Monday, 20 January 2025

(10.29 am)

LADY HALLETT: Mr Mansell?

MR MANSELL: My Lady, the first witness today is Alexandra Jones.

MS ALEXANDRA JONES (affirmed)

Questions from COUNSEL TO THE INQUIRY

MR MANSELL: Please could you give the Inquiry your full name.

A. Alexandra Jones.

Q. Thank you very much for attending today to assist the Inquiry, Ms Jones. You have provided a witness statement for this module of the Inquiry. It is INQ000474338. And this is the corporate witness statement provided in response to a Rule 9 request sent to the Department for Science, Innovation and Technology, or DSIT; is that right?

A. That's correct.

Q. And are the contents of that statement true to the best of your knowledge and belief?

A. They are.

Q. I'd like to start, please, by asking you some questions about your professional background. You are the Director General of Science, Innovation and Growth at DSIT?

A. Yes.

Q. Prior to that you were the Director of Science, Research and Innovation at the Department for Business, Energy & Industrial Strategy, or BEIS?

A. That's right.

Q. That was from April 2019 to May 2023?

A. Yes.

Q. In that position, and we'll come back to this, you had a significant role in the creation of the Vaccine Taskforce, or VTF?

A. That's correct.

Q. Before that position, you were the Director of Industrial Strategy at BEIS from 2017 to 2019?

A. Yes.

Q. And before that, you held a range of senior positions at different organisations working on areas including economic development, labour markets and public service reform?

A. That's correct.

Q. Now you've helpfully provided a detailed and lengthy statement with 198 exhibits, and that is invaluable to the Inquiry for understanding the structures and processes and providing a narrative background. However, there's no need to go through all of that today. Instead, I want the focus of my -- my questions

will focus on future preparedness and lessons learned. Does that make sense?

A. Yes.

Q. First, though, to deal briefly with the way in which the responsibilities of the VTF were transferred to BEIS and then DSIT. So the VTF was first formally proposed in March 2020.

A. Yes.

Q. And was a temporary unit established within BEIS?

A. Yes.

Q. In June 2022, it was announced that the VTF would cease to operate and its functions would be transitioned into bodies across government including BEIS?

A. That's correct.

Q. DSIT was then formed in February 2023 and took over some of the functions and responsibilities of BEIS?

A. That's correct -- I think, yes, that's correct.

Q. And that included VTF legacy responsibilities which are now shared between the UK Health Security Agency (UKHSA), DHSC, and DSIT?

A. That's correct.

Q. Okay. Now, you explain in your statement that most of the VTF's functions were transferred to UKHSA, but the onshoring directorate's work transferred to the Office for Life Sciences, and DSIT is the Office for Life

Sciences's parent department; is that right?

A. We are one of the joint parent departments so we share the Office for Life Sciences with the Department for Health and Social Care, it's joint between the two of us so yes, it does sit with DSIT and also DHSC.

Q. And the VTF's workstreams of manufacturing and supply and industrial legacy are most relevant to your evidence today?

A. That's correct.

Q. Well, let's turn then, please, to manufacturing and domestic manufacturing capabilities. And you may have seen the evidence of Matt Hancock last week. When he was giving evidence to the Inquiry he stressed the importance of having a strong domestic manufacturing capability, which is sometimes referred to as "onshoring"; is that right?

A. Yes.

Q. Let's look first, please, at domestic vaccine manufacturing capability before the pandemic. You explain in your statement that despite a strong research and development base in the UK, there was limited manufacturing capacity and no mRNA vaccine manufacturing capability prior to the pandemic; is that right?

A. That's correct.

Q. That is perhaps illustrated, please, by a document we

can have on the screen now, INQ000421312.

This is the document, it's "Vaccines and Therapeutics - Cabinet Secretary Deep Dive [from] Thursday, 16th April". We can look, please, at page 5.

LADY HALLETT: Sorry, I missed it, 16 April of which year?

MR MANSELL: 2020, my Lady.

See page 5 there? Heading of this slide of the deep dive:

"We do not have sufficient vaccine manufacturing capacity."

It explains there that:

"Most vaccines in the UK have historically been developed by academic institutions and SMEs [small and medium sized enterprise], who lack capability and capacity to manufacture at speed and scale. The need to manufacture future vaccines at greater speed and scale is why we are looking to secure the £70-93 million needed to fund the accelerated development of VMIC."

That's the Vaccines Manufacturing and Innovation Centre.

A. That's right.

Q. Now we'll come back to that.

You also explain in your statement that "fill and finish" capacity was also very limited in the UK. That refers to the final process of producing a vial of

vaccine ready for use; is that right?

A. That's correct.

Q. Now, why was this lack of capacity a problem? What is the issue, please, with relying on international supply chains?

A. There are number of issues, particularly during a pandemic. So if you're trying on international supply chains, there's the risk of trade barriers, there's a risk that countries will wish to keep some of those supplies for themselves, and there's a resilience issue in having some of that manufacturing capacity in the UK so we're able to manufacture it, particularly given the promising nature of the Oxford vaccine that was emerging.

Q. So, to address this domestic manufacturing issue, the VTF had an objective to strengthen the UK's onshore capacity and capability in vaccine development, manufacturing and supply chain for both the pandemic and for the longer term?

A. That's correct.

Q. And we've seen reference to it already, but a key part of that was the Vaccines Manufacturing and Innovation Centre (VMIC).

And let's turn to that now. Because in your statement you explain the history of VMIC -- this was in

a site in Harwell in Oxfordshire?

A. That's right.

Q. And in essence, I'll just run through this to give it a bit of context but in 2018, £65 million was allocated by Innovate UK, part of UK Research & Innovation, to create the UK's first dedicated vaccine manufacturing innovation centre to develop new vaccine technologies?

A. Yes.

Q. In the same year, VMIC (UK) Limited was established as a private company to run the site?

A. Yes.

Q. VMIC was then established as an innovation centre but it also had an emergency response capability which would be able to produce around one million to three million doses of vaccine within three months?

A. That's correct.

Q. And it was still under construction at the time of the pandemic?

A. Yes.

Q. Now, Professor Sir John Bell led the 2017 Life Sciences Strategy from which VMIC had emerged as a concept, and in his Module 4 statement he makes some observations about the fact it wasn't ready at the time of the pandemic.

Can we have, please, INQ000499442, please, and

that's page 16.

So this is Professor Sir John Bell's statement and he says there:

"Unfortunately, two-and-a-half years later, after a very considerable amount of dithering about the exact funding contributions from this variety of partners and multiple issues about where the centre would be able to and how it would be led and managed, there were not even stakes in the ground when the pandemic hit in 2020. This was recognised to have been a major mistake."

Do you agree that there was dithering and a major mistake in that the site was not open at the time of the pandemic? Is that something you can help us with?

A. I can't comment on the dithering. Certainly we would have hoped that it would be further along two years later. This was part of a wider industrial strategy, Challenge Fund programme, one of the priorities, so we would have wanted it to be further along.

Q. Do you know why it wasn't?

A. I don't have the details on that stage. Certainly some of the later lessons learned suggest that some of the ways in which the programme was being run could have been improved.

Q. As the pandemic progressed, additional funding was provided to VMIC (UK) Limited to accelerate the

completion of the facility and the total funding, you explain, that was allocated was around £205 million. And we can see, during the life of the pandemic, the emphasis being placed on VMIC by the Treasury in this document, please, INQ000421276.

This is a Treasury email regarding VMIC, dated 16 February 2021. If we can move further down the page, please, and see reference there in bold:

"In 2017, HMG invested in a new facility, the Vaccines Manufacturing Innovation Centre ..."

And then the next bullet point down:

"In April last year we reviewed with BEIS how this facility could be expanded and accelerated."

And the final bullet point on that page, and over to the next page -- that's it:

"We have pushed the VTF to accelerate VMIC further -- but they have told us this is the quickest they can deliver the facility. Delivery has also slipped from mid-2021 to the end of this year, meaning we will not be able to use it to deliver a response in this phase of this pandemic, although we will be able to use it from the start of next year if ongoing population-level vaccination is necessary."

Then the point is made that:

"It will however have a long life span and will be

a critical piece of vaccine sovereign capability and HMG will have step-in rights for vaccine manufacturing during epidemics."

So despite the further investment that was being spoken about there, there were further delays to the project and VMIC was never completed, and did not manufacture any Covid-19 vaccines; is that right?

A. That's correct.

Q. And --

LADY HALLETT: I'm sorry to interrupt. Just hold your thought, Mr Mansell.

You said there earlier that ways in which the programme could have been run could have been improved. Is that because too many different departments and people were involved? Were there too many fingers in the pie?

A. That wasn't what I was referring to in that instance, actually. There was a set of lessons learned that UK Research and Innovation did. Some of those were about the way in which the programme was run in terms of senior responsible officer, some of the issues that were raised during the project, supply chain delays weren't managed in the right way, so it was more -- I was referring to more how the programme was run rather than multiple departments. I think this was one of many

shots on goal, and it was one, though, that BEIS at the time was leading on working with UKRI, trying to bring in other partners, but the funders that Sir John Bell was referring to were more in the private sector rather than, as I understand it, in the public sector.

LADY HALLETT: Thank you.

Sorry to interrupt, Mr Mansell.

MR MANSELL: That's quite all right, my Lady.

We can see, in fact, that lessons learned document. It's INQ000330729, please.

This is a paper from DSIT, Vaccines Onshoring Programme Monitoring Report 2022 to 23. And page 14, please. We can see the reference to VMIC at the top of that page and then towards the end of the page, "Top six tips for other projects".

"Act quickly if you think there's an issue with the project or its management ... clear leadership of the parties is fundamental to success".

And number 3 there:

"Require quality management information ... allowing you to make informed decisions -- quality, reliability and timeliness. The VTF should be more prescriptive."

What did that mean?

A. My understanding of that is that the VTF should have been more specific about precisely the information it

was acquiring to understand was it on track or was it not on track?

Q. By October 2021, the facility was still not open and there were cost overruns.

A. That's correct.

Q. And the board of directors of VMIC (UK) Limited decided that further funding would not be sought from the government. They sent an email dated 3 October 2021, the board of directors, to UK Research and Innovation. We can see that, please, at INQ000330658. This is an email, as I say, from the board of directors to UKRI, and page 2, please, first paragraph. We can see they are writing:

"I am writing to you on behalf of the board of directors to request permission for the VMIC board to explore various strategic options to secure the sustainable future of the VMIC facility."

And one of those options was the sale of the site. Is that right?

A. That's correct.

Q. That can come down, thank you.

And that's in fact what happened in April 2022: the site was sold to a private company. Why was that?

A. The view of the board of directors, it was set up as a private company, partly to allow it to be more

flexible and agile, and the view of the board of directors was that was the best way to secure a sustainable future for VMIC. When we looked at that within government, the view was taken that clearly we had not achieved the objectives we desired from VMIC, but also, that in these circumstances, that was the best outcome, that it was sold to Catalent, which is a contract management and development organisation that had committed to turn it into a manufacturing facility and create up to 400 jobs in that area.

Q. That was the plan.

A. Indeed.

Q. You will have seen, and the Inquiry has seen, a number of criticisms and concerns being raised about the sale of VMIC in the decision to sell the site.

Professor Sir John Bell, we've already looked at his statement, we know he played a key role in VMIC as a concept initially, one of the concerns he raises is that even though the full amount of capital was recovered by the government when the site was sold, none of the money found its way back into the life sciences pot and the opportunities were lost to either create another VMIC or to use the money to further substantiate the UK's capabilities in vaccine manufacturing or development. Is that right, that the money was recouped

but not redirected into an equivalent project?

A. No. In fact we recouped 80 million that went into projects for manufacturing and investing in onshoring.

Q. And that was dedicated funding that was funnelled for that purpose?

A. That went to the Office for Life Sciences to invest in manufacturing for life sciences.

Q. Another issue that Sir John Bell raises is that it's his understanding that the VMIC site has now been mothballed. Is that right? Is it closed?

A. It's been mothballed, that's correct.

Q. And Dame Kate Bingham says that she is concerned that the sale of VMIC without some form of right or assurance for the government to use the site in the event of a future pandemic has reduced our resilience and capability to be prepared for a future pandemic. Do we have step-in rights in relation to that site? And if we did, would it be any use, given that it's been mothballed?

