HOUSE OF COMMONS

Science and Technology Committee

Oral evidence: Government Office for Science Annual Report (and work of the Chief Scientific Adviser network), HC 437

Tuesday 17 October 2017

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Watch the meeting

Members present: Norman Lamb (Chair); Vicky Ford; Bill Grant; Darren Jones; Clive Lewis; Stephen Metcalfe; Stephanie Peacock; Graham Stringer; Martin Whitfield.

Questions 1 - 66

Witnesses

I: Professor Chris Whitty, Interim Government Chief Scientific Adviser, Government Office for Science; Professor Charlotte Watts, Chief Scientific Adviser, Department for International Development; and Professor John Aston, Chief Scientific Adviser, Home Office.

Examination of witnesses

Witnesses: Professor Whitty, Professor Watts and Professor Aston.

Q1 **Chair:** Welcome, everybody. I thank all three of you for coming along today. This is our first public session, so it is good to have you all with us. I will start the questioning, and we will then have contributions from others.

A key part of the role of the chief scientific adviser is to provide independent challenge to Ministers and Government. How, in practice, do you exercise or execute that role? It is a question for all three of you, but perhaps you could start, Chris Whitty.

Professor Whitty: I am the interim Government chief scientific adviser and the chief scientific adviser at the Department of Health. Before I start, on behalf of everybody in the scientific community, I welcome you all as the new Committee. I hope you very much enjoy it.

Chair: That is very kind. Thank you. We accept that.

Professor Whitty: On independent challenge and advice, different Government Departments run this slightly differently, and the Government chief scientific adviser obviously has a role that is different from that of all the departmental chief scientific advisers. There is basically no point in having a chief scientific adviser unless they are able and willing to say to people in positions of authority, "This is the way the science falls."

I have now had the privilege of being chief scientific adviser in three Departments. My experience is that, provided you do that, clearly based on evidence, and privately, to Ministers, I have never yet met a Minister who did not appreciate having someone lay out to them clearly, "This is what the science shows." Obviously, if there is no evidence, you need to say that. It is not very useful having a scientist who says, "I'm a scientist," and basically gives an opinion they might have given down the pub. Equally, it is not terribly helpful for people to start making big, grandstanding public statements, as that, in a sense, blurs the roles. Provided that people stick to those relatively common-sense rules, there is usually support right across the spectrum.

Q2 **Chair:** Do you think they do?

Professor Whitty: If they survive, they do. Occasionally, there are chief scientific advisers who feel a bit nervous about it, but generally they would not have applied for the job in the first place if they were going to do that. There have occasionally been ones who felt that part of their job was to talk to the outside world, rather than to their Ministers. It is a very important thing for senior scientists to do, but probably not from these kinds of roles.

Professor Watts: It is interesting. One of the important roles is to try to reflect the quality and strength of the evidence. Sometimes in our discussions we say that there is some suggestive evidence on this, but there is not robust evidence, or there is still a lot of uncertainty around it. As scientists, that is the training we give in our professional career; it is about being able to judge and assess the quality of evidence and reflect that to Ministers.

Q3 **Chair:** Do you find that they listen?

Professor Watts: Yes. I agree with Chris, essentially. When you are honest and really talking to the evidence, Ministers listen. The way you build up trust is through being honest about the evidence and saying, "Actually, we don't have evidence on this," or, "We have weak evidence," or, "We have strong evidence", or we might have evidence that gives a different perspective from what a conversation or policy discussion is focused on.

Professor Aston: I should preface this by saying that I have been doing the job for about a month.

Chair: You have vast experience.

Professor Aston: Absolutely. Having said that, I have found that it has been very easy to talk to people about evidence, particularly in the Home Office. In areas of the Home Office, it has obviously taken me some time to understand where the policy needs evidence, but I have certainly found it easy, both with Ministers and with senior officials, to have proactive conversations about what kind of evidence gaps they feel there are and where science can contribute to those evidence gaps.

Q4 **Chair:** You have already met Ministers in your first month—including the Home Secretary.

Professor Aston: I have met the Home Secretary and the Minister for Security. By the end of the month, I should have met all the Ministers in the Home Office.

Q5 **Chair:** Very good. What about access in DFID?

Professor Watts: Yes; I regularly meet Ministers. In the past couple of months I have met three times with the Minister of State, Rory Stewart, and I have met Lord Burt regarding a specific area within his remit. I have a meeting with the Secretary of State later today.

Q6 **Chair:** Is that the same in Health?

Professor Whitty: Absolutely. I regularly meet both the Secretary of State and the relevant junior Ministers.

Q7 **Chair:** Can you explain a bit more about how you can actually make a tangible difference? What impact do you have in your role?

Professor Whitty: To be clear, within the chief scientific adviser job in all three of the Departments represented here—but not in all—there is a dual role. There is a role around advice to Ministers and a role around running a large research budget, which is about trying to improve the evidence base.

Talking specifically about advice to Ministers, the key thing to understand is that there is a continuum between a purely technical decision and a purely political decision. For example, a decision as to whether to put more money into health in children or into primary education is a political decision. Science does not have a role in that, and you need to understand that. But if you are in health, the decision about which vaccination is the right one for children under one is a purely technical decision, and politicians involving themselves in those decisions—unless they wish to override technical advice—is usually a mistake.

Most things lie between those two. What you are saying to a decision maker, who may be a Minister or a senior official, on the bit of the decision that is actually around the evidence is, "This is where we think the central projection is," and, as Charlotte was saying, "Here is our degree of certainty around that." That may be very wide. We may be saying to Ministers, "We cannot help you, because the evidence base is quite weak." At least then they know that the decision has to be made in the absence of a clear steer from the evidence. There have been multiple occasions when I have come across examples where Ministers have taken that very heavily or significantly into account.

Q8 **Chair:** Do you encourage openness about evidence, so that the public can see how decisions have been taken? It is sometimes an issue whether we have published evidence to support a Government policy.

Professor Whitty: I will answer, but it is important that Charlotte and John answer, because they have slightly different perspectives.

In the context of health, which is a trade that has historically been heavily evidence based, we have always tried to publish all the evidence that is available. That is not the same as saying that we have published exactly how a decision is reached, because that has many steps within the political and policy process, but the evidence is completely open. The National Institute for Health Research, which I lead, has a policy of absolutely everything being published.

