

The Best Practice and Impact team, which provides support and advice to all analysts across government. It's fantastic that so many of you signed up for this session, using analysis to provide insight and drive better decisions. We've got some great speakers for you. Sir Ian Diamond, the National Statistician and Head of the Analysis Function, we'll be speaking first, and he is going to talk about the analysis function and the role analysis played in the recent pandemic. We then go to hear from Matt Gurden, Actuarial Director at GAD, and he's going to talk about using analysis to drive policy decisions. We will then hear from Amanda Rowlatt, Director of Analysis at DfT and Stephen Aldrich, Director of Analysis at MHCLG. And they're going to talk about using analysis to tackle the housing crisis. Please post any questions that you have in the Slido box that you will find on the right of the video feed. You'll then need to click start the conversation and make sure you're on the Q&A tab. You can then type in questions to the panel or upvote other questions you want to hear answers to. We'll also let you know when to use the polls tab. Sir Ian, Matt, Amanda and Stephen will be addressing some of your questions in a live Q&A at the end of the session. We'll then be responding to any questions and some of your questions for Sir Ian Diamond on our post session discussion forum, which you can access from the forum tab on the Civil Service Live page. The discussion name is the same as the session called 'Using analysis to provide insight and drive better decisions'. Could I have the next slide, please. So this just gives us some of the the three aims that we're trying to get across from this session today, which is around trying to demonstrate the benefits that analysis can bring to decision making. And we try to work in a very collaborative way across the analytical professions, but also with our colleagues in the policy professions, communication professions and across all the different functions. Could I have the next slide, please. I'd now like to hand over to Sir Ian Diamond, the National statistician and Head of the Analysis Function.

Julie, thank you very much it's an enormous privilege to have the opportunity to talk to everyone.

Just to say the analysis function, I think is an incredibly important part of what we in government have. It covers a wide range of groups, of actuaries, geographers, economists, social researchers, as well as statisticians. And I say that because so many of the problems that we face, so many of the analysis challenges that we have, cut across more than one boundary. I think working together across boundaries and across departments is incredibly important for us. What I'm going to do is run through some of the analyses that have addressed different areas of the COVID-19 pandemic and just try to demonstrate to you the types of analyses that have been done. The different data sources and the different analysts who worked. Next slide, please. So let's just start by remembering back. Next slide please. And let's just start by remembering back to early March when the virus was starting to take hold, and government was taking decisions about whether to impose a lock down and then clearly one wants to know if that is working or not. And the left hand side, you can see some analysis that we did, by web scraping Google Maps, and what that shows is that for a large number of various transit stations, recreation, residential, that we saw drops in some uses, for example, in transit locations, up in residential. Parks initially being used, then dropped. That just gives you a sense of mobility at the time of the lockdown and government therefore, we're able to see that there have been a if you like reductions in mobility exactly the places where it was wanted. On the right hand side of the graph, of that of the slide, is a different type of analysis. Asking the question, really, what's the reasonable worst case, in terms of mortality? I think it is pretty sad really, graphics at the end of the day, we need to