A. We do not have step-in rights for that particular site. We do have a number of other sites which I'd be happy to talk about but for this site we do not.

Q. We'll just finish this with VMIC because it will open up and we'll talk about the other sites in a moment.

Could we have on the screen, please, INQ000474278.

This is the statement provided by Dame Sarah Gilbert, who was of course pivotal in developing the Oxford-AstraZeneca vaccine, and she, in her Module 4 statement, expresses her concerns about the sale of VMIC. This is page 13, paragraph 57.

She says this:

"The UK has no national capability in vaccine manufacturing, which VMIC would have provided. The CBF [Clinical BioManufacturing Facility] at the University of Oxford can concurrently only work on one vaccine manufacture at a time, and does not have space to take on all the requests for work that are received. VMIC would have provided much more capability and could have produced much large numbers of doses of vaccines ..."

She goes on to explain that the site:

"... was set up to manufacture multiple types of vaccines (including viral vectored vaccines, recombinant protein and virus-like particles as well as mRNA) ..."

And then paragraph 58, still on the screen at the bottom there:

"Without VMIC, the only option is to use contract manufacturing organisations. Transferring all of the necessary expertise for the manufacture of a novel vaccine can be a lengthy process, (months or sometimes years) and most academic groups don't have the expertise

to do this."

So what is your take, please, on these criticisms? Is it right that without VMIC the UK has no national capability in vaccine manufacturing?

A. So I don't think that's quite right. We do have other capabilities in vaccine manufacturing. There's a question about whether that's enough. But if you look at what we've done, when we -- when we made the additional investment in VMIC, indeed when we set it up, we did not have investments in vaccine innovation, we did not have sufficient vaccine manufacturing in the UK. Since then, we have made a number of investments to try to do something about that.

So, on the innovation side, there is a Transforming Medicines Manufacturing programme, and a transforming medicines manufacturing centre of excellence that's been set up. We've got an Oligonucleotide Manufacturing Innovation Centre of Excellence, we have got a centre of excellence in Darlington, we've got an innovation centre in Braintree.

So we've got number of investments on the innovation side, which was VMIC's original purpose, and then we've got some investments on the commercial manufacturing side, not just a partnership with Moderna, but also partnerships with a number of other life sciences

companies, and we've got innovations across a number of different vaccine technologies, which we can come on to talk about.

So VMIC clearly did not achieve what we wanted it to achieve. It was not the option we wanted. It was one of many shots on goal for the Vaccine Taskforce. This one did not work, but because we were taking some other shots, and have continued to do so, I think we are in a different position to the one that we were in. We still want to look at the gaps that we've got and where we need to do more on both manufacturing capacity but also the innovation side, and so one of the actions being taken building on all the work of the VTF, the work of the Office for Life Sciences since, is we're doing a review of that, Department of Health is, at the moment, to look at what we have and where the gaps are.

Q. Let's broaden this out then, beyond VMIC, we'll look at some other sites, and you can tell us about -- a bit more detail about some of these other innovations you've just spoken about.

Oxford Biomedica was utilised during the pandemic. It provided most of the supply of the Oxford-AstraZeneca vaccine deployed in the UK. What is the current state of that site, please, and how, if at all, could that be used in the event of a future pandemic?

A. So that's still an operational site. I would need to check what we would do in a future pandemic.

The benefit of that site is it was able to operate at a sufficient scale, with -- one of the investments we made was there, while VMIC was being built, so it could generate the vaccine. That's one of a number of sites that we have in the UK but I would need to check what it can do in the future.

LADY HALLETT: So is Oxford Biomedica a government site?

A. No, it's an investment we made, so it's an -- it's government-made investments so that it was able to manufacture the Oxford-AstraZeneca vaccine.

MR MANSELL: Could we step in, in the event of a future pandemic, or do you not know?

A. I'm afraid I don't know if we could step in. What I do know is we've got a number of arrangements with organisations across the country. We've clearly worked with them in the past so they would be part of plans for the future.

Q. The Cell and Gene Therapy Catapult in Braintree, there was a great deal of investment in that site during the pandemic, through the VTF, although is it right that it was ultimately not required to manufacture any Covid-19 vaccines?

A. That's correct.

Q. And what is the current state of that site, please, and how could that be used if there is another pandemic, when there is another pandemic?

A. That's currently an innovation centre, and one where we've got some agreements in place about being able to step up manufacturing should we need to do so. That is an ongoing conversation. We've had an agreement with them for the past several years, so we're in ongoing conversations about what happens next.

Q. You make the point in your statement that it strengthens the UK's onshore capacity in viral vector and protein sub-unit vaccines?

A. That's correct.

Q. The Centre for Process Innovation (CPI) in Darlington, you've mentioned that. Again, investment in that site during the pandemic through the VTF. Although, again, is it right that no need for it to manufacture vaccines during the pandemic?

A. No need for it to manufacture them in the end, that's correct.

Q. And the current status of that site, please?

A. That's an ongoing innovation centre. So one of the big weaknesses that we had was we didn't have some of the innovation in multiple modalities of vaccine, which is one of the important things for resilience, mRNA in

particular. This is a centre for innovation, and the only UK-based site that can develop and manufacture lipid nanoparticles, which is a big part of mRNA vaccines. So that is ongoing and a thriving site.

Q. And the focus of that site then is mRNA?

A. It is.

Q. Exclusively?

A. It's on mRNA and on innovation -- you know, mRNA, and it's -- yes, it's got the capability to develop and manufacture those nanoparticles should we need it for early phase clinical trials.

Q. There was also a manufacturing site in Livingston in Scotland, the Valneva site. We know the contract was terminated in September 2021, and you explain in your statement that UKHSA is best placed to address the termination of that contract; is that right?

A. That's correct.

Q. But are you able to help us with what happened to the site, whether it's possible that that could be utilised in the event of a future pandemic?

A. That's one of the options we would need to look at as we're looking at what capacity we have now but I don't have further information on that specific site.

Q. You've touched upon the Moderna partnership.

A. Yes.

Q. This was announced in December 2022, a ten-year partnership with Moderna, and you say this will provide the UK with mRNA vaccine development and manufacturing capacity.
A. That's right.
Q. Could you tell us some more about that, please.
A. Of course. They're creating a new innovation and technology centre in the UK, so the aim is they're creating more than 150 highly skilled jobs, but also they'll have the capacity to produce up to 250 million vaccines per year in -- if there was a pandemic. And again, that addresses one of the biggest gaps that we had previously, which was no mRNA manufacturing.
Q. On mRNA -- and before we get there, what status is it at at the moment? Has the site been built?
A. The partnership was established in December 2022, so it's ongoing. Work is continuing.
Q. Do you know the time --
A. I don't believe so the site has been built. I don't know the timescales. They would be happy to come back with those if that would be useful.
Q. Dame Kate Bingham identifies in her Module 4 statement that a central feature of the VTF's approach was to build a portfolio of different vaccine types, and you've spoken about this yourself, the greater resilience in

having a range of different modalities of vaccine, and she says that there seems to be now "no appetite to secure a broader vaccine format capability" beyond mRNA, and that "this lack of diversity in formats is a potential public health weakness".

Are we now over-reliant on mRNA? Are we preparing for the next pandemic on the basis that it will be the same as the last one?

A. That's an important challenge because we cannot assume the next pandemic will be the same as the last one. We do have diversity in the kind of investments we're making in innovation and in sites. So the Future Vaccines Manufacturing Hub, for example, is looking at a range of vaccine technologies and the innovations we need for that. We've got Braintree, which is not just looking at mRNA. So there are a number of investments going -- the strategy is to be ready, to be able to rapidly develop and deploy vaccine technologies recognising we do not know what comes next.

The biggest gap we had was mRNA, and so it's fair to say we have focused a lot on building up that capacity and capability. It's not the only area we've focused on, though, and there have been investments in other areas as well. Again, I think the work that we're doing through -- we have a new life sciences innovative

manufacturing fund, and that is designed to invest across a number of modalities to try to get some of that resilience.

So, it's an important challenge but one I think we're really working to make sure we've closed that gap, we still have investments across different technologies. We need to check that we've got the right mix.

Q. Antibody manufacturing, please. Dame Kate Bingham observes in her statement that "bulk antibody manufacturing capacity in the UK was and remains non-existent". What is being done to strengthen the UK's resilience in that regard?
A. So again, that's part of the work we're doing through the life sciences innovative manufacturing fund, that followed on from a previous biomanufacturing fund which, in fact, used some of the proceeds from VMIC. So that explicitly aims to manufacture across a whole range of areas, antivirals, antibodies, different types of vaccine technology, because that was very clearly one of the weaknesses we had, so being able to be ready for a pandemic because we don't know what kind of pandemic it might be. So that's one of the explicit aims.
Q. You've mentioned antiviral manufacturing as well. Are there specific dedicated sites for antibody and antiviral manufacturing in the UK that you can point

us to?
A. I can't point you to specific sites although I can talk to colleagues to get you that specific information. What I can tell you is that's very much part of the portfolio thinking we're doing about what do you need for a future pandemic, and the UK -- the DHSC are, as I say, looking now, at where are gaps and what do we need to do about them?
Q. Before we move away from manufacturing, in March 2024, AstraZeneca announced a planned investment of 650 million in research, development and manufacture of vaccines in the UK. Is that something you can help us with in terms of how is that investment going to assist with resilience in manufacturing capability?
A. Those are conversations that are ongoing but if all of that comes through that would absolutely help. They're looking to invest in a site in Speke which would absolutely help with some of that diversity of manufacturing capability.
Q. So that site is not open yet?
A. Not as yet, no.
Q. Not a final agreement that there will be such a site; is that right?
A. We're in advanced stages but you'll understand I can't talk about the details of it.

Q. Of course.
A. But some very positive conversations.
Q. Next topic --
LADY HALLETT: Sorry, before you move on.
So in your opinion, Ms Jones, what state are we in if a pandemic hit us this winter?
A. In terms of manufacturing?
LADY HALLETT: Yes. Because we're moving on ...
A. Of course. We're in a much better position than we were because we've invested in some of this innovation, some of this manufacturing capability. As you can tell from my evidence, not all of it is there yet. We have learned a lot of lessons about how might you scale up. We've got Braintree, for example. We've managed to work with Oxford Biomedica, we've got some of the facilities in Darlington. So it's difficult to say. We are in a better position than we were. We will be in a better position than we are. I think we've got a number of things to call on but we're not exactly where we need to be as yet.
LADY HALLETT: Are you confident the commitment is there to continue this work? Sometimes what happens is people respond to an emergency and put in -- and then think, well, yes, we probably ought to do things better, but then some other priority comes along and planning for

the future isn't always a priority for politicians, dare I say it.
A. I recognise that concern. We've got this innovative life sciences manufacturing -- sorry, life sciences innovative manufacturing fund that was announced in the autumn, building on a whole range of work. It is -- we're doing a life sciences sector plan. Sir John Bell is very involved in that and I'm sure will be making the point, as will the sector, of the importance of this. It matters to life sciences investing in the UK. So I am confident that for a whole number of reasons, very much including the importance of being ready for a future pandemic, but also because if you look at UKRI, for example, they're doing work on tackling infections as one of their five major themes. This is well embedded and has been recommitted to by this government. So yes, we are not there yet, but I do feel this is seen as a priority to invest in, as I say, for growth for the future, for any future pandemic.
LADY HALLETT: Thank you.
MR MANSELL: Just to pick up on the questions there from the Chair. If there was a population-level pandemic that hit next year, are there operational sites in the UK to manufacture vaccines at scale?
A. There are some sites available to manufacture vaccines

at scale. It would depend on the kind of pandemic. We don't know what kind of pandemic it would be and therefore what vaccine might be most effective. So we do have the ability to call on a number of sites. It is really difficult to answer that question because I don't know what kind of pandemic it might be.
Q. What about sites that operate across a range of modalities, platform sites that can produce vaccines at scale? Do we have that capability?
A. We have got some capability there, yes. We've got some capability in a number of areas. Could we scale it up fast enough to population scale? We're looking at some of those issues now but it's really difficult to know -- to be able to answer that question, given where we are at the moment.
Q. Okay. Moving on, the role of the Government Chief Scientific Adviser at the outset of the pandemic. You explain in your statement that the GCSA, Sir Patrick Vallance as he was then, now Lord Vallance, played a pivotal role in that regard. He took a series of important actions and made important recommendations. I just want to run through some of those with you now.
In January 2020 he convened the first of a series of meetings of research funders, and that led to the rapid funding of research programmes into vaccines and

therapeutics?
A. That's correct.
Q. He identified, very early on, the potential use of self-amplifying mRNA vaccine approach to tackling the pandemic?
A. Yes.
Q. The VTF was Lord Vallance's idea and he played a central role in establishing it?
A. Yes.
Q. And he was also instrumental in establishing the Therapeutics Taskforce and the Antivirals Taskforce?
A. That's correct.
Q. And establishing bodies like that wouldn't normally be part of the GCSA's role, would it?
A. That's correct.
Q. You explain in your statement that previous GCSAs have had a range of scientific backgrounds but Lord Vallance had particularly relevant experience because he brought his experience as a clinician and experience of working in the pharmaceutical industry to the role?
A. That's correct.
Q. You go on to say that in the future, the GCSA may not come from a biomedical background at all, and future planning will need to take this into account.
On one view, we were very lucky to have