Charlotte will be closer to me; John will be further away.

Professor Watts: In the Department for International Development, we invest a lot in generating new evidence. I manage a research division that has a substantial research budget, and that generates new evidence. In all the research that we commission, a key element is that those findings are made publicly available. We also invest heavily in synthesising evidence, because, to inform not only our own decision making but that of the broader development community, we believe that

making smart, succinct syntheses of evidence is a really important global good.

It is the same as with Chris: we make bodies of evidence publicly available. In the end, some of the decision-making processes might be a combination of politics and weighing up the pros and cons of evidence, and that may not be made public.

Professor Aston: In the Home Office, there are obviously sensitivities around some of the work that we do and some of the research that we commission. I very much hope to establish more of an atmosphere of assumption that research will be published unless there are obvious national security reasons—

Chair: Compelling security reasons.

Professor Aston: Unless there are compelling reasons not to publish it. "We are working on that" is a fair comment.

Professor Whitty: Let me be a bit blunter. There are some Government Departments where some bits of evidence clearly have to be classified, but that is a very small minority of the research that is done. There is a tendency for people to classify things they should not classify. There are multiple reasons why that is a bad idea. From a science point of view, the reason that I think it is a bad idea is that it means they are not subject to external security and peer review. I have seen some really shoddy research done within Government.

Most Government research is very good, but I have seen some shoddy research, which was never challenged because it was at a classification level where most of those who could challenge it never saw it. That is a real problem. Although I completely accept the need for there to be some bits of research that are under the radar, the great majority should be above it, for good, sound scientific reasons, as well as reasons of policy.

Professor Watts: The aspect of peer review is such a critical element of quality science; that you go through the peer review process before something is accepted is one of our assurance mechanisms in science.

Chair: Do you want to come in on this question, Vicky?

Q9 **Vicky Ford:** Yes, I do. I see in all three of you very experienced hands-on scientists who have built a career in research science, who understand what it is like to have led peer-reviewed science projects and who are all professors in your own right. To me, part of the role of a chief scientific adviser is not just advising Government but having the confidence of the science community that you know what it is like to be a scientist. How important is it that the chief scientific adviser to a Department has that type of experience—hands on, leading research to the level that you have done in your past careers?

Professor Watts: I can only speak to my own experience, but I find it incredibly useful to have come from that outside community to make the bridge.

Chair: It gives you credibility.

Professor Watts: It gives me credibility, but I also know what it is like to be on the other side, quite honestly. I manage and lead a research division where we are commissioning research. I have bid for many pots of research funding. I know how hard it is. I know the resources that go into producing competitive research bids, and how to manage and deliver our research. That hands-on experience is really useful, now that I am in a role of commissioning and trying to get the best evidence to inform our decision making.

Professor Whitty: It is important to recognise that different Government Departments have different needs. For ones that are handling a large research budget, it is absolutely essential that the chief scientific adviser, if they are involved in that decision, which, in my view, they should be, has a research background themselves, and a reasonably good research background, not just a relatively limited one. That requires external credibility and external experience.

Secondly, there are Government Departments where there is a large externally facing element. Again, having a background in science in the academic community is essential for those sorts of roles.

There are some chief scientific adviser roles in Government who do not do either of those things. They need to analyse information, and for those people it may be that they come from a very strong analytical background. To take two of the outstanding chief scientific advisers in the time that I have been in government, Rebecca Endean, who is now the deputy to Sir Mark Walport at UKRI, and Carole Willis, who was the chief scientific adviser in the Department for Education and completely transformed their approach to evidence, both came from an analytical background within government. They were classic civil servants. They were serious scientists but not serious external scientists. That worked well.

The most recent example is the appointment of Chris Jones to be the chief scientific adviser at DExEU. In that case, the key skill is the ability to get things through the system and to understand international negotiation. With the best will in the world, most of my extremely able science colleagues, placed in a European negotiating situation, would crash and burn very quickly, if that was put in as their first job. That was probably quite a prudent move on the part of DExEU in that particular case, but that, in my view, should be exceptional.

I want to be clear: there are very good scientists and analysts within government who may not have been external scientists except early in their careers, but who are of international or at least national standard.

Q10 **Chair:** Were you involved in the production of the Government's paper, "Collaboration on science and innovation," which was published in September as part of the Brexit process?

Professor Whitty: Yes, although at a slightly late stage in the day.

Q11 **Chair:** What do you think of it?

Professor Whitty: I think it is high on aspiration and a bit light on detail. I think most people would accept that.

Q12 **Chair:** This is the final question from me at this stage, and it is a specific question for you, Professor Whitty. Would fire safety be the sort of thing that would come within the remit of a chief scientific adviser in a Department—DCLG, for example?

Professor Whitty: Yes. The disaster that happened in Grenfell tower, which is presumably what led to that question, raised a very substantial number of technical questions. There were obviously questions around cladding, which most people are aware of. There were also questions around the safety of particular fridge types. We soon discovered that it was not necessarily the fridge type, but the sub-components within a fridge, which might be across multiple different standards. You were trading off the risk of people turning off fridges in summer and late autumn, and having the risk of food going off and food poisoning, particularly among older people, against the small but real risk of fires and so on. Those are technical questions; they go right back into firmly technical areas.

Clearly, there are lots of technical people in the relevant Government Department, but there is not a chief scientific adviser there, and one of the questions that will probably be asked is, given that in local government so many of the technical questions are answered, whether they be around transport or multiple other areas, should there be one in that Department? I am aware that, in that Department, there is an active debate on this. My own view is that it would make a lot of sense for there to be one, but I have not yet had a chance to have a proper discussion with the permanent secretary about it.

Q13 **Stephen Metcalfe:** I think you have just said that DCLG does not have a chief scientific adviser.

Professor Whitty: Correct.

Q14 **Stephen Metcalfe:** Have they ever had a chief scientific adviser?

Professor Whitty: Yes.

Q15 **Stephen Metcalfe:** So they are debating whether or not to refill that role.

Professor Whitty: There has been quite a long gap.