remember that every statistic here is the loss of a loved one. But what we're showing here, and this is work that was done with the government actuaries department, and the red line is the reasonable worst case of mortality across the period. As estimated by some pretty stunning mathematical models. The blue line is our estimate of excess deaths that would come because sadly some people would likely have died in this year anyways. The blue line is the excess deaths and that work actually continues jointly with DHSC, the government actuary department in the Home Office to look at deaths that have occurred as a result of reprioritization of the health service, as well as potential deaths were there to be a very, very long recession. Next slide, please. Moving forward. The next slide shows on the left hand side there, the weekly deaths that we in this country have one of the best death registration systems in the world and certainly the one that requires death registrations to be made more quickly. And that's incredibly important because in many countries, it is not the case that we have our death registrations within a short period of time. And those death registrations enable us to have COVID on the death certificate that was it organised very, very quickly with the World Health Organization. And there are two types of causes' death of primary or secondary and if the COVID is mentioned on either of those, then that is included. What you see is the red line, which is the COVID death and pretty much like the blue line which should be overall deaths. There is a bit of a hiccup that you can pick up in May. And that's one of those things you sometimes have to deal with. And to understand that was the that's the effect of a Friday bank holiday. So I think on Friday, it will get pushed to the next week you get a bit of an increase. The message here very much is COVID very, very clearly the major driver of excess deaths. But at the same time we have had significant numbers of excess deaths in the grey dotted line near about two thirds of the way up is the five year average with the blue line being the total number of excess deaths over a period of time. It does show that this has been a really massive cause of deaths. We've seen no, we've had some of the record numbers of deaths in weeks that we have ever had. And moving on the right hand side, and just to show some graphs. We stood up a weekly opinions and lifestyle survey very, very quickly. So that's a survey that goes out on a Thursday, we close it on four o'clock in the morning on a Monday. The results are ready and with government by midday, and what you see on the right hand side is the portion of public transport users who are wearing face covering across a window in June and what you see is the increase. And again therefore government able to see the impact of policy. However, at the same time, we've been incredibly interested to look at the impact not only on health and on policy around doing that, but also critically on employment. Next slide, please. And picking up real time employment data is not straightforward. For the very simple reason that many of our surveys look retrospectively. So we've been using faster indicators to give impact on employment. This one shows using HMRC PAYE data, again, making the use of the opportunities that administrative data here can use and what you see is increases in the number of people in employment and then and then a very fast drop off. Next slide please. One of the other things people are very interested in regional differentials. And the left hand side of this graph shows you the regional differentials in mortality. And you can see that London clearly very much impacted in the bottom, the southwest of England, Wales and Scotland built into here and a lot of work done to be able to do that. And what you also see on the right hand side, if you look at the deaths over time, you do see London down there, the the third column bottom, a really early hit. And you know that there are different ways of showing this and you can show that what this was was a pandemic started in London, moved out through the inner cities, particularly in Birmingham and northwest and then into the Northeast. With the rural areas relatively less impacted. If I move on to the next slide, please just wanted to make a point here that we have been working, we, ONS and DHSC working very, very hard to get good estimates of

the number of tests that have been done, four pillars of tests. And that has been an important part of what we have done. But at the same time testing of obviously health workers, obviously, of particular key workers, that doesn't give you a real impact of the proportion of the infection in the population. And so that's why, next slide please, that we have introduced a new survey, COVID infection survey which we stood up remarkably quickly, joint with a number of partners and what this doesn't. Phase one has just finished, we're now scaling up into phase two. And goes to households and within households, takes note, nasal swabs, those swabs from all members of the household over the age of two. And for a sub sample of 10% of the household blood samples from everyone over 12. That allows us to address maybe antibodies as well as the prevalence. And the two graphs really indicate that and what you can see on the right hand side is a pretty quick reduction over the period of the survey in the prevalence of the virus. It starts to pick up at the end of a little bit, but I can report that after these slides were made the latest dot on the time series goes down again. This is a national estimate, clearly there are outbreaks we've seen them in high risk workplaces, for example, in meatpacking factories and the Joint Biosecurity Centre is doing a fantastic job in being able to to really keep on top of outbreaks. While at the same time this gives us a picture of the prevalence across the population and enables government to take decisions on the basis of relaxing the lockdown. To blood samples, which I haven't put a slide here, enables us to be able to say that maybe around about 3.5 million people in the population have had exposure to the virus, and the survey has also shown that very, very many people are asymptomatic but positive and therefore are able to pass it on. And that to me is a very strong reason for the emerging policy on face coverings. It's been an enormous pleasure to talk to you. I hope to engage in the dialogue afterwards. Thank you very much.

Thank you Sir Ian Diamond. That was fascinating presentation, and great to see the analytical community developing new collection methods during this time of crisis. So I'd like to hand over straightaway to Matt Gurden, Actuarial Director at GAD.

Thanks, Julie. It's a real pleasure to be able to speak to so many of you today. As Julie mentioned, I'm an Actuarial Director at the Government Actuaries Department or GAD. For those of you that don't know, actuaries are experts in valuing risk and explaining uncertainty. And within GAD, we use those skills to support departments across the Civil Service to develop better risk informed policy solutions. So we do things like valuing the public service pension schemes, which I'm sure most of you will be members of, we look at the finances of the National Insurance Fund and we assess the potential costs to the NHS of claims against it. And we also get involved in a whole variety of other projects, where there's elements of financial risk and uncertainty. Next slide, please. I want to talk today about one such project where we've worked with colleagues across the Civil Service to look at trade credit insurance and the support government could provide. So I've got a couple of poll questions to run through in the slides. So we can see here that not many of you have heard of trade credit insurance before so that's good, you should hopefully learn something now. So if you can go to the next slide, please. I'll give you a little bit of background to what it is essentially, a business can purchase trade credit insurance to protect themselves against the risk that their customers default before paying their invoices. So for example, if we had a widget maker, it could pay a premium to get an insurance policy to cover a certain level of trade credit. It would then sell its widgets on credit and issue invoices to customers. If those invoices weren't settled, it could then claim on its insurance policy for reimbursement of its lost invoice and that would be subject to any policy excess or limits that might apply. In turn, the insurer may then

approach the defaulting customers and try and recoup some of the money that it's had to pay out. Next slide please. So next question to keep you on your toes here is a question about the trade credit insurance market and how big you think that is in the UK. So looking at the information coming in it looks like we're all heading for 350 billion.