Lord Vallance in the position that he was at the time of the pandemic.
A. Yes.
Q. But if a similar figure with the same sort experience can't be guaranteed in the future, how do we prepare for that to make sure that we do have the right expertise in place?
A. We definitely cannot assume that a future GCSA, Government Chief Scientific Adviser, would have that expertise. Having the advisory body that Government Office for Science has, SAGE, is a good way to have a built-in set of advice about issues ongoing and they will advise on issues like monkeypox, for example, and where we should be taking issues more or less seriously. I think one of the lessons from the pandemic was the importance of bringing in expertise early, but we've got that build in through SAGE so we've got regular external expertise, and then, when there are concerns, those are escalated through government and we can get people to look at them in a bit more detail.
We'd need to bring in some of that expertise, I think, or make sure we understood where it was in government in future.
Q. We've touched upon the rapid funding of research programmes, including in genomics and vaccines that

Lord Vallance identified. That included investment in clinical trials at an early stage, and a concern raised by some Core Participant groups, including the Federation of Ethnic Minority Healthcare Organisations, is the lack of ethnic diversity in clinical trials.
Could you help us with DSIT's position on what could and should be done in order to ensure greater diversity in the future?
A. So clinical trials does sit with the Department of Health and Social Care and then with the academics who run them, and there are groups that contribute to that. One issue that did come up during the pandemic was the ACCORD studies which, as you will have seen from the evidence, were delayed. There were a number of reasons for that. One of the issues was actually the focus on ensuring a diversity of participants and the struggle that they had to do that. Exactly the right thing to do. One of the lessons was getting some specialist communication -- some communication specialists who could help reach out to some of those groups, seemed to improve later recruitment.
So that was one, I thought, useful insight but the best people to comment are those leading some of those studies. So Department of Health and Social Care, but also the academics leading those studies, and they have

various rules and guidance on those.
Q. In your statement you explain the structures that were created in the initial version or incarnation of the VTF. It had a programme board, an external advisory board.
If we can just look at your statement, please, INQ000474338 page 19.
This is the structure as it then eventually became. We can see there the Vaccine Taskforce Steering Group, the Vaccine Taskforce Programme Board, chair Kate Bingham reporting to the Prime Minister and the Secretary of State for BEIS, and the various workstreams in the red boxes that the VTF was focusing on.
That can come down, thank you.
But the question is: why was it necessary to create these structures at the time of the pandemic? Why weren't systems already in place for a body like the VTF to spring into action?
A. This was a body that pulled together some of the people across government, pulled in external expertise, which we needed, but in a very focused way. So one of the characteristics of the Vaccine Taskforce was it had a very clear objective to secure a vaccine as quickly as possible in a way that would benefit the UK, benefit globally, leave a legacy. And so that focus meant

that -- and the need for very rapid action, given what was happening, was why we set that up, so they could really focus on specifically what was required.
So there were various workstreams across government. They weren't pulling together to get a vaccine for Covid.
Q. It takes some time to establish structures like that. If a pandemic hit next year, is there a plan as to where a body like the VTF would sit, which department it would sit within?
A. So the UK Health and Security Agency is the lead on much of what the VTF formerly did, as you noted earlier, and my understanding is they would take the lead on pulling in people and pulling people together from across government.
Q. One of the recommendations that the Inquiry is considering is, as emanated from Dame Kate Bingham and Dr Clive Dix, and it's for a national vaccines agency, a body that is kept warm in peacetime, if you like, scanning the horizon, looking for the types of threats that may emerge, making sure that the UK has a broad platform, a diverse platform in terms of vaccines, and also bringing in the external expertise that seemed crucial during the pandemic. What is your view on whether such a body should established?

A. The objectives you've set out of making sure we're scanning the horizon, bringing in external expertise, of coordinating the work we do across government, I think, are incredibly important. There are questions about the best way to do that. At the moment the UKHSA are the lead in government on doing this work, and can pull in external groups and you'd be well placed to speak to them -- I believe, you're speaking to them later.

I think the challenges of a separate agency are that it would still need to pull in everybody in government to get us all working together so it creates an additional structure alongside, perhaps, the UKHSA. So I think the challenge would be how do you get the best, most streamlined structure to achieve those objectives? Wherever it sits, it needs to pull in external expertise, expertise from across government, Government Office for Science, the manufacturing work we do. So I think as long as the outcomes are clear, there is a simplicity to it staying within UKHSA but I do understand the arguments being made for the agency.

Q. I suppose the point is that you don't want to be pulling in these experts when the pandemic is already here. You want these systems and processes to be kept warm and to be running in the background and making sure that they're looking at the capability of the UK, at what may

be the next threat.

You'll have heard the evidence that Lord Sharma gave last week. The idea of a national vaccines agency was put to him and he suggested the creation of an vaccine expert advisory panel, not as formal as a national vaccines agency, but a body which comprises industry experts, ministers and civil servants meeting regularly, horizon scanning, and making recommendations for investment.

Do you have any thoughts on that?

A. Again, I can see the benefits. I would want to, in the interests of making sure government is pulling together all the existing groups, we have some excellent external advisory groups for life sciences investments, at the moment. So I'd want to make sure, if we set something up, and I can see the benefits, we are complementing, not duplicating, particularly where we're using incredibly business people's time. Clearly, ensuring the horizon scanning has huge benefits, so I think that -- I do agree with the objectives, I think pulling in external people is always useful, UKHSA will have their views, but I think I would note we have some very good relationships, including a life sciences council, with the life sciences industry. Now, I know that's not specifically on the vaccines, but I'd want to make sure

we were making the most of those as we were thinking about what we do on vaccines specifically.

Q. Next topic, the remit of the VTF insofar as it related to therapeutics and antibodies. The Inquiry has seen some correspondence, some debate, about whether therapeutics would fall within the scope of the VTF's work, and it didn't end up falling within the ambit of the VTF.

Can you help us with why therapeutics were not involved in the remit of the VTF?

A. So my understanding was there was a discussion about ensuring the focus of the Vaccine Taskforce and you'll have seen the various email exchanges. With hindsight, one of the benefits of the VTF was it was very focused on a vaccine. I think the concern at the time and the conversation at the time was: how do we ensure we achieve the outcomes best and what's the best set up to make sure we do that? And ultimately, the view was therapeutics would sit better with the Department of Health and Social Care, partly also because of some of the nature of the work there sat better with that department.

Q. Vaccines won't be effective for everyone, immunosuppressed people and clinically vulnerable people, for example, and we're going to come on to

antibodies and Evusheld in a moment, but on the issue of therapeutics more generally, was the exclusion from the remit of the VTF reflective of a lower priority being given to them?

A. That's certainly not my understanding. I think it was much more -- from my understanding of the conversations I was involved in, or heard about, how do we make sure we set this up for success and ensure that both get the focus that they need rather than perhaps being diluted by being put together.

Q. Antibodies did remain in scope for the VTF, and that included work on the prophylactic antibody therapy Evusheld, and that was intended for around 500,000 immunocompromised individuals who would not obtain much benefit from vaccination. Evusheld was not purchased and last week the Inquiry heard evidence from the Clinically Vulnerable Families' witness Lara Wong who explained that immunosuppressed people were left locked inside their houses while a large proportion of the population were freed by virtue of the vaccine rollout. Was sufficient priority given to ensuring protection for immunosuppressed people, in your view, and what should we do to prepare for the next pandemic to ensure that such people are looked after?

A. So the inclusion of antibodies in the Vaccine Taskforce

partly reflected that sense from the beginning that it would be important for immunocompromised people, vulnerable people, for whom the vaccine might be less effective, to make sure that was part of the thinking on vaccines, and of course lots of links for therapeutics. Others will be better placed to talk about whether the focus was sufficient, but certainly in the conception of it, it was there at the start. Clearly the impact and the way that it worked in practice for many people was not what we would have wanted it to be.

Q. And what are we doing now to ensure that when the next pandemic hits, those people are sufficiently prioritised?

A. So others will be better placed to say, as they're putting together those plans. Certainly from the work that I'm doing, because we've got that portfolio of investments in manufacturing, for example, including thinking about antibodies, that is part of it. There are clearly some lessons from what worked well and what worked less well. Others will be better placed to tell you more about what that would look like for the future.

Q. I've almost finished my questions, Ms Jones. The last thing I want to ask you about is the Advanced Research and Invention Agency (ARIA), which is an executive non-departmental public body sponsored by DSIT?

A. That's correct.

Q. And could you tell us, please, with how DSIT is working with ARIA, if it is at all, on ensuring pandemic preparedness in relation to vaccines and therapeutics?

A. ARIA was set up in recognition that it is difficult to take big risks with government funding for research, because inevitably, when people do take risks and projects fail, we ask them why they failed. ARIA was set up with an Act of Parliament to be able to take risks, let things fail fast, and determine its own research agenda.

So, at the moment, its work, which is determined by the chief executive and the programme directors they've recruited, is focusing on a number of areas -- programmable plants, robotics -- none of those are directly relevant to the pandemic or to vaccines. There may be areas of work that emerge but they're explicitly set up to explore areas which they think have real potential and are not currently being explored, riskier areas.

UK Research and Innovation are the area which we do direct far more as government. And as I've said, they've got -- one of their five strategic themes is tackling infections. They're doing a lot of work on this. So ARIA might help, we don't know, because that's

not our role to direct them. UK Research and Innovation, we do, and we do with the National Institute for Health Research, and they are both working on these issues.

MR MANSELL: My Lady, those are all my questions, thank you.

LADY HALLETT: Thank you very much, Mr Mansell.

Mr Wilcock.

Questions from MR WILCOCK KC

MR WILCOCK: Good morning, Ms Jones. I ask questions on behalf of the Northern Ireland Covid Bereaved Families for Justice, and accordingly I want to ask you some questions about the involvement of the devolved administrations in the Vaccine Taskforce.

Now, at paragraph 57 of your statement, you say:

"Having reviewed the papers from this early period, it appears that [devolved administration] involvement in the genesis of the [Vaccine Taskforce] was limited, most likely because of the pace required to set up the [Vaccine Taskforce] and to start its work, as well as the initially very limited resources available."

So can you tell us what involvement there actually was from the devolved administrations in the Vaccine Taskforce in the early phase that you were referring to?

A. There was very limited involvement.

We did talk to colleagues from across the UK, UKRI

is a cross-UK organisation, but we didn't work specifically with colleagues from the devolved administrations.

Q. Can you tell us what UKRI is, certainly tell me what it is.

A. I'm sorry, it's the UK Research and Innovation. So it's the organisation that works on research right across the UK.

Q. Right. But there was no specific contact with the devolved administrations?

A. No, there wasn't.

Q. It may be obvious but could you tell us a bit more about why it was that the pace of the work and the limited available resources restricted the involvement of the devolved at administrations in the genesis of the taskforce?

A. Initially there were two of us working on the Vaccine Taskforce, and it expanded rapidly but with a number of demands on time. I think this is one of the lessons that I would say we should learn: about making sure, as we're setting something up, who do we talk to.

I know there were conversations that were happening within the devolved administrations, we didn't join them up, we were so focused on moving rapidly to get an advisory board set up, get a programme board. So

I think that was something I would want to learn for the future. But it was very much two of us in the first week getting the team built and trying to deliver as fast as possible.

MR WILCOCK: Well, that's very clear, and thank you for your recommendation as well. I'm sure the chair will consider that. Thank you.