Q16 **Stephen Metcalfe:** I had thought that the network of chief scientific

advisers was now well established across Government, and that it was almost automatic that you would reappoint as someone left. I accept that there might be delays while the recruitment process goes on, but I am disappointed to hear that there is some debate about whether the role would be filled. Could you comment on why that might be the case?

Professor Whitty: The first thing is that we have never quite got to the stage where every Government Department has a chief scientific adviser, at any point. I will choose my words carefully, but there was a Secretary of State in that Department whose feeling that science advice was useful was quite limited—if I can put it that way. During that period, the sense was that a chief scientific adviser was not something that would be terribly helpful. There has been quite a gap over time. There has been science advice in the Department, to be clear, but not at that level of seniority.

In all the Government Departments where significant amounts of science are used—not absolutely all of them, but a majority, and I would include the DCLG in that—my view, as Government chief scientific adviser, is that it would be advisable to have a serious scientist, whether from inside or outside Government, as chief scientific adviser in those Departments.

Q17 **Chair:** Professor Whitty, the GOV.UK website lists Stephen Aldridge as the chief scientific adviser for DCLG.

Professor Whitty: In my view, there is a slight ambiguity. Stephen Aldridge is an outstanding analyst and a very good economist. He is very much part of the analytical community, but I would not—and he would not, want to see him—as the kind of person who could address questions such as those with Grenfell.

Q18 **Chair:** He is defined as the chief scientific adviser, but it is more a question of the qualifications of the person in that role, is it?

Professor Whitty: He is an excellent chief analyst. He is really outstanding, and I do not want in any sense to underplay that, but he would not be a scientist of the kind of science that I think that Department needs. There is a different situation, for example, in the Treasury, where, historically, they have always said—I think reasonably—that the science advice they want is from someone with an economic background. Philip Duffy, the chief scientific adviser there, is excellent, and he is an economist. That is relevant in the Treasury; there are other Government Departments, however, where you would probably need a wider portfolio.

Chair: It sounds like an issue of some urgency, and it is of some importance that it is resolved in that Department. I am sure you will perform a role in seeking to ensure that it is resolved.

Professor Whitty: I look forward to engaging on that issue.

Q19 **Stephen Metcalfe:** We have just had some success in getting DExEU,

after 11 months, to appoint a chief scientific adviser, and I welcome Chris Jones to his role. I hope that we do not have to wait another 11 months to push DCLG to do the same.

You are now the Government's acting chief scientific adviser, and you were previously Sir Mark's deputy. What are your priorities as the Government's chief scientific adviser? Personally, what are you trying to achieve in the role?

Professor Whitty: In the time that I will be doing the role, which at the moment I think will probably be until about April next year—that could change, depending on when Sir Mark's substantive successor comes in—there are clearly quite a lot of things in train, which need to be completed, as with anything. For example, I am involved in work on the future of e-mobility, in work on some security issues around the GPS system and what would happen if that went down, and on a variety of other issues.

There are at least three things that I would like to do in the next period that are, in a sense, new. One is that I want to have a real look at the science in emergency system that the Government Office for Science has. It has had a very successful system, improved by comments from a predecessor Committee to yours, looking at what happened after the Ebola crisis, when some serious lessons were learned. For completely good, independent reasons, a lot of the excellent people who were then running it left in very short succession to do other interesting jobs, and the result is that we are trying to rebuild that. Since that is my background, to some extent, one of the things that I can offer to my successor and the system is to try to help rebuild that.

The second is Brexit and the multiple scientific issues. It is a big deal for science in the UK—everyone knows that—and, inevitably, it will take a certain amount of time. The third thing is that, since the Government chief scientific adviser will be appointed from outside the Government, as would be normal, I think I am in quite a strong position, having been in government for a while now, to help to get the join-up between the Government Office for Science and the policy profession, which I think is an important one, stronger than it is at the moment. I will be putting quite a bit of effort into that. Those are probably the three biggest new things that I would like to push.

Q20 **Stephen Metcalfe:** On the Brexit point, presumably you were instrumental in the recruitment of Chris Jones.

Professor Whitty: Sir Mark Walport was. That was before I started.

Q21 **Stephen Metcalfe:** Was that position advertised externally?

Professor Whitty: No. It was very much an internal appointment, for the specific reasons that I gave earlier: it is a time-limited Department, where almost all the really important stuff is about how to negotiate with our colleagues in the European Union and so on.

What we have agreed—I have now met Chris Jones twice since he was appointed, and we are going to meet very regularly—is to provide a support network for chief scientific advisers from across Government, who will feed in through him to the process. I think that will be more effective for this particular role than bringing in someone from outside who does not understand how government works.

Q22 **Stephen Metcalfe:** I think that DWP, Justice and Treasury have all filled their roles internally, whereas there was a sort of expectation that these roles would be advertised to try to bring science into government. Were they advertised externally, and is it just that those people were the best candidates?

Professor Whitty: No, these were internal. I go back to my previous point: it depends what a Government Department needs from a chief scientific adviser. If these were ones where people were sitting on top of a large research budget, having to do all the peer review process and all of that, I would be very concerned by those kinds of appointments. In the context of the kind of jobs that will be done in those Departments, I do not have too many concerns. I have flagged the concern that I have around DCLG, but, for all the others, I can see the reasons why they happened.

Q23 **Stephen Metcalfe:** I hear clearly what you say. I accept that those Departments do not necessarily need a practising scientist, with everything that goes with that, to lead them. However, by doing it internally, you are shutting out industry and the third sector; you are not throwing your net as broadly as you could and bringing new talent into the Government.

Professor Whitty: I totally understand the point you are making, and I am not saying it is a bad point, but I can also see why the Departments ended up where they were. An ideal world where everything was advertised would probably be quite sensible. That is my view. I have been in post for only four weeks, and this is a big machinery of government question that I suspect will not be settled while I am doing an interim role. It may be for Sir Mark's successor. The point you make is a very reasonable one.

Q24 **Stephen Metcalfe:** My final question is about the CSA for the Department for International Trade. I think that has been advertised. Is there any movement on getting an appointment?

Professor Whitty: There is subterranean movement.

Stephen Metcalfe: Excellent.

Chair: Is there any chance we could bring it to the surface?