Next slide, please.

Actually there are 600,000 businesses buying this insurance every year and it does cover around 350 billion pounds of trade credit. So this is a big area of the economy and is an important part of ensuring that trade is functioning appropriately. Next slide, please. So why were we looking at trade credit insurance and what were the problems? Well, as you all know, that the COVID-19 pandemic has caused massive economic disruption across many areas and numerous companies have had to close their doors for a period and that's affected cash flows throughout businesses, and significantly increase the risk that invoices won't be settled and insurers will have to pay out on those policies. To protect themselves, the insurers have had to either withdraw cover or increase the premiums they're charging so that they can cover the risks to themselves. Those increase in premiums come at a time when businesses are struggling through economic disruption. Next slide, please. So ultimately, this was a big risk to the economy and effective trading. And this wasn't just in the UK, across the EU governments were facing similar issues and looking at ways they could address this and help businesses to continue to operate effectively. Next slide, please. So it's not simply a case of throwing the financial support of the government behind the industry to ensure policyholders were paid. We needed to think about the design of a policy that would address these issues, but not allow insurers to just cherry pick the risks they retained and pass on the highest risks to government. And so we wanted to manage the costs and risks to the taxpayer, recognise the support measures that have previously been put in place through the global financial crisis, and more recently, the additional support measures that were being put in place to reflect COVID challenges. To get actuary were bought into assist with this project for their knowledge of the insurance and reinsurance market and their expertise in analytical modelling. And we work very closely with colleagues in BEIS and the Treasury, regulators and the Association of British Insurers to look at a range of different policy designs to see which would be most effective. Next slide, please. A crucial part of that analysis was modelling that would show the trade offs between different stakeholders. We had to balance off the support provided to insurers and policyholders versus the potential costs to the taxpayer and offset against that the level of premiums that will be passed across to the government in exchange for the support it was providing. So GAD's actuary analysts worked on modelling that would show the cash flows between the different stakeholders. And we looked at different elements of that and different policy designs where we considered different levels of government support, different trigger points for that support to kick in and then a different share of the risks once government support was in place. And that analysis allows colleagues in BEIS to consider what were the important factors and how did they balance the risks between those different stakeholders. And to further that analysis, we also looked at different economic scenarios that challenged the way in which the risk of invoices being settled would change. And the whole modelling had to be delivered at speed but evolved to reflect those changing understandings and changing desires at the policy design. Next slide please. So despite the complexity involved in the negotiations that were required, this was all carried out in a very short time period, whilst maintaining very high standards of analytical quality and allowing policy colleagues to develop a solution that was both value

for money that addressed the issues in the market. Next slide, please. So the whole project has come together to deliver a scheme that will provide a 10 billion pound guarantee to the insurance industry through a temporary reinsurance arrangement. In exchange for that government will receive a large proportion of the premiums that are paid for this type of insurance and the scheme will be open to all trade credit insurers that operate in the UK.

And they will have to sign up to certain codes of conduct around the way they organise their business whilst they're members of the scheme. And the scheme is intended to run until the end of the year, but may be extended if it becomes necessary. Whilst there's still a few remaining hurdles to get through to fully implement the solution. It's been roundly supported by the insurance industry. And it provides value for money way for government to support the economy and ensure that the COVID pandemic has a lesser impact than otherwise would have been the case. Next slide, please. So that's a very, very quick run through of what's been happening on this project, which highly significant for the economy. For me, what it reiterates is that high quality analytical advice can be provided to support risk aware policy decisions, and that works best when we understand the policy context in which that analysis is required. And we can draw support from our policy colleagues to help support the work we're doing. And then as a Civil Service, we're able to provide a robust and coherent challenge to industry experts, and ensure that the design of our policies provides value for money and controls risks to the taxpayer. So I hope that's been useful insight. And thank you very much for listening. I'll hand back to Julie.

