged with this number of employers, engineers and artists." That might be a way of encouraging more schools to do it. Do you think that is a good idea and that that might be a way of encouraging it to be adopted widely?

Mr Gibb: You are right about encouraging more successful engineers to go into schools to explain the attractions of engineering as a career. For example, Speakers for Schools, the Robert Peston organisation, is doing great work encouraging high fliers from industry to visit schools, in the way they routinely do in the independent sector. There is a corporate social responsibility role for major engineering companies to release their employees to visit schools to do that.

We always have to be careful about saying we should get Ofsted to do this, this and this. Ofsted inspections are two days. When we came into office in 2010 we were worried that they had 27 different grading objectives, and the academic side of their inspection was just one or two of those 27. We narrowed it down to four, concentrating deliberately on quality of teaching, attainment, behaviour and quality of leadership. The more you spread their inspection objectives and frameworks, the more you dilute their core focus. They look at the quality of careers guidance, but if you emphasise one particular area too much you detract from that core responsibility.

Q65 Stephen Metcalfe: You touched on the issue of getting more girls and women to take sciences and then to take engineering. What progress is being made in that area?

Mr Gibb: The campaign was launched last month and is being headed by business leaders, including the head of Dunnhumby—the Tesco Clubcard. She is driving this thing with energy and enthusiasm, and it had a very successful launch. If you look at some of the stats for the proportions of young people taking sciences, of those girls who gain an A* in physics GCSE, only 19% go on to take physics A-level; among boys it is something like 49%. Both those figures are too low, but for girls, science is particularly low. One of the focuses of the Your Life campaign is to encourage those girls to take physics A-level, so there is more to do.

Q66 Chair: Sticking with engineering qualifications for the moment, the new qualifications were designed in partnership with the Royal Academy of Engineering. Can you give us some idea of the numbers who will study that new qualification?

Mr Gibb: It is a bit early to say on the numbers, but the work with the Royal Academy of Engineering has resulted in—what is it called?—the core learning element of the engineering diploma.

Chair: Principal learning.

Mr Gibb: Yes. That diploma was regarded as probably the most successful of the diplomas we abolished when we came into office, because of other concerns, but the principal learning element of the engineering diploma was highly regarded. That has been turned into four different qualifications, two with Pearsons and two with OCR—two BTECs and two level 1/2 national certificates. I think they will be very successful, but it is too early to say what the uptake is.

Q67 Chair: What remit did you give the royal academy in designing those qualifications?

Mr Gibb: They were given the remit to develop new key stage four engineering qualifications, and they worked with the awarding organisations to do that. I am not quite clear what lies behind your question, but they were given a remit to create level four qualifications.

Q68 Chair: What is behind the question is that in the end it was a compromise, wasn't it, between the views of the Department and those of the royal academy?

Mr Gibb: In what sense? Compromise between what?

Q69 Chair: Where different subjects were incorporated in the syllabus.

Mr Gibb: Do you mean within different elements of engineering?

Q70 Chair: Yes. One of the criticisms I heard from an eminent engineer was that the syllabus includes things that really belong in a catering course, for example.

Mr Gibb: In engineering?

Chair: Yes.

Mr Gibb: I am not aware of those criticisms. To get through the Ofqual process is not easy, so these will be rigorous qualifications.

Q71 Chair: One area that we reported on in the past was the TechBac, and we did not get much of a response from the Department. Could you update us on your ambitions for the TechBac and what kind of careers you think it would lead to?

Mr Gibb: The purpose of the TechBac is for people who are particularly interested in a technical career. The new TechBacs are very rigorous, and comprise a level three qualification, such as the BTEC. They are a high quality qualification.

Q72 Chair: Will that be equivalent to the EBac?

Mr Gibb: It is a performance measure. It is a sixth-form level three performance measure, so it is slightly different from the EBac, which is a key stage four measure. It comprises one of the existing level three qualifications, like a BTEC, plus a level three maths qualification, which is A-level, AS or what will be the new core maths qualification, and an extended project qualification from one of the awarding bodies. That is the kind of combination that leads to a TechBac performance measure for a school or college.

Q73 Stephen Mosley: A few weeks ago, we had the new chief scientific adviser for the Department for Education in front of us. The role of chief scientific adviser is to ensure that all "departmental policies and decisions are informed by the best science and engineering evidence". Do you think that is possible when he is working for only just over one day a week?

Mr Gibb: He went through the recruitment process in the normal way and was appointed by the chief scientist. I enjoy my discussions with Tim Leunig, who is a very able man. He is determined to make sure that in the Department we use rigorous evidence in making policy decisions.