Q25 **Stephen Metcalfe:** Quite. Just to reiterate, for the record, the predecessor Committee, and, I am sure, this one, had great support for the use of scientific advisers across Government, and a comprehensive

network of departmental scientific advisers under your or your successor's leadership. We felt that was very useful.

Professor Whitty: In return, the chief scientific advisers, who work very well as a network, have found the support they have had from this Committee, and from the House of Lords Science and Technology Committee, really powerful, including the challenge.

Chair: There are two supplementaries, from Vicky and Darren. Could we keep it tight? I am conscious of the time needed to get through all the questions.

Q26 **Vicky Ford:** I was really interested in your second comment on your priorities, on resilience if GPS goes down. I thought that was why the UK contributed to Galileo. How important is it to continue having access to Galileo post Brexit?

Professor Whitty: That was not a priority; I was just giving it as an example of the kind of projects that the Government Office for Science is doing. It is being done under the Blackett system.

Having the Galileo system will increase the resilience of the system, but it uses the same broad methodologies. It does not necessarily produce the full degree of mitigation of risk for critical infrastructure that you would need if you were to have a full suite. Having Galileo definitely adds to resilience, but it is not a complete answer.

Q27 **Darren Jones:** I have increasingly been given answers by Government Ministers in the House, when I have asked technical questions about Brexit policy, that DExEU will give me the answer. It concerns me slightly that the chief scientific adviser for DExEU is a part-time role. Do you think that there is enough time to do properly the job of co-ordinating science across the whole of Government when Ministers are referring me back to DExEU for technical answers?

Professor Whitty: We have a period now when it is quite difficult, for reasons that you will know from reading the newspapers, to get into the substance of the kind of discussions that we are going to need on science. That is going to happen, but not until a bit further down the tracks.

At this stage, we have to identify all the issues that need to be settled. My judgment, having talked to a lot of people both in the UK and overseas, among our European colleagues, is that there is a very strong will on both sides of the channel to get something that supports science in Europe and in the UK. It is absolutely in the UK's interest to be firmly embedded with Europe, and it is absolutely in Europe's interest to be firmly embedded with the UK when it comes to science. That is irrespective of the mechanism you use.

Most of the mechanisms we have that are technical—things like qualifications and standards—are wrapped up in EU membership, and

finding our way from where we are now to, hopefully, an equally close relationship, but not using EU mechanisms for all those areas, is quite a cat's cradle. Our job at this point in time is to identify all the strings in the cat's cradle, accepting that we will have to unravel it once the negotiations get to that point.

This is a long-winded answer because it is a complicated issue. Chris Jones in DExEU can, in a sense, be a point person for the chief scientific advisers to feed in at this point in time the very long list of things that need to be sorted out in each area. Each one of them is sortable, but there are a lot of them and they are highly technical. Ultimately, only one Government Department can really take the lead in the negotiation because, if we had every Government Department negotiating independently, it would be an absolute disaster, for obvious reasons. There is a logic as to why it has to go through a single channel in the end.

Q28 **Darren Jones:** With respect, that did not answer my question. Do you think that a part-time role is sufficient to do that job?

Professor Whitty: Let me be clear: all three of us here are part time. This Committee in its previous incarnations has been keen to have chief scientific advisers who have other roles, because it helps to maintain independence. I am far more bothered about the qualities of the people involved, and about their having the skills to do the job, than I am about the number of hours specifically given to this. The short answer is that I am content.

Q29 **Graham Stringer:** Professor Aston, I think we have had a rather rose-tinted view of scientific advisers in the Home Office. I can think of two examples off the top of my head: the Home Secretary completely rejected advice on the reclassification of cannabis, and there was an almighty row about that; and this Committee was highly critical of Professor Silverman, who did not seem to think it was important for the scientific adviser in the Home Office to be involved when the Forensic Science Service was effectively abolished. What is your view of those two issues, and what attitude would you take?

Professor Aston: It is important that the scientific adviser is able to give independent advice, yet in a way that is listened to and embedded in the Department. You very much have to balance the way you give the advice with your ability to be in a position to give that advice.

On both of those—I will start with the cannabis decision—a scientific adviser must make sure that the Home Secretary and other Ministers have the relevant scientific advice to hand, but, ultimately, whether to criminalise or decriminalise cannabis is a policy decision. As long as the Home Secretary has access to the evidence, you have done what I believe is your job.

On the Forensic Science Service, I do not want to go back and criticise, or say whether I believe my predecessor did something right or wrong; what I would like to say is that I hope that, if another scientific decision of the magnitude of the Forensic Science Service came along, I would be in a position at least to know about that, with the ability to give my opinion about it. I feel that, as long as I have the ability to give my opinion and to put the evidence to Ministers, I have done my job.

Q30 **Graham Stringer:** I know there is a criminal investigation going on in the forensic laboratory in Manchester, where there appears to have been some fiddling of results, let us say that. Do you think that having the Forensic Science Service as it was would have avoided that situation?

Professor Aston: It is hard to go back and say whether that would or would not have resulted in the allegations that are of concern. I am afraid that, as you can imagine, because of the criminal investigation I cannot comment on that directly. However, the Home Office has committed to give the forensic science regulator statutory powers. That is positive. I will make sure that it is something that continues to be looked at and is high on the Home Office priority list because, as regards forensic science, that is important.

Q31 **Graham Stringer:** I understand that you cannot comment on something where there is a criminal investigation taking place, but do I take it that, when those investigations and any court cases are concluded, you will look at what has happened there, and come forward with recommendations for the future of forensic science?

Professor Aston: Absolutely. In addition, Dr Tully, the forensic science regulator, has offered to write to the Committee about that particular incident.

Q32 **Graham Stringer:** I have one final question: where is the biometrics strategy?

Professor Aston: The Home Office has committed to produce a biometrics strategy.

Graham Stringer: It was to be for the end of 2015.

Professor Aston: I believe that the reason it has been delayed is that it is a complex and sensitive issue. To be honest, because I have been there for only a recent amount of time, I have not formed an opinion about the Home Office biometrics programme. However, it is something that I think it is important to spend time on, and it is something that a lot of time will be spent on, because it has both opportunities and considerable risks for the Department. We need to get it right. The use of biometrics can bring considerable success, for example—

Q33 **Chair:** There is an urgency to this. Things are happening on the ground—the Notting Hill carnival.