Thank you, Matt, for a really interesting presentation and great to see and hear how the actuarial profession have been so closely involved in analytical work through this crisis. Just a quick reminder, if you have any questions for Sir Ian Diamond or for Matt, please include those in Slido. And now I'd like to hand over to Amanda Rowlatt and Stephen Aldrich.

Right. Hi guys, I'm going to kick off it's Stephen here. Amanda and I are going to talk about how analysts in our two departments have worked together to deliver transport and housing outcomes. If we could go on to the second side slide please. I want to start though, by noting that there are very few areas of public policy where one departments decision is not affected by another's. In MHCLG's case, such interdependencies are present in pretty well everything the department does. Decisions that DWP takes, for example, about housing benefit and Universal Credit impact directly with a host of MHCLG housing policy goals and outcomes. Just as decisions we take about say rent levels in social housing will impact on DWP. In local growth policy, a host of departments choices and decisions impact on local economies. And that's MHCLG's local economic growth objectives. The drivers of local growth include educational skills, business investment, innovation, competition and much else. So it's important that MHCLG works closely and collaboratively with other government departments. Both in relation to policy development, and the analytical work that underpins it as Sir Ian noted in his presentation. This presentation is focused though, on how analysts in the Department for Transport and MHCLG have worked together. Transport investment, land use planning and handling investment are clearly interdependent. If DfT funds a road or another piece of transport infrastructure, but the expected housing developments supported by that transport infrastructure does not take place then the returns from the transport investment risk not being in shape or being achieved. Similarly, a new housing development will be less attractive if it's not accessible or not well connected to, for example, the local labour market. Given the policy priority attached to improving the nation's transport infrastructure and

increasing housing supply, it's vital the two departments work together both to coordinate policy and decision making and to align how investment decisions are taken. Tackling the housing crisis therefore requires a joined up approach with DfT and vice versa. Perhaps we could go on to the next next slide. To further this collaboration, Amanda and I took the decision some years ago to establish and jointly chair a DfT MHCLG Analytical Board. This has proved a really valuable initiative, helping not only to join up analytical work across the two departments but in the process extending, I believe, collaboration between policymakers in the two departments too. These close working relationships have developed and deepened further recently, by bringing analysts from Homes England, the Highways Agency and Network Rail onto the board and into our discussions. Can I have the next slide please. The board has proved beneficial in a number of ways. We've developed a programme of work to ensure consistency of approach to transport and housing investment appraisal and that's reflected in the DfT's transport appraisal guidance and MHCLG's appraisal guide. We provided a forum where nitty issues can be shared, discussed and tackled. We've built in the process, a better shared understanding of the barriers to transport and housing investment, and how to get the most out of both and it's facilitated the sharing of data plans, methodologies and local intelligence.

More specifically we have, amongst other things, so let me give you some more concrete examples of the things we've done. We've considered how to avoid the double counting of benefits in transport and housing investment appraisals. We've reviewed the circumstances in which transport investment will unlock dependent housing development. Whether because there are no other sites in the local area that could support housing development with less or no transport investment, or because the existing transport infrastructure is clearly unable to support additional housing. We've analysed the circumstances in which transport infrastructure investment or housing investment can stimulate local economic growth. The conclusion is that neither can do this alone. Rather, they and other investments including for example, in the upscaling of labour are needed in combination. That's a very important insight in the context of initiatives such as the Northern Powerhouse and Northern Powerhouse Rail where as a consequence transport investments are being considered alongside land use planning policies. We've reviewed also the circumstances in which transport investment can bring about transformational benefits for local economies. In these circumstances, user benefits such as travel time savings may underestimate the wider economic benefits of transport and housing investment. This is incredibly tricky area. But it's also a key one for example, for the review of the Treasury Green Book that's currently underway to which the two departments are contributing. And we've also turned their attention increasingly to policy and programme evaluation and how it might be done. The lessons from this and other work will feed into the development and design of major new programmes such as, for example, the Single Housing Infrastructure Fund. Can I have the next slide please? The Housing Infrastructure Fund illustrates particularly well the benefits of analytical collaboration between the two departments. The housing infrastructure family is a multi billion pound programme that is sought to unlock substantially increased housing development in areas of greatest housing need. The two departments brought together their respective expertise in transport, and housing investment appraisal to develop a combined method for assessing major projects. The resulting methodology tested whether the housing development was dependent on the transport infrastructure proposed and assess the implications for local transport infrastructure of the housing development. The latter has brought out the importance of thinking about the impact of housing development on future travel demand. Such joint working significantly improve the decisions taken have made it a great deal easier for local authorities

and others working with the two departments to bring their proposals to fruition. Now, at this point, I'm going to hand over to Amanda who's going to talk us through some real life case studies of the benefits of our joint working.