LADY HALLETT: Thank you, Mr Wilcock.

Thank you very much indeed, Ms Jones. I'm extremely grateful, obviously, for the work you did in helping to get the Vaccine Taskforce going and also for your help in this Inquiry. Thank you very much indeed.

THE WITNESS: Thank you.

(The witness withdrew)

MR KEITH: My Lady, the next witness is Professor Sir Chris Whitty.

PROFESSOR SIR CHRIS WHITTY (sworn)

Questions from LEAD COUNSEL TO THE INQUIRY for MODULE 4

LADY HALLETT: Professor Whitty, we continue our demands upon your time, but I gather that you've got even greater demands on your time now, acting as interim Permanent Secretary.

A. I think today I'm answering only as Chief Medical Officer.

LADY HALLETT: You are.

MR KEITH: You know the ropes, Professor. Could you commence please, by giving us your full name.

A. Christopher Whitty.

Q. Thank you very much.

Professor, this is of course the fourth time you will have given evidence in this Inquiry. We're also extremely conscious of the burden on you, especially given your many other commitments, so our thanks, of course, for your assistance.

And you've produced a further witness statement for the Inquiry, INQ000474401, dated October 24, some 88 pages.

Professor, it was not a foregone conclusion that the United Kingdom or any country would find and develop an acceptably safe vaccine, let alone deliver it at population level. And the therapeutics programme, whilst it didn't lead to a general prophylactic treatment being made available -- a prophylactic therapeutic or treatment being made available, led to a number of repurposed medicines being authorised, in particular the life-saving dexamethasone, as well as two important new treatment drugs.

So on, I think, a fairly sensible view, there was very considerable success in both programmes. That was the product of a vast amount of work, dedication and

attention on the part of a very substantial number of government bodies, entities, advisory committees, scientists, epidemiologists, researchers, academics, and the like. Is that a fair summary?

A. It's a very fair summary and I think we should all pay huge tribute in fact to not only the scientists in the UK and internationally, and prior to the pandemic, who worked on this, many people, as you say, who came in to advise government from academia, from industry, and elsewhere, but I think, above all, to the people who volunteered. Over a million people in the UK volunteered for clinical trials and other studies, and that was really what drove this and it's that volunteer spirit which I think underlies many of the successes that you outline.

Q. And of course credit must also go to the manufacturers and to the bodies and organisations, the National Health, social care bodies, Public Health Agencies, local, charitable and military organisations which helped with the delivery of the vaccine?

A. It was an extraordinary logistical effort by the NHS and many others, yes.

Q. You remain the Chief Medical Officer for England?

A. Yes.

Q. And you were appointed on 1st October 2019. And the CMO

is the UK Government's principal medical adviser and professional head of the public health profession and, indeed, the medical profession in England.

We heard a bit about the extent of the role of the Chief Medical Officer and of the Office of the Chief Medical Officer in Module 2 and 3 but essentially, you provided public health and clinical advice to ministers, including the Prime Minister, to the DHSC, and officials across government. You were, however, are, however, the Chief Medical Officer for England. Are there chief medical officers for the devolved administrations?

A. There are, and for most of the functions of the Chief Medical Officer, they are devolved entirely to Scotland, Northern Ireland and Wales.

There are a few exceptions, of which the most important is international issues, which remain a UK competence.

Q. In very brief outline, did you, as the CMO, remain in lockstep with the other UK CMOs throughout the course of the pandemic?

A. I think -- we did and I think most people would recognise that that was the case. We were in very close contact, often daily, to ensure that -- I think it had two advantages: it ensured that we could give advice that was similar technically to ministers from different

nations who could then take their own policy approaches. It also, actually, allowed us to test one another's thinking, because they're all very experienced public health and clinical experts.

Q. And did you and your fellow CMOs advise repeatedly on many aspects of the pandemic, in particular the clinical aspects from issues such as writing to clinicians about treatment and vaccines, issuing therapeutic alerts, highlighting the discovery of new -- repurposed, or new treatments. We'll see, in due course, frequently you were asked to give advice on areas such as the prioritisation of particular cohorts, from a clinical perspective, you gave advice on whether or not children and young persons should be vaccinated, the dosage intervals, the definition of frontline health and careworkers. The list appears endless. You had a very wide remit, in truth?

A. Yes, I mean, many people working had a very wide remit but I think that we felt it was very important that the public, the medical profession and political leaders were hearing similar technical and clinical advice. We also thought that on a few occasions it was important to demonstrate that by doing joint statements and, for particularly difficult issues, we were joined by the excellent Deputy Chief Medical Officers who brought

a range of additional skills and experiences. You'll be hearing, obviously, from two today.

So I think the body of Chief Medical Officers and Deputy Chief Medical Officers, alongside in England, the NHS medical director, so Sir Steve Powis, and as you've heard, we were exceptionally fortunate to have Sir Patrick Vallance, who is also a clinical leader of great expertise, in addition.

So there was a group of people who were collectively trying to wrestle with the difficult problems and come to collective decisions.

Q. It is self-evident that a major piece in the pandemic jigsaw was and remains the National Health Service. And you refer in your statement to the great important feature of the NHS, or one of its features is that it provides a centralised health delivery system. So obviously in the context of delivering vaccines, having a centralised NHS system is of great import.

The NHS played a critical role in other areas, did it not, as well? Firstly, by having patients in NHS hospitals and also attending GPs and in other places where they might receive therapeutics, those patients were able to be the subject of very extensive trialling of therapeutics; is that right?

A. That is right and I think the UK had several advantages

in this area, but I'd like to highlight three because I think they are important for the future. The first is that having a single provider of almost all medical services -- there is obviously a private sector but it's almost all medical services -- and then alongside that, having a very central national research funding capacity provided a kind of, you know, a core function which was joined up across the whole system.

I think the second is that it was possible to set up trials extremely rapidly across the whole of the NHS. And to be clear, much of the recruitment, in fact most of the recruitment, was in peripheral hospitals, district general hospitals, rather than just in the big teaching hospitals, as I think is often the case. And as we moved in to a work in general practice, there were general practitioners involved in that as well. And that I think is possible to do because of the central arrangement.

The third is there is a very strong tradition, both on the part of clinicians and on the part of the public, of taking part in clinical trials. And we were able to say, and I said with -- and you'll probably have seen this -- with many of my colleagues on several occasions: look, we do not think it is sensible to be using drugs that are unknown in terms of their effects on this

disease, outwith clinical trials. If you want to know about a drug, put people into clinical trials. And people did that overwhelmingly. Clinicians in the UK did that, which allowed us to do this.

So this combination of the volunteer spirit of the public, strong tradition of research in the periphery and central direction which, I think, the UK is very fortunate in.

Q. Could you say something also, please, about another aspect of the NHS and having a centralised health system, which is the provision of data. From your witness statement, it's obvious that there are a number of observational studies set up to do with the NHS. SIREN was a study of NHS workers; CO-CIN was a clinical information network based around hospitals. There were a number of other surveys. And it is obvious from the written documents before the Inquiry that it was essential that persons carrying out research and development and trials could have an accurate understanding of NHS data and what the response to the trials was, but also that NHS systems correctly recorded and evidenced the take-up of vaccines and therapeutics, so who was receiving vaccines and therapeutics and who wasn't, who was registered with GPs for learning disabilities, for example, or registered as a migrant,

so that we would know where they were and whether they were available to be offered a vaccine.

In what general state do you assess the data systems, based upon the NHS, are in?

A. I think we entered the pandemic with a very large amount of data in a very fragmented state. And part of the problems we had in the first three to four months was that corralling the data, so you can link different bits of data together, was extremely difficult.

There were legal mechanisms to do so, which overrode previous mechanisms that you use in -- with an emergency, and they were brought into force. But I think all of us would agree that this fragmentation of data was a weakness in our system that caused us problems, really, in several domains, not just in research, but including in research.

Once that had come together, once we had the data linked up much more thoroughly, we -- that was very central to our ability to do both observational studies and, indeed, do, sort of, passive follow-up of people who'd been in clinical trials. And, as you say, to identify people who might be at risk and might need particular treatments.

So, bringing together data more effectively is absolutely essential.

I regret to say I think we have slipped backwards since our time in the pandemic in terms of bringing data together. So I think if -- we are now in a less good and more fragmented place than we were in the middle of the pandemic. Probably better --

Q. Could you expand upon that. Is that because the structural systems have not been put in place to maintain that flow of data or is it because it just so happens there are now fewer observational studies being carried out, fewer trials, and therefore less recourse or less need to have recourse to the data?

A. I think that what happened during the pandemic is people overcame both a set of procedural and functional barriers, and also the legal structure which allowed data to be shared changed because there was a direction because there was an emergency from government.

And we've now gone back to a non-emergency setting. So, firstly, the legal framework is back to where we were previously. And I consider that's actually regrettable. I think it is much more sensible that we share data across the NHS. I could go into the details of that but I suspect that's probably a little bit too small print, but the general principle is right.

And then I think that the -- there is -- has always been a difficulty in, for example, linking up primary

care data, general practice data, with secondary care data. This is not good for patient treatment on an individual basis, and you can end up with someone going to several different settings and data that is held in one place is not held in another. That's potentially dangerous. Certainly a problem.

It's not good for the organisation of the NHS because it means that we have a much ineffective structure. And it's not good for research, which of course is central here.

So my view is that one of the things we absolutely should be trying to do is routinely join up data across the system.

And then, of course, if any emergency hits, not just a pandemic, but any other emergency, that allows for a much more quick and effective understanding.

But at its peak, from about three to four months into the pandemic until about two-and-a-half years in, I would say it was an extraordinary demonstration of the power of the system, both to run more effectively and to conduct research very, very fast, if those data are integrated. So I would hope that this is something the Inquiry might want to explore as a recommendation.

LADY HALLETT: You described the fragmentation as a weakness. Some would argue it's also the opposite --

the other side of the coin is: and we're missing a trick because it could be one of the great strengths.

A. Completely agree, my Lady.

If I could just -- I mean, if people are interested in this, Professor Cathie Sudlow did a review of this which I think summarises many of the things I think should need to be done. That came out this year. And she --

MR KEITH: She carried out a review in fact on the subject of health data --

A. Yes.

Q. -- and the systems for their provision.

A. And I think if many of those recommendations were taken forward that would put us in a much better place, not just in emergencies but including emergencies.

MR KEITH: My Lady, that's an issue which shall be raised with your experts.

Just two final angles on the question of data. From the witness statements from the MHRA and the JCVI, it's clear that accurate data is also of great importance when it comes to the issue of safety, because when side effects may emerge and are reported, it's absolutely vital to be able to dig down at speed into the nature of the medical condition which has been encountered, in order to be able to see what treatment has been given,

also what symptoms are apparent, both at GP level and by way of secondary care.

So having an accurate comprehensive data system is also very relevant to safety.

A. That is absolutely right. And in particular that is important for rare but important side effects.

Q. Yes.

A. Because the danger is otherwise, a doctor in York will see it one day and a doctor in Shrewsbury will see it the next day, and each one of them only sees one case and doesn't put the pattern together. The faster you can actually put all these pieces of information together, the faster you will pick up something which is important but rare.

Q. And health data is also vital, is it not, to the issue of delivery and vaccine hesitancy, because the more you know about everybody's medical conditions and why they might have a level of distrust in government or be hesitant or lack confidence in terms of taking up vaccines, the better?

A. That is absolutely right.

I think that does, though, raise -- and it's an important issue, really -- that the one, I think, legitimate counter argument -- I think there are many less legitimate counter arguments -- and that is that

people are very nervous about their data being shared for reasons that they don't know and don't agree with. And you do have to get that balance right. You have to both be able to absolutely guarantee the security of the data but you also have to make sure that this is being used for purposes that people would want it to be used for.

But if you have -- all the surveys, the data, all the time people are asked these questions, people are overwhelmingly in favour of data being used for their own health benefit, for the NHS to be more effective, and for the benefit of the future patients in the NHS through research. All of these are, I think, things where the public is overwhelmingly supportive.

Q. Funding. From October 2019 to August 2021, you were also the Chief Scientific Adviser at the DHSC, and that meant that you were also the head, the CEO equivalent of the National Institute for Health Research, now called the National Institute for Health and Care Research, NIHR.