Professor Aston: Exactly. On the Notting Hill carnival, for example, the biometrics strategy is likely still to say that the police have the ultimate responsibility about whether they use facial tracking software or not. That will be a police decision—an operational decision.

Having said that, it is important that we have a good independent device in the biometric space. I am pleased that the National DNA Database Ethics Group has now had its remit extended to become the Biometrics and Forensics Ethics Group. I have met the chair of the group and I have attended one of its meetings as an observer, and I am confident that it is in a good place to provide independent advice in this area.

Q34 **Darren Jones:** On the biometric strategy question, I know that a previous Science and Technology Select Committee report looked at the use of facial recognition software. There was a court case in 2012 when the police used facial recognition software and it was ruled unlawful. Can you tell the Committee whether the Home Office is using facial recognition software today or not?

Professor Aston: I am afraid I will have to come back and answer that, if you are talking specifically about the Home Office. In actual fact, yes—of course they are: the e-gates use facial recognition software.

Q35 **Chair:** Can you confirm whether there is a draft strategy prepared that is waiting for sign-off and final amendment, or does it still have to be written?

Professor Aston: I think it is well in progress. I cannot tell you exactly whether it is finished or not, but it has certainly been extensively—

Q36 **Chair:** Could you come back to us on that?

Professor Aston: Yes, I can. Certainly.

Q37 **Chair:** It would be very helpful to have an update on timing.

Professor Aston: Absolutely.

Q38 **Darren Jones:** Can I stress the urgency of that? We are due to debate derogations under the new Data Protection Bill from the Home Office in the House, so it would be useful to have that strategy before—

Professor Aston: I know that the strategy has certainly taken into account the legal framework of the Data Protection Act and the Information Commissioner and the biometrics commissioner—all of those—looking at how that will be covered and how it will be separated within the biometrics strategy.

Darren Jones: Excellent.

Q39 **Clive Lewis:** Good morning, Professor Aston. Can I ask you whether you would agree with the statement that the Government's current Prevent strategy is based on questionable science?

Professor Aston: No, I don't think I would agree with that statement. I think that there is good science and there is difficult science to do with the Prevent strategy. Particularly for the Prevent strategy, this is a very difficult area to do science. It often deals with very small samples, where traditional scientific methodology struggles, if you want to look at very small populations to try to understand them.

Good work is being done in the area. There is obviously much more work that can be done, and I do not want to say at any point that it is all done and dusted. I would not agree with that at all. There is a lot of extra evidence that can be used. I am pleased, for example, that there is a commitment to publish the Channel statistics, looking at people going into the Channel programme. That is likely to happen in November. We have evidence about that, and it helps to inform policy. Is it perfect? Absolutely not. But is all the science that is being done in the Prevent area bad science? No, I do not agree with that.

Q40 **Clive Lewis:** The Royal College of Psychiatry came up with that. Taking the quote that it used, the college complained that there are "no reliable evidence-based tools that can predict involvement by individuals in terrorism." Although it is not a scientific organisation, MI5 has also been very critical of the datasets that have been used and of the sample sizes. I wondered whether the Government review of counter-terrorism was going to include Prevent and some of the science behind it.

Professor Aston: Although, again, I have only been there a month, I have been heavily involved in counter-terrorism and the Contest review since day 1. It is useful to say that, in the Contest review, there are two areas that are distinct in some ways. There is the science and technology area, where there is a lot of very good science about how to do aviation security and security for people and places. There is also the part about how you do behavioural motivation—how you understand the motivation of someone to become a terrorist. How do you understand what is the best strategy to deal with someone who is a convicted terrorist, and try to deradicalise them?

We need to do a lot more work on the second side to understand the behavioural motivations. That does not mean that there is not any evidence, but an awful lot more work can be done. They are committed to doing that.

Q41 **Clive Lewis:** It is that bit that has come under intense criticism, especially on the sample sizes used and the lack of transparency. Those are the key issues that a lot of others in the scientific community are very critical about.

Professor Aston: Absolutely. We have to hold people to account for this kind of work. I am not saying that I think all the work that has been done is perfect; I just want to say that it is very important that, in my role, I get to be fully part of both the behavioural and the traditional physics or

chemistry side of science. So far, in the four weeks I have been there, they have been very engaging in having me involved in that.

Q42 **Clive Lewis:** In your new role in that job, will you be trying to ensure that a greater level of peer review and transparency takes place on that side of the debate, in preventing people and the causes that lead people potentially to become terrorists?

Professor Aston: In the more general case in the Home Office, we should be aiming to publish as much research as we can. I also think that we should have rigorous systems of peer review, even internally, if there is not the ability to publish. Building opportunities where we have sets of external independent academics who have the right clearances to evaluate the research is a highly important thing, and we are starting to build those networks, but I think we could do more.

Professor Whitty: To take an example, there is good evidence—not excellent evidence, but good—that assesses the question of whether there is a link between mental health issues and terrorism. In very broad terms, it makes it pretty clear that, for people in large organised terrorist groups, there is no link. If anything, the link may go the opposite way: there is a lower rate of psychiatric morbidity in that group. For lone-wolf actors and so on, it is a bit more complicated. Most of these data are in the public domain. They are done by academics, they are peer reviewed and I think they are broadly accepted, but, going back to the point, you are of course starting with a relatively small database in the first place.

Professor Aston: For example, there is CREST, the research group at Lancaster University. The behavioural science side of counter-terrorism is primarily and firmly within their remit. All the work they do is open, peer reviewed and published.

Q43 **Martin Whitfield:** Professor Aston has almost answered this. Is that example one where peer review would have caught the errors earlier, or where stronger quality control would have hinted at more research before decisions were made?

Professor Aston: Sorry. Which example?

Martin Whitfield: In relation to the Home Office evidence on terrorism. I know it is difficult going back with hindsight.

Professor Aston: It is.

Q44 **Martin Whitfield:** Is this an area that concerns you? Let me put it that way.