Thank you. Next slide, please.

So I'm going to first talk about Kirkstall Forge. And this was an industrial area in northwest Leeds that was not which was no longer being used, and the local planners identified this as an ideal place to build a large housing and office development complex. But the only downside was the roads were already congested. DfT at this point stepped in with a sophisticated model to work out what the impact on the roads would be of this new development and also whether a new train station would help. And the conclusions of this were, the housing would generate a lot of extra traffic. So the scheme could not go ahead without more transport capacity. And on its own, the benefits, the transport benefits of providing the station we're not big enough to justify it. You did get much better trips for people using the new station, but slower trips for everybody else. However, when you combine the two, there would be enough people using the new station to reduce the road congestion to manageable levels. So on that basis, the the station meant the housing could go ahead, because part of the benefits and part of the benefits of the new housing could be attributed to the station scheme and this gave it high value for money. So the local council provided planning permission conditional on the station. The station was approved on this basis. And I'm delighted to report that a beautiful 1.5 thousand home development is literally starting to be built. So success, the two of were beautifully complimentary.

The East West Rail link we move to the next slide please,

is doing this on a much larger scale and could be seen as analogous to High Speed two and Northern Powerhouse Rail. So in 2017, the government announced a plan to build a million houses in the arc of land between Oxford and Cambridge. The intention was to combine this with a train between Oxford and Cambridge. And all of this would stimulate high quality jobs within the area. Sounds great, but will it work as a plan. So as you'll see on this chart, DfT has proposed five potential routes for the train between Bedford and Cambridge. So MHCLG and Homes England analysts alongside this have been looking at where new houses and where new industrial developments might go. And we are looking at the two side by side, much as we did with Kirkstall Forge to see which train routes would be most helpful for to combine to support the new houses and the new sites. And more strategically, we're looking together, drawing on our joint discussions of the conditions for local growth, to help understand what it will take more generally to drive economic growth within this area and the role of the train in achieving these. We have made some progress in that we've assessed these different routes and looking at a range of factors and importantly talking to local people, local authorities, local businesses. And in January, we announced that the preferred route would be route E and this is the bottom right of these charts. And what they show is going for on the left, the little red blob on the left, Cambridge on the right and then the grey areas are the possible routes for the rail. So we haven't identified exactly what route but we do know broadly. So we've made good progress on this. But this is a long and complex process. And the next stage is to look in more detail at where the rail might be and really work up the thinking on housing and funds.

So moving on to the next case study.

Ah next slide. How does this work contribute to helping us become a brilliant Civil Service? Well, what these do show is that looking at housing separately, we really can't tell whether the investments are a good idea, will have an appropriate strategic impact. So we do need to work together. It isn't easy to work together, this is an iterative process. Looking at joint methodologies, communication with large numbers of analysts and stakeholders, and over time to develop our thinking to a point where we reach a conclusion. And doing this across two departments is genuinely tricky. However, it can be done. We are working. We have our joint meetings, we have close communication, very helpful that our offices are side by side. And this does mean that we believe we are giving the best advice on what government should invest in to ensure the money does indeed transfer, transform our regions.

So over to Julie, to wrap this.

Thank you, Amanda and Stephen. It's fantastic to hear departments collaborating so closely. So thank you very much for that presentation. So I'm just going to wrap up. Just outlining a couple of things that we'd like you to do differently following this session. So I would encourage you to find out more about the analytical community in your department. Find out who your local analysts are and understand the different expertise and perspectives that they can bring. We all work better if we can engage early in projects and new pieces of work. And as you probably heard from the presentations today, a collaborative approach always seems to work best. So I'd like to now move on to our Q&A session. Next slide. Thank you. So the first question we have, and I think I'll probably direct this to Sir Ian Diamond if that's okay. But I'm sure the other presenters may wish to speak as well. And how do we ensure that all civil servants have enough analytical understanding to make effective decisions?