Q74 Stephen Mosley: You mentioned the recruitment process. Is it not the case that he was chosen from a pool of applicants for what was essentially a completely different job? He said

himself he got the job because he ticked a box on the form asking if he would also like to be the CSA.

Mr Gibb: These are matters for the Government chief scientific adviser and the permanent secretary, who make those appointments. I know that the permanent secretary will be responding in due course to Mr Miller's letter on this very issue.

Q75 Stephen Mosley: The Committee is concerned that science and evidence-based decision making is very much at the core when the Department for Education is making its policy decisions. How can we be sure that is the case?

Mr Gibb: You have taken evidence from Dr Leunig. A lot of the scientific advisers in Departments will have continuing academic involvement. You want to have that; you want them to be people deeply engaged in the academic world. That is what they bring to the job, and Tim Leunig, from my experience of working with him, brings that academic rigour to the advice he gives, making sure that policy is based on properly assessed evidence.

Q76 Stephen Mosley: In a report we did a couple of years ago on research within the Department for Education, we expressed concern that there was not a ring-fenced budget. Do you know how much has been budgeted for research for the Department this year, and how does it compare with previous years?

Mr Gibb: I do. The peak was in 2008-09, when we were spending £31.1 million. There has been a decline, for obvious reasons, as we sought to tackle the crisis in the public finances. Since 2011-12, research expenditure has been stable at about £11.6 million a year, and last year we saw a slight increase of about £1.2 million. It is still substantial, but it is less than it was in 2008-09.

Q77 Stephen Metcalfe: Quite early on the Committee did a report into astronomy and particle physics. One of the areas we looked at was what systematic engagement and outreach was going on between the research councils and schools. Can you tell me what the Department is doing to exhort and facilitate that systematic engagement between those two parties?

Mr Gibb: We do work with the Science and Technology Funding Council and BIS. We also work with and promote the UK European Space Education Resource Office. I do not know whether I am answering your question correctly, but we work with those bodies and promote their facilities, like the National Schools' Observatory.

Q78 Stephen Metcalfe: The next part of my question is that when we had a response to the report, that particular issue was not addressed. It is like the interaction that directly affects primary and secondary schools; the Department does not seem to know a great deal about it, or have a lot to do with it, because it is not part of the core activity. Is that a fair assessment of it?

Mr Gibb: I am not quite sure what it is you are worried about. Explain it a bit more.

Q79 Stephen Metcalfe: I am worried that the Department is not fully aware of, and supporting and encouraging, interactions between schools and, in this case, the research councils, because it is not part of the Department's core activity. It lets it get on; it is left to the research councils to initiate, and if that does not happen the Department is not necessarily aware. It goes back to my point about getting these opportunities into every school in a systematic way, not just the good ones that take them up.

Mr Gibb: We promote the products from those bodies. We promote the good quality engagement with science that comes out of those bodies. We will and do promote them to schools.

Q80 Stephen Metcalfe: How do you do that?

Mr Gibb: We have a vast communication approach; we have our website, and we have termly newsletters to schools. That is how we would promote it.

Q81 Stephen Metcalfe: Do you make any assessment of how many of those opportunities are taken up by schools?

Mr Gibb: I am not sure that we do, but I will check to see if we have any systematic evaluation of that.

Q82 Stephen Metcalfe: It goes back to the earlier point that where a school takes up those opportunities, whatever they are, the school and ultimately the students seem to benefit. In this particular case, we are looking to increase the number of students who will take on STEM subjects and take them further. If they are exposed to people who are enthusiastic about those subjects, they are more likely to see them as things they may wish to do in the future. It is about getting that into every school.

Mr Gibb: I do not disagree with you on that, Stephen. There is evidence from the national science learning centres that teachers who go there for CPD come back enthused, with ideas on how to teach science in a more interesting way. They are very effective.

Q83 Chair: One of the topics we touched on in relation to your Department's engagement with STFC and BIS was the long-term future of the National Schools' Observatory. This has been bubbling along for some time. From the evidence we have seen, which I am sure the Department accepts, there are manifestly benefits to students who have access to that wonderful facility. They can do it in their classroom with internet tools developed through Liverpool John Moores University. It belongs to BIS. The resource they are using is in the hands of STFC, with La Palma, but having kids work on tools like that excites and encourages future engagement in science. What has happened recently to try to solve that problem?

Mr Gibb: We have never funded the National Schools' Observatory. As you say, it is funded via Liverpool John Moores University.