That is the main government funder of applied research in health and social care, and in your statement you say, it's one of the largest government funders of medical public health and care research in Europe.

By way of example, was it the NIHR that funded pre-pandemic research into the work being carried on at, I think Oxford, and also at Imperial under Robin Shattock; is that right?

A. Well, they are two slightly separate things, although I was in fact responsible for both of them. That funding was different, and that came from something called the UK Vaccine Network.

Q. The UKVN?

A. Yes.

Q. All right, we will come back to that in a moment. It may be that I've got the example wrong --

A. Yes, but the general principle is absolutely right that the great majority of, in a sense, the more practical research, more clinical end of research is done by NIHR. It is probably just worth me pausing on the difference between the NIHR and the Medical Research Council, unless you're coming to it later.

Q. I am going to come to that.

A. Fine.

Q. Another important body is the UKRI, and we heard about that from the previous witness. It is a non-departmental public body sponsored, I think, by DSIT and it's a public research funder, so not just health and social care, and it has a very significant

budget, around about £9 billion a year, and that brings together, you've just mentioned it, the Medical Research Council, seven of them and I think another couple of bodies including Research England.

Before I put my question, there was also the UK Vaccine Network, which you charity from its inception in 2015, which is designed to support the development of vaccines and vaccine technology.

There appear, therefore, to be a number of very significant players in the funding field. Is it your assessment, however, that, having a number of disparate bodies and different funding flows in no way held up what appears to be the very generous and rapid provision of funding in the face of the pandemic?

A. The -- well, the first thing to say is that UKRI for almost all other areas apart from health, would cover all the research, from the most basic, the most fundamental research in the laboratory and so on, through to the most applied.

Health happens to be split in two, so the fundamental research, the basic research, is funded principally through the Medical Research Council, and the applied research is funded principally through NIHR. That's a bit of an accident of history, but it seems to work pretty well. And the reason for that is there are

co-ordination mechanisms between the two, and they existed prior to the pandemic, but it allowed us then to move, essentially, as one during the pandemic, and almost all the calls that were put out were jointly put out by NIHR and UKRI mainly, but not exclusively, the Medical Research Council and also Innovate UK. It allowed us to put these out as joint calls. That has two advantages. It means that the sums of available are larger because we are pulling from two budgets, but also this also attracts different academics who tend to look to the Medical Research Council or NIHR as their principal funder.

So I think it had some -- overall, the system worked. It could have not, but it did. So I think I would chalk that down as a relative success in the funding sphere.

Q. Right, that's very clear, so we needn't, I think, focus any more attention on that.

LADY HALLETT: Are you moving on, Mr Keith?

MR KEITH: Yes, my Lady.

LADY HALLETT: In which case, would that be --

MR KEITH: Yes, that would be very convenient.

LADY HALLETT: Very well. In that case we will break for 15 minutes. Back at 12.

(11.46 am)

(A short break)

(12.00 noon)

LADY HALLETT: Mr Keith.

MR KEITH: Professor, we've been discussing in a very broad sense the issue of the trials that were carried out, and I referred also, you'll recall, to the different issue of observational studies. And I mentioned, I think, Vivaldi, SIREN and CO-CIN.

You've given very helpful evidence about the nature of the funding that was available for trials. Was there also generous funding or appropriate funding available for the observational studies that were carried out, of which there were very many?

A. I mean, I think that the UK contributed hugely, actually, in the context of observational studies. And as you say, these covered a very wide range. So just to take the three which you've mentioned, the SIREN study was following up healthcare workers repeatedly over time, and that allowed us to look at healthy younger people. The Vivaldi study, by contrast, was working in care homes and was looking at what happens to older people and people who are disabled and -- in particular. And the CO-CIN was looking in particular at people who had severe disease, in hospitals, and it was observing what happened over time. And from that, you could learn

clinical lessons and public health lessons that allowed us to improve the response overall.

If you look around the world at people citing observational studies, the UK studies I think were very central to the thinking of very many other countries which were unable to mount this kind of comprehensive observational response.

Q. Give us some understanding, if you'd be so kind, of the scale of these studies. SIREN, for example, roughly how many hospital sites were engaged in that survey, how many tens of thousands of participants?

A. I would have to -- I wouldn't --

Q. Very roughly.

A. Very roughly, we're talking about many thousands of people overall were involved in these -- each of these studies. Different sizes depending on which ones they were involved. But I'd need to check the exact numbers.

Q. There were a very significant number of advisory committees constituted -- well, perhaps some were already in existence, certainly some were constituted -- to advise in particular in relation to what therapeutics should be researched, trialled and, if appropriate, procured by, initially, the Therapeutics Taskforce, latterly, the Antivirals Taskforce, and then the combined Antivirals and Therapeutics Taskforce.

There was a NERVTAG committee, there's a -- the DHS standing committee, there was a Covid-19 therapeutic subcommittee, a Covid-19 therapeutic advisory panel, a clinical review panel. There was a group specialising in neutralising monoclonal antibodies and antivirals. That was the access independent advisory group. A prophylaxis oversight group, and the very important committee, the RAPID C-19 committee, which was also concerned with therapeutics.

Is it your overall assessment that the committee structure, the advisory structure, the administrative structures which were formed to be able to badge the correct trials and studies to give authority for them to be funded, for decisions to be made as to what would be trialled and studied, and of course, ultimately, what should then move forward for procurement, do you think the structure is right in terms of the sheer number of bodies, or is there room for some rationalisation here?

A. I think that, in a sense, the test is always how well did the system work against realistic expectations? And I think, I would divide it into three different broad areas, and two of them I think it worked really well, one I think it worked less well.

The first area where I think it worked extremely well was in both observational study and repurposing

drugs that were already existing for trials. I think we got off the ground in the UK extraordinarily quickly, and picked up the majority of the drugs which, when repurposed, actually lead to a better outcome.

Others around the world also did so but I think that's --

Q. May I just pause you there and will you just explain for us, please, the -- what is a repurposed drug?

A. Apologies. That's a very important point.

So when we were looking -- at the start of the pandemic, what has usually happened in most infections is you find that some drugs which we already have used for another reason can also produce a positive benefit for patients.

Now, that could be because they actually attack the underlying infection, so they have an effect on the virus, but it could also be they have an effect on the way the body responds to the virus. And in Covid, the most important of those was what's called immunomodulatory drugs, so these are ones that dampen down bits of the immune system. And several of the drugs -- dexamethasone has already been raised but there were several others that we found worked were from those classes of drugs. So they weren't actually affecting the infection directly, what they were doing was

essentially detecting the body from, essentially, its own response to that.

Q. But they weren't new drugs; they were drugs which were already in use, had been authorised by the MHRA, and which had been made available by clinicians and obviously through the NHS, but which were then reauthorised for a different purpose when their benefits became apparent?

A. Yes, and in fact, I mean, you can use -- so, it is much better to use a drug within its licence -- what's called within its licence -- which MHRA has said you should use it for, but it is perfectly reasonable medical practice to use a drug that is licensed, so you know that it's well manufactured, you know its side effects and have a lot of other information about it, but for a slightly different purpose. That's quite --

Q. That's off-label use?

A. That's what's called off-label use.

Q. Right.

A. But that is -- it is important they've had a licence somewhere, so you have that basic information.

Q. All right. So that's repurposed drugs. And that's an area which, in your assessment, the system worked very well?

A. I think, you know, if you ask anyone internationally,

I think they would say the UK was probably the leading or one of the leading countries in doing these studies of repurposed drugs, yes.

Q. You were then going to identify other areas which perhaps, when --

A. Well, the second one where I think it worked fine, was on the -- actually procuring and getting hold of drugs for use and, you know, we were pretty confident for most of the drugs that were repurposed, that we had a reasonably good supply all the way through the pandemic, despite the fact there was international competition for them, so although it looks a slightly byzantine system, the fact is it did the job it was supposed to do.

I think the area where, legitimately, I think we need to look again at getting it right, was how we chose drugs for what's called phase I and phase II studies. These are ones which are new drugs going into clinic -- into patients for the first time. And that system, I think, got off to a slightly shaky start, if I'm honest. I don't think it made any difference in the long run for reasons I can go into if it would be helpful, but I think if we were to rerun the whole response again, in the great majority of the research and drug and vaccine areas, I would say we did probably as well as we

reasonably could have against realistic expectations; I think in this area it was less strong. And I think we recognise that, for example in the technical report which I know you've read and have referred to.

Q. Yes. So your technical report was a report prepared by yourself and your fellow CMOs and DCMOs?

A. And Sir Patrick Vallance.

Q. And Sir Patrick Vallance, and I think an element of the NHS, perhaps --

A. Correct, yes, so that's Steve Powis.

Q. And you set out your particularly expert views on various aspects of the pandemic and the response, and there was a chapter on vaccines and therapeutics, and you make a number of recommendations as to how the system, perhaps, could be better run in the future. But one of the most important points you make is that overall, the phase I and II trial processes were perhaps better -- were less well managed and coordinated than the III and IV phases.

A. I think they settled down to actually be quite well coordinated. Patrick Chinnery, who was in the Medical Research Council, and who now runs the Medical Research Council, ended up leading that process and I think did it very well with many colleagues supporting him from across science. But I think it was a less assured start

than we had in the vaccines and in the repurposed drugs, for sure.

That said, and I think this is a very important caveat, and I hope you will allow me just to digress because it's an important digression, the reason that, in my view, we were less successful internationally on this area was that there simply wasn't the science to underpin drugs going into treatment for coronaviruses in the way that we were able to identify ways to get vaccines moving, and we were able to get a repurposing of drugs moving.

Q. So it was a much more difficult field in which to make progress?

A. It was a much more difficult -- exactly. And I think that, you know, therefore in my view the fundamental problem was actually the fact that the pre-pandemic science was weaker in this area, rather than the particular operations although I think the operations could have been improved in the first couple of months. They then, as I say, settled down.

Q. One might say, of course, that there was a complete absence of scientific foundation for the successful development of vaccines. So that would have posed problems that were no less --

A. That was a very different situation because you had some

vaccines already being developed for coronaviruses, for example the UK Vaccine Network had supported Sarah Gilbert's team in Oxford to look at that. MERS is a coronavirus, which they were working on, and they swung it over. There was a lot of work internationally on different vaccine platforms, including RNA, which had never been used for a major infection before, including viral vectored which the Oxford one was, which had only been used in relatively limited circumstances before.

So there was a lot of pre-existing work that was swung over to Covid and was appropriate for Covid as it turned out. That wasn't given, to be clear. That wasn't true for drugs.

Q. So there was much less pre-existing research on the important areas of therapeutic medicine which ultimately proved to be of assistance but in particular in relation to monoclonal antibodies and the general issue of antivirals?

A. Yes.

Q. There wasn't that pre-existing research which allowed the system to be redirected towards producing antivirals and therapeutic antibodies for Covid?

A. No, therapeutic antibodies, there was an existing, both -- there was an existing large scientific literature on that, but the antivirals, what's called

the small modules, which are the things that aren't antibodies, for the sake of argument, we have many fewer good classes of antiviral than we do, for example, antibiotics and we do in many other areas in medicine. So it's a relative area of scientific weakness. There are some diseases, HIV and Hepatitis C, for example, where we do have a good group of drugs, but for many viruses we do not, and since we've never had a major coronavirus outbreak that lasted for long enough -- there was obviously MERS and SARS -- we hadn't really invested in that for human studies.

There were some studies in animals but not in humans.

Q. Not enough.

The evidence before the Inquiry, Professor, suggests that there were a number of disparate angles or aspects to the way in which we went about trying to carry out the trials for repurposed therapeutics as well as new therapeutics, in particular antivirals. Firstly, there appears to have been a debate within government as to whether or not the taskforce should be lead by an external professional in the way that the vaccine taskforce was led by Dame Kate Bingham, and I think the Antivirals Taskforce was led by Eddie Gray.

Secondly, that there has been since a debate about

whether there should be a single body responsible for managing, coordinating, and keeping oversight of the therapeutic trial process -- this is a suggestion that's been made by Professor Charlotte Deane at UKRI -- a single body responsible for coordinating the trialling, in light of the material with which I know you're familiar from Sir John Bell and others who said that the system was quite chaotic at the start.

And thirdly, there needs to be more research and development on prototype antivirals. Are there any of those -- are there any particular recommendations in that list that you would put your not inconsiderable institutional weight behind?