I think there is three things we need to do, Julie. The first is to raise the profile of analysis so that people think about it. So sessions like this, which just show brilliantly what you can do working together. Secondly, I think part of CPD should not be to try and turn everyone into statisticians and actuaries and things but should enable people to understand the benefits and make sure that people can understand the kind of papers that get written. The third thing is to make sure that analysts, policymakers and non policymakers are all talking at the earliest stage. One of the things that just came to me from what Stephen and Amanda said was that actually, the conversation took place at day zero. And if you do that, you can start to build things forward. So a culture where we think about analysis and where we think about what that can bring, and having the conversations at the beginning, the conversation not just in a way that the analysis is just sort of done and thrown over a wall to catch, but that it is co-created around particular questions. Thank you.

Thank you, would any of the other presenters like to speak, if you give me a nod?

Yes, can I come in, briefly? So, the other thing I'd add to that, I'd agree with all of that from Sir Ian. I think it's also incumbent on us as analytical experts to actually present the output of our analysis in a way that's properly understood and clear. So there is a need for us to develop those communication and presentation skills so that we provide the key messages that really influence the policy decision

making process, and but I think that does link to being engaged early so we understand the context of what's driving some of the decisions.

Thank you. And I think Amanda, you nodded as well.

I was going to make exactly the same point.

Okay, wonderful. I'll move on to our second question, then. Data and analysis is often an afterthought when systems are designed but become critical when we need to make decisions. How do we change this?

Who would like to answer that? Thank you, Stephen.

That's okay. I think for me, I think Ian has already mentioned it, part of it is analysts data people, you've got to be in there from the outset. And you should start thinking about your data requirements from the moment you start thinking about the policy or the programme. And one thing we've in our department, that I'm very pleased about is that we've recently changed the template that's used for cases that go to our investment subcommittee so that they have to address the question of data, how the policy or programme will be monitored, and set out from the outset how the impact of the policy or programme will be evaluated. So I think there's, there really is no alternative but to getting in there very early and making this an integral part of the whole approach for the policy or programme you're concerned with. And if we can put it in that COVID context, too. I think we're seeing again and again, that whenever we come to important choices or decisions, if you don't have the data, you really are in trouble and the work that for example, Ian highlighted in relation to the ONS infection study, for example, really powerfully demonstrates that. So we've got some fantastic case studies of what we can achieve if we do things the right way.

Wonderful. I've been told we can probably go on just for a couple more minutes as we were a little delayed starting. So I think my third question is, what is being done to enable data access and sharing it across government so that data driven decision making can happen, and perhaps go to Sir Ian to start off with that. Thank you for that.

I just think this is so important. Yeah, I am absolutely passionate that you should only collect data when it doesn't exist somewhere else. And just to give you an example, some of the work that we at ONS have done looking at the impact of COVID on the BAME community, was taking death certificates and linking them with census data to understand the ethnicity data. We need to do that across many, many, many, many areas. And I'm just delighted that in the last month or so, Cabinet Committee has been building a real plan for sharing data and making sure data are properly shared and that Alex Chisholm and I have been asked to lead a 10, an 11 point plan to enable that to happen. And so I've always been unbelievably enthusiastic about the opportunities here. I am now even more optimistic and enthusiastic about the opportunities that we have. We just, community need to really look at the opportunities and seize them.

Again, would any of the other presenters like to comment on that?

No, that's fine. Okay, I'm going to try and squeeze in one last question. I think this is a really interesting one. How can you get into an analytics role with no experienced background? How do I get the experience to get into this field? What's available via Civil Service Learning? Do you have any tips? Perhaps look to those in the sort of policy departments that might have colleagues that were keen to move into their areas. You have any tips for them?

I'm happy to come in on this one. What I would say is firstly, we we are now developing, like any profession, our professionals do need a reasonably deep level of expertise. So what we're doing is developing ways in which people can get that. One key way we're doing this is through the new apprenticeship programme, which is available to people at any stages of their working life and allows people to do that transition over. We can also provide support for people wanting to build on their technical, on their A Levels and deepen their understanding. So I think it's always worth talking to others around you about what lessons are, where you can learn things. The other thing I would say is that we now have the broad analysis profession with some professions underneath that. And increasingly, departments are moving to include people with the broad skills of an analyst rather than needing specialist ones. And that too, opens much more flexibility in terms of how we recruit people, but at the end of the day, they are professions, you do need specific expertise. And the question is how government can support people to acquire that expertise in order to try and include.

Wonderful, thank you very much. To all of our presenters for some fascinating presentations and some really informative answers to those questions, so thank you very much for your time.

Thank you very much. Thank you.