Q84 Chair: It went through a period when it almost had to close, because STFC had not seen the education benefit in the past and people in the Department for Education had failed to rattle the cage and say, "For goodness sake, don't let that facility close. It has an enormous education potential". Our criticism is about the lack of triangulation among the three organisations to say, "This is a wonderful education resource. How are we going to ensure between us that it continues?"

Mr Gibb: You will be pleased to know that there is a working party called the space education and skills working group that brings in those elements both in DFE and BIS to ensure that precisely what you are worried about does not happen.

Q85 Chair: From the point of view of the student or taxpayer it does not matter which Government Department picks up the bill. At the end of the day, it is taxpayers' money. Are you agreeing with us that resources like that have tremendous value in enthusing children about science as a career?

Mr Gibb: I absolutely agree with you. Working groups like the one I described are there to prevent things from falling between stools when responsibilities are split.

Q86 Chair: That was exactly the phrase I was going to use in my next question. You read my mind brilliantly. Let's make sure they do not fall between stools, and this Committee and yourselves will be at one.

Turning finally to Ofqual's argument on science practicals, I listened carefully to your responses to colleagues. You still seem to be saying that the Ofqual position that there are no other alternatives is one that you have accepted. We struggle with that, because we heard from about 20 real experts from Wellcome, SCORE, royal societies and learned societies that there were alternatives. A very simple suggestion by one of the groups, which I slightly paraphrase, is that to avoid what Ofqual regarded as teachers cheating, and hence clustering at the top of the grades—because, on the one hand, every teacher is under pressure to get their school up the league tables and, on the other, they are invigilating the exams which then matter in terms of grading—is to reintroduce the concept of clustering schools, so that teachers circulate and invigilate other schools' practical exams. That very simple change would remove the so-called incentive to cheat. Surely, there are other alternatives that you ought to look at.

Mr Gibb: I do not accept your criticism of teachers as cheating.

Chair: It is not my phrase.

Mr Gibb: The issue is not cheating but the difficulty of differentiating between students in any meaningful sense in the way it is currently assessed. Even if you moved teachers from one school to another to establish objectivity, that same difficulty would arise.

Q87 Chair: It is the lack of objectivity that Ofqual said, very firmly, was the problem—the lack of objectivity of the teacher responsible for their immediate class; they lose objectivity in their marking system. That was their criticism. The word Ofqual used was malpractice, not cheating, but in summary it was criticism of the lack of objectivity of teachers in examining their own class. There is a very simple solution: create clusters. This is not new; it happened 40-plus years ago in the certificate of secondary education.

Mr Gibb: It is not just lack of objectivity. There is a difficulty even with objective teachers from another school coming in to do an assessment. There is also no end product in the assessment as it is currently performed, to help that process. If you could do it in such a way that each individual pupil measured something and recorded it on a sheet, that would be an end product, but the way it is currently assessed, through controlled assessment, means there is not an end product that individual students record, to bring about that differentiation.

You cited again all the learned bodies who are critical of Ofqual's position, but the view of Gatsby, for example, and the Wellcome Trust, of the current approach to controlled assessment, to quote them, is that "it makes teachers focus on a narrow range of externally-set practicals as they hone students to do well in what constitutes 25% of their final grade".

Q88 Chair: We are not saying there is not a problem; we are saying that the solution offered by Ofqual—Wellcome is one of the bodies that agrees with us on this—is not the correct solution in terms of the problem that is facing us.

Mr Gibb: I understand the debate. Ministers have been deeply engaged in the debate, and, as I said earlier, we challenged Ofqual from every angle. This is one of those areas where you could argue that there is a little bit of overlap between the curriculum content and the assessment process. Our clear objective as policy makers was to have practicals well taught and all students leaving the sixth form with strong practical skills in the sciences they are studying, but at the end of the day, after all that challenge, we have to rely on the advice and views of Ofqual, and they are very firm.

Q89 Chair: In your comments, you cited what Wellcome said. Wellcome have also said that Ofqual were sidestepping the problem, not solving it. What we are asking you to do, Minister, is consider very carefully the evidence session that took place in this room following a brainstorming session we conducted, part of which you saw in the film. Consider the evidence that came from those bodies, and sit down with Ofqual and say, "Really, it is untrue to say there are no alternatives. There are alternatives. Please go away and think about them."

Mr Gibb: I will certainly do that. I only read the transcript of your video this morning. I will go away and look at it again and re-challenge Ofqual on those issues both for A-level and, more importantly now, for GCSE.

Q90 Chair: And we will re-challenge the science community to come back with stronger and better ways of doing it. Let's keep this dialogue going, because we both have the interests of the next generation of scientists at heart. We agree on that.

Mr Gibb: We do agree on that, Mr Miller.

Chair: Thank you very much indeed, Minister.