A. So on the first two, I'm going to sound slightly heretical for someone in government on this, but I actually have always found the structures to be actually pretty secondary in terms of their effect. If you've got good people, the exact structures tend not to matter, if you get very good people who work in the system who are half in, half out like Sir John Bell, or are fully out, like Dame Kate Bingham, they all come in when there's an emergency and the exact structures, as you have implied both for vaccines and for therapeutics, the system was pretty complex. You wouldn't probably design it like that if you were doing an MBA course, but

actually it worked.

So I would be worried if we decided it was all a structural issue.

On the third point you make, I completely agree with that statement. It's not that -- I don't disagree with the previous ones, it's just that I don't think they are fundamental, whereas we have large groups of viruses where we do not have any serious prototype antivirals, and were those to become pandemic, and I think we should look in particular at ones that are important in animal species, birds and bats and pigs, and a variety of other ones, the diseases that are important in those animals and birds are the ones that are likely to cause future pandemics. And we really ought to look at those virus classes and ask the question: do we actually have things that could at least have a reasonable chance of working for them, yes.

Q. It's very well known that pre-pandemic, of course the government was guided very heavily by a 2011 influenza pandemic strategy and that had provided for antivirals for flu. I think it's well known that there was a -- there is or there certainly was a very large stockpile of antivirals, I think the brand name is Tamiflu, is it? So there is a good availability of antivirals in the context of flu but what you're saying is there needs to

be more work done in terms of producing a library, if you like, of prototype antivirals that can be worked on in order to provide an antiviral for coronavirus, or bird flu, or whatever the specific pathogenic disease is that may next emerge?

A. Yes, and I think -- I mean, Sir Jonathan Van-Tam is a particular expert on the antivirals for flu, amongst many other things so you might want to ask him, but even more flu, despite the fact that we have it the whole time, every year, and we have it as our top pandemic risk, actually, the antivirals for flu are not very good. They are only moderately effective, and they would acquire resistance relatively rapidly, I think, were a pandemic to occur.

So I think we should be clear that antivirals is an area in general where even where we've got a known risk to humans where there's an extreme industrial interest in building it, a company that produced a very good anti-flu virus drug is going to benefit from that, we still have a relative weakness. So as I say, antivirals is an area where we are much weaker than we are both on vaccines and on antibiotics and other antiparasitics.

Q. Can I press you on recommendation or suggested recommendation 2 which is a single body for keeping oversight over the therapeutic trial process. In your

technical report you make the points -- I won't take you to them but you'll be very familiar with them, points 2, 3 and 5 in this chapter -- that the need for faster and not too many trials --

A. Yes.

Q. -- and also the use of existing research infrastructure whenever possible in order to make the system self-evidently flow better.

Is there not anything that can be done to bring about those two very laudable aims which you identify, making sure that trials -- there are not too many trials, it doesn't become a profusion of bodies tripping over each other in their haste to commence trials, and that also research infrastructure is utilised as well as possible? Doesn't that require a heightened degree of management?

A. So those two are linked, but if you think about what happened during Covid, and I think this was an example of things being done the right way, there was already existing a mechanism called UPF, which --

Q. Is that the urgent --

A. Correct, it was a --

Q. -- public health badging --

A. -- public health badging. And what it was aiming to do was to say there is a limited -- we only can run

a certain number of trials in any particular group at one time, and therefore there will have to be a fairly rough justice approach to saying we're only going to do a certain number of studies. Any more than that, the risk is -- and this happened for -- if I'm honest, this happened for most other countries that tried this, so the UK succeeded because we didn't do this -- if you allow every single trial to start, none of them complete their necessary size, and you don't get results. You have to have a smaller number.

So it was a fairly ruthless process. You've seen that there was about a thousand trials went into the -- into the hopper(?), and only 100 were badged, and that meant we could concentrate all our resources, so there was a mechanism for doing that, and ultimately I had to sign off on each of them.

Then alongside that we swung all of our trial capacity and other capacity that was available over to Covid and to these trials.

Now, that had a huge advantage and a significant downside, which we should be very clear about. The big advantage was, therefore, because we had a pre-existing very strong system, of course divided between multiple diseases, we were able to build on that and just swing it over.

And I think a repeated point that your Ladyship will have heard multiple times is if you're already strong, you've already have the foundations, you can swing it over to an emergency. If you don't have those foundations, you can't build it from scratch when the emergency starts. So you can change those things, what you can't do is build them *de novo*.

The downside -- and interestingly, even in the evidence you've received from some of the witnesses for this -- things -- people mentioned this as if it wasn't a trade-off -- is we had to stop large amounts of other very important research, both from the commercial sector and from the academic sector and from charities. So work on cancer, work on, indeed, other infections, work on cardiovascular disease, all stopped to push our system over to Covid.

Now, that benefited the world hugely. Some people have then said, well, it's appalling that the UK's ability to do clinical trials and all the other things that went down in 2020 and doesn't that demonstrate that the UK doesn't care about trials? And you say: come on, guys, we've actually got one of the largest sets of very fast trials, done incredibly professionally, used everywhere in the world, because we closed everything else down. But you can't have the one without the

other.

And I think the learning from this that did surprise me, actually, the -- was that re-standing those trials up again -- we closed things down very fast, and very effectively, and that gave us space to do all the studies that were needed for Covid. Re-standing the other studies back up took a lot longer than I think we anticipated. So it's taken us about two-and-a-half years from the time we've swung it round to get back to a point where everything is beginning to get back to a normal state.

So there is a price to be paid, because all the studies that were stopped were doing very important and useful things in other areas of medicine. So this a trade-off. But I think in a national and international emergency like this, my own judgement is this was the right trade-off.

But we shouldn't pretend there wasn't a price. There was a price.

Q. And that it was easy, because it wasn't?

A. No, it was not easy. No.

Q. One final question, please, Professor. Notwithstanding the systems that were obviously in place for deciding which trials would proceed, and you've referred to the urgent public health badging system and the Office of

the Chief Medical Officer, yourself and Sir Jonathan in particular were concerned in deciding what should proceed and what shouldn't, there is significant evidence, nevertheless, from Sir Jeremy Farrar, Professor Van-Tam himself in his own statement, Professor Sir John Bell, talking of a degree of dysfunctional planning. There are many strong opinions and perhaps vested interests in this field, and, on the part of Professor Sir John Bell, a splintering of the national programme for trials into different networks, difficulties, debates, disputes between the various parties, leading to then also, ultimately, in practical terms a very -- he describes a lamentable rate of recruitment.

So there do appear to have been considerable problems in the running of this complex structure. Is there not a way in which, in the future, when these trials will have to be reset and, of course, repurposed and sent in the direction that they need to be sent, that there appears to be a stronger degree of control or management?

A. I think that -- so I think, firstly, let's separate out the phase I and II studies, where I think some of the things that Sir John and others have said --

Q. Yes, I think concerned mostly with the --

A. Yes -- have some justification. From all the other studies, like RECOVERY, PRINCIPLE, PANORAMIC, the list of trials that the UK did, CTAP, the -- all of which were highly successful, properly coordinated, you -- actually the UK had the largest portfolio per head of population of trials anywhere in the world that came to conclusion and had multiple outputs.

So I think -- I think -- I don't want people --

Q. No, Sir John Bell was talking about phase I and II, and they're all concerned with phases --

A. Yeah. Now, phase I and II studies, in my view -- so there was a dispute at the beginning, if I'm honest -- you know, you -- at the beginning of Module 2, 1 and 2, you worried about groupthink. This is not one of our moments of groupthink. And several people had strong opinions, several of whom have given evidence to you, about what the right way to proceed was.

The reality was that phase I and II studies really depend on there being good products to put into them. And the fundamental problem, actually, was we didn't have very many antivirals to put into the system. If we had had, I think the system would have shaken down quite fast.

So what you then had was large number of groups -- who are quite disparate, you're right. They tend to be

academic groups and/or companies, but with academic links, mainly in the teaching hospitals. Very different kind of model to where we had -- for all the repurposed drugs, where the majority of the recruitment was done in district general hospitals, and I think that was important for lots of reasons. And, you know, would we have produced a different result had there been a different way of running it? Ultimately, the answer is no, because the drugs weren't there.

Q. And the science just wasn't --

A. The science simply wasn't there. And if -- you know, if it had been that the UK were doing poorly in this area and there were really good studies being done in the US and China and Italy, that would be different, but actually we didn't end up -- at the end of Covid, we didn't end up with a large portfolio of good antivirals for coronaviruses, unfortunately. So the science simply wasn't there on an international level, in my view.

That's not to say that there wasn't some mêlée at the beginning. I accept that point. But I don't think it had any practical outcomes, in reality.

Q. And there's nothing that immediately springs to mind in terms of ensuring that the degree of mêlée is reduced next time?

A. You know, you're always going to get little bits and

bobs. It was quite short lived and, you know, these are all people who like and respect one another. They just had different versions of how to get from A to B.

Q. Yes, like every profession and industry, I expect.

A. I'm told, yes.

Q. So there's number of discrete areas, Professor, that have been raised particularly by the Core Participant groups and I just want to put some of them to you, given the almost unique position in which the Chief Medical Officer is placed, and in particular in terms of the response to the pandemic.

The first issue concerns the extent to which pregnant or breastfeeding women could take part in the vaccine trials, and the extent to which, as a result of their absence from those trials, the JCVI advised in December 2020 that there was insufficient evidence to recommend routine use.

Obviously latterly the advice changed, and pregnant and breastfeeding woman were told -- or pregnant women in particular were told that they should be offered and could be offered the vaccines. In hindsight, do you think the messaging that went out generally in relation to pregnant women could have been better formulated in December 2020? It does rather appear as if such a negative tone was adopted that it was extremely

difficult, thereafter, to engender sufficient levels of trust and confidence on the part of pregnant women that they would take up the offer that they were subsequently given?

A. Yes, so I think there's a lot of force to that argument, actually. I think the judgement was a perfectly reasonable one, but the way that it was phrased and the way that it was communicated I think made it much harder when subsequently we were confident (a) that this was a safe thing to do, relative to the risk of infection, and (b) that pregnant women, and therefore their unborn children additionally, were coming to harm because of Covid, preventably, because of not being vaccinated.

I think we -- if we'd written it differently -- when I say "we", I didn't actually -- wasn't involved directly but I ultimately should take responsibility as the CMO for not spotting this -- I think it would have made it easier to make that transition.

I think that, though, there are two other problems that go alongside this that probably are worth highlighting. The first of which is there is an automatic assumption that pregnant women will be excluded from trials until it's proved that a drug is safe. And under ordinary circumstances, that makes some sense, and people constantly think back to and worry

about, legitimately, issues around, for example, thalidomide, and wanting to get this right and never having that repeated.

In an emergency like this, the risk-benefit does change, and I think we should have probably been more careful on that.

On drugs, we were much more careful to make sure that pregnant women and, indeed, young children, who are often also excluded, were included.

Lucy Chappell, for example, did -- Professor Lucy Chappell, who is now Chief Scientific Adviser, did a very good on the pregnancy with RECOVERY. So I think there's a variety of ways we could do that. And excluding people systematically from studies is a problem across the board.

The second issue, though, and I do worry about this, is that there is probably an exaggerated worry about giving pregnant women drugs and vaccines in general, not just specific to this, and it is notable that one of the lowest uptakes of vaccines in the entire medical workforce, or healthcare workforce was among midwives, for example.

So there is actually not a strong tradition of encouraging drugs and vaccines in pregnant women the way that it is in others. On the one hand, they are more

vulnerable to the risks of the drug having an interaction with the pregnancy, but on the other hand, they're also more vulnerable to the risks to the baby from an infection, and we've seen several recent cases of this, Zika was the most extreme one.

So I think there is a balance of risk and I think sometimes we have erred too far towards excluding pregnant women from studies when actually the correct way would have been to accept that in fact the balance of risk is in fact the other side: that pregnant women and their unborn babies are uniquely vulnerable to many infections, and therefore doing trials in this kind of environment probably is an important priority.

LADY HALLETT: Can I just check. The stenographer, like me, missed -- you said -- the lowest uptakes of vaccines in the entire medical workforce or healthcare workforce was among ...?

MR KEITH: Midwives.