Professor Aston: It is an area where I feel that, as a scientific adviser, I should have considerable interest, and it is something that I should be spending a lot of my time on. It raises the important idea of what a scientific adviser is. In many people's minds, a scientific adviser is someone who looks at science. People naturally think of science as being

physics, chemistry and maths. I do not take that view. I think that science spans the entire remit, and I want to be able to be involved in everything, including the arts, humanities and social science implications, which are just as important if not more important than some other things in the Home Office. I want to be involved in the whole spectrum of things.

Professor Whitty: I agree with that.

Professor Watts: Yes, we would all agree. Often, the policy issues and challenges that we are facing need multidisciplinary perspectives to answer them. A key role that we play is asking how we draw upon the different types of scientific expertise and use them and bring them together to inform our Ministers.

Q45 **Martin Whitfield:** This question is for Professor Watts. It is about the global challenge research fund. I am going to play the newbie card. It is part of the science budget, isn't it? BEIS controls that element of it, I think I am right in saying. Previously, it was DFID that took the lead in research in international development. BEIS is relatively new, and it has a large budget. How is it working? To get to the crux of it—I am conscious of time—do you think that BEIS has learned from DFID's experience? Can it learn? How can it move it forward successfully?

Professor Watts: You are right. The GCRF, the Newton fund and others are part of the science budget. It is relatively new that such substantial amounts of ODA research funding are now managed by other Government Departments.

We work really closely in supporting other Government Departments to use ODA research to the best effect. From the outset, on GCRF, for example, we supported a Wilton Park meeting to support officials and to enable them to engage with key stakeholders to share best practice and to ask how we do development research in a way that focuses on the right questions, and leads to impacts and is done in a way that has meaningful partnership with partners in the south.

We are in a new landscape, which I think is quite an exciting landscape, where we have a number of Departments, including the Department of Health, with substantial ODA research budgets, and we are asking how we bring the best capabilities across our different Departments into tackling some major development challenges. The issue that came up from the ICAI rapid review, which I think is important for our Department, is to ask, given that we now have ODA research funding across Departments, how we ensure that we have coherence and that the whole is bigger than the sum of the parts.

The next step, very much building on the recommendation of the House of Lords Science and Technology Committee, is to set up a coherence mechanism. There is a new board called SCOR—the Strategic Coherence of ODA-funded Research Board—with an independent chair. We have just

appointed Professor Baron Peter Piot to chair it. That board will work with lead officials across all Government Departments holding major ODA budgets to ensure that we are achieving coherence.

Professor Whitty: Can I add two points? The first is to be really clear about two things, the first of which is that, for many questions on development, science is the answer. Having really strong science is critical. Secondly, I would judge that the UK is, by some distance, the best country at doing that in terms of quality, and is second only to the US in terms of quantity. In bangs for bucks, we are really strong in this area, whether it is health, agriculture or climate change; this is an area where we are really strong.

There is a caveat, though, and Charlotte and I would completely agree on it. Because the budget is ring-fenced, both as science and as ODA, there is a risk that people will start to say, "What I'm doing is ODA," when it is not. It is very important that that line is policed clearly. That money is there to help poorer people in poorer countries improve their lives through a variety of ways. You can do fantastic science across the whole suite that clearly does that. We need to be careful not to allow a drift of the definition. There should be a direct line between doing the research and poorer people in poorer countries having a better life. If that line is not there, it should not be within the ODA area. We need to hold that line.

Professor Watts: Just to add to that—

Chair: Keep it tight, please. I am conscious that we have quite a lot more to get through before half-past 11.

Professor Watts: In terms of the opportunity, we have new research funding across a number of other Government Departments, but DFID has maintained its own research budget. Historically, DFID invests 3% of its budget in research. This creates a really fantastic opportunity, with substantial new research resources focused on tackling development challenges.

Q46 **Martin Whitfield:** To take that point slightly further, do you think that the co-operation that you talk of, which is highly admirable, is reflected in that? My understanding is that DFID has only one seat on the research and innovation part. Do you think that the importance of that co-operation should be reflected in a more transparent interrelationship between the two?

Professor Watts: We have very close working relationships. I sit on the advisory committee. Other advisers on that board have substantial expertise in development, so it is not only me who polices that. My officials work very closely with relevant BEIS officials and DH officials as well. On a day-to-day basis, those conversations and that interaction and sharing are happening very regularly and quite intensely.

Q47 **Martin Whitfield:** The reality is that there is far more co-operation than is apparent from the scheme graph.

Professor Watts: Yes. There is a lot—it is very close.

Q48 **Martin Whitfield:** Good. How could it be improved?

Professor Watts: The major issue moving forward is the issue that Chris raises about ensuring that it is true to the ODA objectives. The second is the issue of ensuring coherence and making sure that we look across our different departmental research portfolios. What is the really exciting science and what are the findings coming out of that? Are there areas where we need to focus more, where there might be a real opportunity to create huge development impacts?

Martin Whitfield: Exciting. I am conscious of the time, Chair.

Chair: Do you want to ask a final question?

Martin Whitfield: I am happy to back-pedal my question, and we will follow up later on. That would be easier.

Q49 **Darren Jones:** I find it remarkable to hear that DCLG does not have a chief scientific adviser, when you have said today that the Department has a high number of technical questions that need answering. It is even more remarkable that the delay was because the Secretary of State did not quite like to hear about science. I was then bemused to find that the website says that there is a chief scientific adviser who you say is not in fact a chief scientific adviser.

I would like to return to the question of the influence that you have on Government for your resource, to ensure that we are doing this job properly. I know that, as the Government Office for Science, you produce an annual report. It is a slimline version, because you are not mandated as you are a subsection of BEIS. Do you undertake an assessment of the staffing and resource you need and present that to BEIS?

Professor Whitty: Are you talking about the Office for Science or science more widely in government?

Darren Jones: The Government Office for Science—the staffing resource that you need.

Professor Whitty: I have not had those discussions, because that cycle, the last time around, was when Sir Mark Walport was in post, but yes, there is a straightforward discussion with BEIS.

BEIS took quite a substantial headcount hit as part of wider civil service slimming down in the last two rounds. The view was that the Government Office for Science should roughly track that, neither more nor less. That is where the total numbers came from. We agreed that we would up the number of interns and fast-streamers—people coming in. In the context of science, they are often some of the best people, because their

scientific knowledge is very current. They have come straight out of doing a master's or a PhD, and they are extremely able and extremely fast at picking things up. I do not think that is trading down in any sense. There has been a downward shift in numbers, but a slight rebalancing in terms of grade mix.