A. Among midwives, yes -- (overspeaking) -- I didn't say the lowest, but among the lowest, and I think -- I mean, we can back those numbers up if you'd find that helpful but quite a bit lower than some other groups. This is not a judgement, it's simply a statement of fact. But I think that kind of gives you a feeling for the fact that worries about drugs and vaccines are relatively

deeply entrenched in this area.

MR KEITH: Children and young persons. You've just referred to them. In relation to this issue, this is quite a contentious issue, that there are people who hold a very strong view that children should not be offered vaccination. There are other people who hold no less strong a view that it's vital to vaccinate children for the purposes of reducing transmission overall and also, of course, to protect vulnerable and extremely vulnerable people in households in which there are children.

By September 2021, the issue arose as to whether or not the JCVI, the Joint Committee on Vaccination and Immunisation, should offer vaccines but not the AstraZeneca vaccine, to all persons aged 12 to 15 who had no underlying health conditions.

Hitherto, from December 2020 onwards, if you had a health condition and you were over 18, you were offered the vaccine, and subsequently, between December 2020 and September 2021, all 16- and 17-year-olds were offered a vaccine, so it was a question of going down the scale and seeing what the position should be for 12 to 15-year-olds.

Why was it that the JCVI decided not to reach a concluded position in terms of the advice to offer

vaccines to this cohort, but sought the assistance of the UK CMOs?

A. So I think the thing to -- so the thing to understand with the JCVI advice, as you imply, and I just want to re-emphasise this point because I think it sometimes get lost -- is that they came to a view, which was the same as what MHRA had come to the view, that there was a small benefit at an individual level to a child of that age group being vaccinated, but it was very small. That was their judgement. And that had to be set against all the risks of vaccination which were even smaller, but they're never zero. And their judgement was the benefit at an individual level was sufficiently small that whilst they accepted there was an advantage, it was not enough on the basis that they would normally make recommendations to recommend a rollout across -- an offer across the whole country for children.

So that was where they were. But they also -- their view was -- and I think it was perfectly sensible that they considered this -- that there were wider issues, and the biggest of those, but not the only one, was around education.

Q. Can I just pause you there. Why, though, did the JCVI regard itself as not being entitled to express a view on the wider educational and societal benefits of

vaccinating children as opposed to narrowing down its remit to expressing a view on just the individual risk benefit balance?

A. I think it was just their judgement and this was entirely their judgement, they're an independent committee, that they weren't set up to do that, that wasn't their expertise, and it also wasn't the remit they usually followed, so therefore they would essentially be breaking with the way they would normally be considering the issues. Then they laid this out in their own documents which I know you've seen, so I'm not going to repeat them.

Q. Please.

A. At the same time, I and others were well aware of the fact that my colleagues in public health, my colleagues in local government, my colleagues in education were saying that the damage to some children from being -- having disrupted education has become cumulative and very severe. And I know you will be -- her Ladyship will be looking at a module exclusively on children but for this, this is an important point, which is that education is a very central part of the development of people and it is a public health issue. All the way through history, better education leads to better public health. So there is a very clear public health need for

that.

So the question was, would vaccination in this age group if taken up, and very much up to the individual parents and children, but if taken up, could that lead to a reduction in the disruption in education that was certainly harming children, and in particular, harming children in areas of relative deprivation who were not in a position so easily to do home schooling and so on.

So there was a very live debate about the impact on childhood of this disruption of education.

Q. And so in summary --

A. So we were asked essentially to say: is there enough evidence that the overall benefit to this age group as a whole, but not extending to any other age group, just this age group, would it produce additional benefit sufficient to recommend that this is made as a universal offer, accepting that it is much more finely balanced, and that this needs to be communicated to parents and children that this is a much more finely balanced argument than, for example, for a 70-year-old where the argument is way over --

Q. Much clearer.

A. -- towards vaccination.

And that was what we were asked to do. We consulted all the royal colleges that were relevant, the medical

royal colleges, we consulted all the directors of public health, we consulted local authorities and experts in this area and there was a fairly widely-held view -- so our view was we were representing the central position of the medical profession -- that, based on what JCVI and MHRA had said about a small advantage, we didn't relitigate that, but these additional advantages were sufficient to justify a universal offer to parents and children.

Q. So you took as read that there was a marginal benefit on the individual level?

A. Yes.

Q. You took as read what the MHRA was and the JCVI were saying about the very rare possibility of an adverse side effect, risk, but you focused on the position of children themselves in terms of whether or not, absence of vaccination would have a disruptive or damaging effect on education and would lead to wider societal and mental health issues for them as opposed to trying to answer what is in the best interests of the population at large?

A. Correct. I mean, I think -- yes, I'd slightly reframe that but only very slightly because I completely agree, but it absolutely had to be that the benefits accrued to children of that age group. So it wasn't to benefit

anyone else. And the question was not whether disruption of education would harm children -- there is absolutely no doubt it was doing so, in multiple ways, as I'm sure your Ladyship will hear --

Q. But would vaccination reduce the disruption --

A. So the question really was would the vaccination -- was there a high enough probability the vaccination would reduce that disruption sufficiently to justify the rollout on a top of the points that were made. And our judgement, based on the collective view, certainly in my view, of the medical profession was, the answer was yes, but accepting that there should be no obligation on anyone to get vaccinated and that we need to make clear -- and this was very much in the rubric we gave -- that this decision was a much more marginal one and that parents and children needed to be aware that this was a more marginal call at an individual level.

Q. And you were addressing different issues from that, of that from the JCVI, in no sense were you overruling the JCVI?

A. In fact, the chair of the JCVI was part of the group that was looking at this because we were very determined that we didn't -- we started off from where they left off, rather than try to go back over the ground they'd covered. We took that as read.

Q. A separate topic now, please, the dosing interval. When the MHRA initially approved the Pfizer BioNTech vaccine, one of the conditions was that there be two doses at least, I think, three weeks apart, and subsequently, advice was given that in relation to Pfizer BioNTech, they should be at least three weeks apart, the two doses, and in relation to the Oxford AstraZeneca vaccine, I think it was set at four weeks, 28 days.

But the issue arose at the end of December 2020 as to whether or not the first dose should be prioritised, given obviously the limit on supply, and whether or not the JCVI should give advice on that.

The four UK CMOs were asked to advise on this subject, which they did in a letter -- well, they set out their views in a letter dated 30 December 2020. Why, again, were the UK CMOs invited to give their expert view on the issue of prioritisation of the first dose? Why was it a matter for you?

A. Well, the -- firstly, just to put some additional bits of background to what you've said, to just recall that this was at the point where the Alpha wave was really taking off. We needed to move at considerable speed to get as many people protected as possible, and by a process of not terribly difficult maths, if you vaccinate only once and then have a delayed second dose,

you can get through a much larger proportion of the population to have the first dose than if you do two for everybody, because you can basically do twice as many people in that first period.

So the question was, was the first dose providing the majority of the protection? And the answer was yes, pretty clearly. And our judgement technically was that that protection continued at least for 12 weeks, so therefore there was some room for manoeuvre. That didn't mean there wasn't some benefit to a second dose, but on a population basis, there would be significant benefits to vaccinating more quickly and there were theoretical reasons for thinking that a more delayed second dose probably would lead to a better immunological response, but we didn't know that and there wasn't data to support that. So that was done on the basis of first principles.

Now, the reason it -- the two bodies that were consulted on this, that rightly were consulted before it came to us, although we said this was a reasonable question to ask, so we came in twice: firstly, was this a reasonable question to ask? Answer, on public health grounds, yes. Then it went to JCVI and also went to MHRA who both independently agreed that this was a reasonable thing to do, and then the UK CMOs gave the

advice out to the public and to the medical profession. But we in a sense were -- at a technical level, we were communicating the views of JCVI, but we also supported those views, and we were aware that this was a very controversial area including in the medical profession and including amongst many scientists both in the UK and particularly, actually, in other countries who thought this was a very poor decision, was their view at that point. And we thought it was important that we therefore in a sense stood up for this decision and explained it to the public and were prepared to take the criticisms head on and explain them as best we could to our professional colleagues and to the general public.

So that was the reason we chose to, in a sense, put ourselves in that place. If it had been an uncontroversial decision we probably would have just let JCVI decide it and it would have happened.

Q. All right.

A. It was the controversy that meant we felt it was important the CMOs actually gave a view and gave it publicly.

Q. Could I use you to identify, please, another important body. There is a body known as the Commission on Human Medicine which gives advice on these matters in fact directly to ministers, alongside the JCVI. Did they

also consider the question of the dose and interval and issue a prioritisation of the first dose?

A. They did and although in theory they give their recommendations to ministers in practice, they are actually the scientific advisory committee to the MHRA so they were consulted alongside the MHRA.

Q. Thank you very much.

An important issue for this module is, of course, the take-up of the offers of vaccination, the offer of vaccination, in particular the barriers to access in the -- facing minority ethnic groups and the many reasons why there was an absence of trust or confidence, both in vaccines and on the part of the government. I just want to focus for a moment or two on how the Office of the Chief Medical Officer contributed to the system by which barriers were sought to be reduced and confidence raised.

Did you yourself convene in fact a meeting in January 2021 between the Office of the Chief Medical Officer and the directors of public health to discuss particularly the question of uptake of vaccines in ethnic minority communities?

A. I did, yes.

Q. In your statement you make a number of recommendations for future pandemics on this point, on this topic,

including better identification of lower take-up groups, engaging much earlier and repeatedly with local leaders before, of course, having to face a pandemic itself and to respond, and also recognising that some lower uptake is probably symptomatic of deprivation distrust, rather than, rather than ethnicity.

Trying to focus on what can be done most rapidly and in a practical sense, most practically, practicably, do you think more should have been done and can be done to build these communication links between central government and the NHS, and local leaders, local communities, speaking to them on the ground, engaging with them in advance of a pandemic and saying: look, when the next pandemic hits and we need to vaccinate, what can we do to engender trust and reduce barriers? Is that what you're driving at?

A. Yeah, I mean, I think that it is very clear that, you know, we didn't do as well on this as we both should have and actually, in my view, could have. Again, accepting that you're never going to get perfection in this area.

What doesn't work, and I think sometimes people think that it's going to but it clearly is not going to work, is people say: well, there's a low uptake in X group so why can't the Chief Medical Officer go out

and say, "Please take it up"?

The people who are cautious about vaccines for a whole variety of reasons, are -- you know, if they were going to listen to the Chief Medical Officer, they'd have already done so.

And one of your core witnesses I thought made rather a very powerful point, that it is all very well there's people like me prancing around and putting up slides, that wasn't actually speaking to their community. And that's an entirely fair point. And just speaking more and more is not going to help that.

So you're absolutely right, it has to go through trusted interlocutors, and we need to start with their views about what needs -- what people need to hear about, what they are concerned about, what are the issues.

The problem we tend to have is that people -- and they -- some of these leaders will say this fairly forcefully, and rightly -- is: when there's an emergency you come to us, but you don't talk to us in between worlds, and therefore why should we trust you now?

And that's a very forceful point, in my view. It's actually the continuous communication in both directions, learning in both directions, hearing what people are concerned about and addressing it, or

learning from it, I think, which makes this work.

There's a limit to what a CMO can do, but there's quite a lot that a government can do. But a government shouldn't assume they're just -- that they're going to be seen as the good guys. And I think the NHS sometimes -- and I speak as a member of the NHS -- assumes that everyone loves them. Actually not everyone does. And they're seen as authority by some groups and you need to be pretty realistic.

There was a very specific issue which I -- it may sound small print but I think is quite important on this, which was around the ethnic minority healthcare workers. And we were very fortunate that healthcare workers from multiple communities, Somali community, Bangladeshi community, whatever, doctors, nurses, physiotherapists, others, pharmacists, were extraordinarily powerful advocates within their own communities, but they were expected to do it in their free time. And so therefore if you're a Somali doctor, you did your day job and then you went and talked to your community to help uptake happening.

My view was a small but important thing we could do is actually to recognise that that is an important part of the job. Now, that may sound very small print, but it's the kind of -- it's multiple practical things like

that which I think help, but the biggest one is to have the ongoing dialogue all the time, rather than waiting until the emergency hits, because then you would not -- should not be surprised.

I think one final thing which we did not really fully appreciate was how much of the news that some communities were getting was not from UK sources, and that's --

Q. Social media?

A. Social media, or they might listen to the television programmes from a country from which they or their parents had come or whatever. So -- and over that, of course, the UK Government has relatively little ability to influence things. But we should recognise the channels of communication may be different, and we should factor that into the way we respond to it.