Q50 **Darren Jones:** What is the gap between what you think you need and what you have?

Professor Whitty: I do not think that a big Government Office for Science is an essential part of the mechanism. I am much more bothered about whether there is a mechanism within each of the line Government Departments that is able to put a strong scientific emphasis where it is needed and that also, where needed, has the capacity to commission research where gaps exist. You happen to have two of the three CSAs who have a significant research project who can do that; most Government Departments cannot.

Linked to that, it is not just having a CSA, because there have been a few occasions historically—not at the moment—when a Government Department caved into pressure to have a CSA and then put them in a small garret with a two-person private office and said, "Think deep thoughts." That has no advantage at all. It is only useful to have a CSA if the Department has bought into it.

You need four things to get on in government. You need seniority, because it is a hierarchy; you need a budget; you need staff; and you need personal capital—only one of which is specific to the person who takes the role. You do not have to have all of them, and not every chief scientific adviser has all of them, but they must have enough to have some kind of traction in the system. Otherwise, the post is largely ceremonial, and that is not of any use to anybody. I am much more worried about looking around Government, and saying, "Where is science advice less strong?" than worrying about the size of the Government Office for Science, which I do not think is an unreasonable size for what it is supposed to do.

Q51 **Darren Jones:** I do not find it acceptable that Secretaries of State can decide whether they want to listen to science or not, or whether to have it as a priority in their Department. Do you think that we ought to mandate Government to give a statutory footing to Ministers having to listen to science?

Professor Whitty: Having to listen to and paying attention to are completely different things. I am sure that this would not be true of any current Secretaries of State, but with some Secretaries of State, even if you imprisoned them and broadcast science at them, it would not change their mindset. The much more important thing is to have a structure that allows science to flow through the whole system.

There are two things. Secretaries of State have huge powers within their Department. That is the way the UK system works. They can sort of do what they want. Secondly, they are not the only people making decisions. The great majority of decisions of a technical nature in government would never reach a Secretary of State. They are in the run of business, and that is what a major Government Department is for. For that, science can feed in the whole time, even were there to be a situation where the distinguished person at the political cap of that was not personally so committed to it.

Q52 **Darren Jones:** In the current position, where we have a part-time chief scientific adviser in DExEU and a non-scientific chief scientific adviser in DCLG, with a gap we are looking to fill, and maybe some others, are you happy with the current resource that you get given by BEIS?

Professor Whitty: I do not think that having more resource from BEIS would change the grip that GO-Science has on the system. If Treasury were feeling in a spending mood, I would want to say more that there are some Government Departments that have had their research budgets carved right down and now do not have the capacity to respond when they spot a gap than that I was worried about the Government Office for Science. I certainly do not want the Government Office for Science to shrink further, but in my view that is not the No. 1 resource constraint on the system.

Q53 **Vicky Ford:** We have to be careful of the language we use. I would hate to give the suggestion that this Government are not committed to science. They are spending £4.7 billion on science and research, more money than any Government of the past 40 years. We have three very eminent professors here who are not only full-time professors but are giving their advice to Government. You have already made it clear that it is good for a chief scientific adviser to be involved with other work as well. The terminology "part time" might be better or more positively appreciated.

Professor Whitty: I fully agree with the point about the increase in the budget, which has been very impressive under the financial situation that we have been in.

Professor Watts: In terms of scientific input in my Department, there is myself, I have a deputy chief scientist and I have six part-time professors who come in and have input at a smaller FTE level on different areas of speciality. The science input is quite major across many of our Departments.

Q54 **Bill Grant:** Professor Whitty and others, GO-Science is funded by BEIS, which I understand is the Department for business, enterprise, innovation and science. You are accountable to it, quite rightly, for that funding. I understand that the chief scientific adviser reports to the Cabinet Secretary.

Professor Whitty: Correct.

Q55 **Bill Grant:** And that is different from the funding source, so there are two different avenues for reporting. What is the rationale for those two avenues of reporting, and is it workable?

Professor Whitty: This is one of those debates that has gone round and round in government for a long time. The view on putting it in BEIS was that, by some distance, the biggest slug of research funding, which is the bit that incentivises the whole system, is in BEIS, and it made sense to put the Government chief scientific adviser alongside the bits of the government machinery that control the science budget. That is the reason why BEIS was chosen rather than the Cabinet Office, which is the alternative, but although I am accountable for the money, which is not the major issue for GO-Science, to the permanent secretary in BEIS, I am not accountable to him for other things. For those things—in the actual line of reporting—I am accountable to the Cabinet Secretary and, through the Cabinet Secretary, to the Prime Minister.

It is a slightly odd arrangement, but I could point to 101 slightly odd arrangements in government that have been created because they are probably the best compromise you can come up with. That is the reason people have chosen, at this point in time, to do it this way.

Q56 **Bill Grant:** But it is not a silo system. Your working efforts will cross a number of Departments.

Professor Whitty: Yes. Absolutely.

Q57 **Bill Grant:** On funding and sourcing it from a particular Department, is there an allocation of funding? Do you go to that Department with a programme of work that you price and cost against? Do you bid for that money, or is it a straight allocation to you?

Professor Whitty: It is essentially a settled allocation, but we tend to go up and down with BEIS as a whole. It is an anomaly called a non-ministerial Department, which gives it certain rights and responsibilities that you would not have if you were just a department of another Department.

Q58 **Bill Grant:** At the risk of offending Vicky, I take it that you are comfortable with the funding at the moment. If you spotted a gap and needed funding, do you feel that you would be resourced for that?

Professor Whitty: I would not go that far. If I spotted a gap, I think I would be listened to seriously by both Treasury and BEIS, depending on which direction it was going. I have not yet had the need to test that, but I know that Sir Mark did, and he never said that it was a particular problem for him.

Chair: We can overrun by about five minutes. I want to make sure that we bring in both Vicky and Stephanie for their questions.

Q59 **Vicky Ford:** I want to ask about genomics and genome editing. What are the basic main opportunities and challenges? Has the NHS been able to

leverage the benefits of genomics research enough? Do you work with the chief medical officer and collaborate on her report? What more can we do to ensure not only that we lead the world in genomics research but that patients benefit from it?

Professor Whitty: I work very closely with the chief medical officer. One of my many reporting lines is to her, so I meet her very regularly.

On the benefits for the future and where the NHS will go, I would differentiate genomics as a way of diagnosing and directing treatment and genomics as a way of changing treatments, as in genome editing. Genomics as a way of directing diagnosis, saying which drugs work, is already beginning, and will only go in one direction over the next 20 years. The genome diagnostic revolution will be considerable. That might be which drug is best for someone with breast cancer; it might be saying which antibiotics an organism is susceptible to; for a child who has a problem, it might say what the genetic basis is for that problem. There is a real move to try to embed that in the NHS. It is new, and it is patchy. It is not where it will be in 20 years, but the direction of travel is positive in my view.

Genomics as a way of editing genes to improve, in particular, the lives of people with genetic disease is more scientific—doing it, in the sense of editing a gene—and the technology is actually there now. With things like CRISPR and so on, you can do it. But in doing it and knowing what the results will be—the whole scientific side—we are very much in the foothills, and there are clearly major ethical issues, which are for this House, not the scientific establishment, to address, as it did recently for mitochondrial transplantation in people with mitochondrial disease as genetic inheritance. In that area, we have a long way to go before, either scientifically or ethically, we are in a position where genomics is used, at least in a widespread way, for changing genes to improve health. Whereas, with diagnostics, I am confident of the direction of travel and I am confident that it will look very different in 20 years, genomic editing, in my view, is likely to be a niche subject, although that may change. That is where I think we are.

Q60 **Vicky Ford:** Some serious thinking from politicians on the ethics would help to unlock the science of the benefits of editing.

Professor Whitty: Absolutely. This is an area where science cannot stray beyond what the public, as represented by Parliament, are comfortable with. We have to have the political debate, in a sense in advance of the scientific advances, because then, politically, Parliament can say that, at this point—of course, views on most ethical issues shift over time—this is where we believe the line should be.

Q61 **Chair:** You need the framework.

Professor Whitty: You need a framework, yes.

Q62 **Vicky Ford:** Would you agree with me that we are a world leader in this?

Professor Whitty: Yes.

Q63 **Vicky Ford:** And that, if we can get a world-leading ethical framework, we could be benefiting millions and millions of people.

Professor Whitty: I absolutely believe that. I also believe that it is easier to have a public discourse about this where the arguments are balanced, in the UK, than it is in many other countries that are scientifically strong.

Vicky Ford: Inspiring. Thank you.

Q64 **Stephanie Peacock:** Your job is to provide science advice to Ministers, and we are undertaking an inquiry into research integrity. Can I ask each of you whether you are concerned, or whether you think there might be a crisis or a question, about research integrity? I am sure you are aware of the rise in the number of journal article retractions.

Professor Whitty: I will go first, as I represent the whole system, but I will then go to John, who represents the bit of the system that has had the biggest problem, if I'm being honest.

Overall, the amount of science that is damaged because it is fraudulent, or where the numbers have been cooked, is a very small proportion of science in most scientific areas. There are bad apples in every area. They tend to be where people are in science for the wrong reasons, for personal fame, for fortune and the usual kinds of things. For people who are in science for what it should be for—benefiting humanity and improving science—why would you falsify results that are clearly going to change that?

There are many ways we can now reproduce results, particularly in some of the quantitative sciences, which means that we are able to test results and check their validity in a way that was not previously possible. To some extent, the increase in the amount that we are seeing is because we are more able to do it. A far bigger problem in science is poor methodology. If I was to compare how much science is damaged by poor methods compared with fraudulent stuff, it is way over towards not very good science, rather than fraudulent, but there are some areas where there have been particular problems. John—not personally—might want to outline some of those.

Professor Aston: This comes back to my background as a statistician. When people use statistical methods, sometimes the poor methodology is because they have not done the statistical methods in the correct way. One of the problems about the idea that there is a crisis in research integrity is that you can often throw the baby out with the bathwater. There have been some high-profile cases where a single individual has been shown to have done scientific fraud—I think that is the clearest way to put it. However, that has then impacted on their discipline. I have been involved in looking from the statistical side at some of those studies, where people have said that the whole discipline is wrong and

have systematically tried to disprove everything in that discipline, even the good science in there.

We have to be very careful, because experimental design is often a statistical process whose assumptions you can question, that we do not end up in a situation where one person does something wrong and you throw out the entirety of that science block by saying, "Well, if that person has done it, the entirety of that discipline is obviously corrupt." I have spent a lot of time looking at the work of some of my colleagues who are doing good work but have been falsely accused because their discipline is supposed to be corrupt. You have to be very careful, when you have the debate, to see both sides. You can lose a lot by the idea that people are not doing good research, so it contaminates everything.

Q65 **Stephanie Peacock:** Have you ever provided advice based on research that was later found to be problematic? I do not know if you have any examples.

Professor Whitty: No. I have definitely given advice based on science that was subsequently overtaken, and you discover that the advice you gave was, with the benefit of hindsight, not correct, but I have never yet had one where I have had fraud as the reason for that.

Professor Watts: Often, your perspective and advice might change as bodies of evidence grow. You might be able to answer the question in a more nuanced form or with more specificity, but I have never had a fraudulent case. I have had a situation where, within my area of expertise, some secondary analysis came up with a misleading conclusion because it was a bad analysis. It was somebody who did not really understand some of the technical issues behind the data and did something quick and dirty with a dataset. They came up with an elaborate, shocking title, and it got a lot of noise. That should never have got through peer review in the first place.

Chair: I am conscious that we are keeping the Minister waiting. Vicky has a final, very quick point.

Q66 **Vicky Ford:** This is a really quick Brexit question, because we have hardly discussed it. On Euratom, how important is it that there is a successor regime in place for science and research?

Professor Whitty: Very, but it is a legal question, not a scientific one.

Chair: Good. Thank you.

Vicky Ford: And that was a legal answer. It is very important.

Chair: I am conscious that we could have gone on for another hour very easily. Thank you very much indeed for coming here and for your helpful answers. We appreciate your time.