Q. You referred to healthcare workers. In the context of prioritisation, it's self-evident that the JCVI recommended a priority approach based on clinical vulnerability drawn from age as well as a focus on the healthcare and care sector systems, that is to say the persons who looked after people in care homes, as being the people who had to be vaccinated first.

Is there, as I suppose would be the case with any attempt to prioritise vaccination, always going to be

problems with definitions? And you were asked, I think in January 2021, to give your advice as to what was meant by the reference to healthcare workers in what happened to be cohort 2. Is there anything that can be done in terms of data to try to identify more clearly by virtue of occupation how many people are in a particular cohort, what characteristics they might possess, and, therefore, whether or not they can be more readily identified when it comes to their turn in the chain?

A. Yes. And I think this goes back to the point you were making at the beginning of this -- before the break, which is in some areas I was surprised by how good the data were but in many other areas you think: how on earth do we not know that?

So I think that this is about having proper data across a whole variety of things, of which occupation is clearly one. I think another important one was who counts as a carer for the purposes of any kind of decisions, because that has practical implications under a number of different scenarios.

Q. Related to that, you refer in your statement to the fact that the Office of the Chief Medical Officer had quite a significant role to play when the JCVI, the joint committee, came under pressure from various sectors and from government to promote the interests of particular

groups or cohorts or sectors when it came to prioritisation. I'll ask you questions about the independence of the MHRA and the safety context in a moment, but how important is it that the JCVI, which is in fact a statutory advisory body, maintains its independence?

A. My view is it's absolutely critical. That doesn't mean that they shouldn't hear what government is doing, understand what's happening in other parts of the system, but if you wish to have independent scientific committees, independently chaired, and JCVI is one of those, you can't then mix it up really.

So it was very important that they had independence, and there were occasions when, if I'd -- if all the decisions had been mine, I might have taken a slightly different position to JCVI, but the whole point about having a committee like JCVI is that they give the independent advice and then, in England, statutorily, and the other nations on advice, people follow that advice. And that is -- unless it were patently ridiculous, which it's not going to be with such a distinguished and able group of people.

Q. Another point related to the issue of data -- and thank you very much for expressing your views on that -- was the issue of the group 6 cohort. So in the list of

prioritised groups in phase I, as promulgated or disseminated by the JCVI at the end of December 2020, was a particular cohort, group 6, which included carers, at least in some shape or form, and there was a very difficult debate to be had about how to identify, at least in England, adult carers, whether you identify them by lists of who receives a Carer's Allowance, in DWP (Department for Work and Pensions) records, or as carers in GP records, or perhaps through the receipt of what's known as an assessment process, a carer's assessment at local authority level.

Were there very difficult issues there to be circumnavigated in terms of trying to identify in particular unpaid carers and whether they would be entitled to prioritisation under cohort 6?

A. Yeah, I think that it's important when considering this to go back to first principles, because they explain why we ended up where we did. The first of which is that the whole basis of getting this to work was that the vaccine programme went at speed. And the more complex you make a system, the slower it will go. So you can have a perfect prioritisation, but because it is so complicated, it's a lot slower to deliver, and actually the net effect at a public health level is negative, and there's very clear modelling that demonstrated that. So

speed was important, and for speed you need simplicity. Simplicity is the only way you're going to do it.

The second basic principle is we were -- the prioritisation of carers, and in group 1 the prioritisation of people caring for people in care homes in particular, was not because we were prioritising carers; it was because we were trying to protect the people they were caring for. And so that was the key to making the decisions.

In practice, we therefore had to work on a -- some form of list that would approximate reasonably to those who are looking after people who were most likely to get -- to be harmed by getting Covid because the person who was caring for them came in with --

Q. But that was people in care homes in fact --

A. Well, care homes was in group 1, and of course we made the same judgement on health workers in group 2. But in group 6 it was about carers of people who were less vulnerable than those in care homes, based on the data was available, but still would be more vulnerable than the general population.

I think that the approximation that was used was a reasonable one, but there will undoubtedly have been large numbers of people who were, in a sense, hard cases at one edge, who were not identified by that process,

but trying to identify all of them accurately would have slowed down the process to such an extent it would have actually led to net harm overall. The queueing system, in a sense, was very important to maintain, the integrity of that and the speed of that, to achieve what we were trying to achieve in terms of vaccinating the whole population.

So that was the trade-off to be had, was between perfection in terms of getting the exact people right and the speed and usability and simplicity of the system we were applying.

Q. And for the future, if ever there is a similar prioritisation process adopted, which includes within its cohorts a group of carers, sole or primary carers, having the data to be able to identify such persons would be of enormous assistance?

A. Correct.

Q. All right.

VCOD (vaccine as a condition of deployment) in England had two aspects: one, the policy, which was actually put into place, of vaccine as a condition of deployment for persons working in care homes; and then, subsequently, there was a proposal to widen it out to the wider care and healthcare sector. Was that an issue which ultimately was for the Chief Medical Officer, and

it's obvious that you gave advice -- I'm not going to go into the details of the advice -- or was it ultimately a political decision for ministers?

A. My view is it was always one hundred per cent a political decision, but there was some clinical information that needed to precede it. But ultimately, it's about essentially balancing two risks and rights against one another: the risk to an individual who is highly vulnerable being cared for by someone who, because they haven't had a vaccine, then has an infection and then passes it on. So that's the risk to the person who is being cared for versus the risk to the individual that their right to essentially not have a medical procedure, or lose their job, is protected.

Now, there's a range of opinions on this, for what it's worth, but I don't think it's worth very much. I'm rather more sceptical than some people that this is a good idea. But that's a view as a citizen.

As a doctor, I've got three views, basically. The first to which is there are of course situations where a health issue, health treatment, does lead to some having to lose their current employment and go to another. An example might be if a professional driver had an epileptic fit, then that person would no longer be able to do their job, because the risk to other

people is too great. So the principle that because you're a risk to others you cannot do particular jobs -- and that is enshrined in law -- already exists. So that is not a new --

Q. And patient-facing doctors and nurses and clinicians have to be immunised for hepatitis B?

A. Well, so then there's a professional responsibility, and there's very clear professional responsibility. I know the medical side very well. There is, and has always been, in the General Medical Council guidance, which all doctors sign up to -- if you're a doctor you're agreeing to abide by this -- a professional responsibility to protect your patients from you giving them communicable diseases, which includes, explicitly, vaccination.

There is a big difference, though, between responsibility and legally mandating it so that you lose your job if not.

And then there have historically been periods when we have, for example, early in HIV, in previous eras of hepatitis B, if someone had those infections we would say you can be a doctor but you shouldn't be doing what's called exposure-prone procedures, which would include some surgical ones. So this is not new grounding.

I think the only question for the Chief Medical

Officers was -- and I made this point several times -- to say, firstly, there is some evidence that if you make mandation, you will increase the rates of transmission, and, clearly, if someone doesn't get an infection, they're less likely to pass it on.

Those are statements in the sense of the blindingly obvious. But they do need to be made.

But I also made the point, and made it repeatedly, that you need to take into account the fact that every drug and vaccine has side effects, and some of those may be rare but still severe, and that has to be taken into account in the decisions that are taken about mandation.

Q. And just --

A. And I made that point --

Q. -- I know it will be obvious, but why is it important to be upfront about the fact that there may be, however rare, serious side effects in the context of making someone be vaccinated as a condition of their deployment?

A. Well, essentially because you shouldn't -- you know, I was sometimes worried that people were just thinking: well, why on earth -- people should just get vaccinated. I mean, what's the problem?

And my view is, look, this is (a) it's a medical procedure, but (b), more importantly, of course there

will be side effects, and there may well be rare and side ones. That is an important part of the balance of risk.

Now, I, you know, don't think it's easy to make a single overriding view of this. I would observe that --

Q. And I should emphasise we're not asking you to come down on one side or the other and to reach a view.

A. No, but in general, mandation has not got a very happy history, so there are practical reasons for not doing it.

Q. So smallpox --

A. Smallpox was an example. And indeed, in my view, what happened after the mandation in the social care system in England I think probably will be added to that catalogue. But then the arguments of the other side are perfectly strong ones. And if your own relative died from Covid and you knew that they caught it from someone who had chosen not to get vaccinated, I think you'd have a strong view in the other direction.

So I accept, obviously, as a citizen, this is a balanced and difficult decision, but I just think it's important that the medical facts are in front of people, including the side effects, as part of that balanced decision.

Q. And since you've very helpfully identified some of the competing considerations, is it important to note also that in that balance, in that mix, there must also be the evidence that appears to suggest that mandatory schemes tend to increase distrust and vaccine hesitancy generally?
A. Yes, they increase uptake and decrease trust.
Q. Right.
A. As a broad thesis.
Q. The MHRA system and the issue, the systems and processes for safety of vaccines will be addressed by other witnesses including the Inquiry's own experts. You mentioned earlier the issue of independence in the context of the JCVI.

Could we have up, please, INQ000071886.

This is an email from yourself and Sir Patrick Vallance, as he then was, to the head of the MHRA, Dame June Raine, dated 26 November 2020. You say:

"Dear June

"Patrick and I were just agreeing how lucky we are to have such a strong independent regulator as MHRA, and you at its head, at a time of intense pressure ...

"We ... wanted to send a message of support and recognition."

In this field of, or concerning the topic of

distrust or vaccine hesitancy and confidence, why is the independence of the MHRA to be treasured?
A. Both the professional and the public trust has to be based on the idea that MHRA, which is the first port of call -- without MHRA approval you don't get a drug or device -- is completely independent. And this was a very good example. The desperation, if I'm honest, of not just the public but also political leaders to the highest level, to have, for example, a vaccine or to have drugs that would get us out of the extraordinarily damaging situation we were in --
Q. -- (overspeaking) --
A. Sorry?
Q. Hydroxychloroquine being an example?
A. That was an example of a different sort. That was a licensed drug, actually, but this is for vaccines in particular, was very strong, and it was clear that when they -- when -- that there was a risk that they would either say to MHRA, "You've got to hurry up" and "Why are you going so slowly?", et cetera, or, even worse, say, "We really want you to come down on one side of the argument or the other." It is absolutely essential for all of us, including me as CMO and as a citizen, that the MHRA is completely independent in its judgements.

And what we wanted was to make sure that Dame June,

who did, I thought, a superb job along with her colleagues in the MHRA, but was under a lot of pressure, felt that if there were any pressure brought to bear on her, she could talk to Sir Patrick or me and we would do our best to counteract that because I think I was worried at that point in time, if I'm honest, that otherwise the pressure would be applied and I made it clear that that was what I was doing in government.
MR KEITH: My Lady, I will finish by quarter past and thereby I think ensuring --
LADY HALLETT: No, but we've also got 10 to 15 minutes of CPs questions.
MR KEITH: Yes, I will have shorn about 25 minutes from Professor Sir Chris Whitty's evidence, but I am in your hands as to whether you wish --
LADY HALLETT: Professor Whitty, I will do whatever suits you best, given the impositions we make upon you. We can carry on until 1.30 or we could come back this afternoon. Whatever suits you best.
A. From a purely practical point of view, my Lady, obviously if I can go earlier that's easier but I'm very happy to be in your hands. I really don't want you to feel I'm rushing this very important inquiry.
LADY HALLETT: We wouldn't be thinking that at all. I think we'll carry on. Can we warn the stenographer that if

she needs to take a break, she can catch up later with the transcript.
MR KEITH: Thank you, my Lady.

Many of the members of two Vaccine Injured and Bereaved groups, in particular, have raised in their written material the issue of absolute and relative risk. That is to say in relation to the risks of vaccines.

As shortly as you possibly can, Professor, because obviously this might be -- might lead to rather a long answer -- is there a strong case for changing the way in which the MHRA and other government bodies talk about risk in the context of the very rare or extremely rare or rare possibility of serious side effects.
A. Yes, and I think -- so I think, firstly, people are understandable in their concerns about this. It can be made very complicated but at its base it is pretty straightforward which is, let us say I said this drug halves your rate of dying, or alternatively, this drug doubles your rate of having a side effect. Those sound big effects.

If you had a 50% chance of having the side effect in first place, that would be an enormous increase. Let's say there's a 10% increase -- a 10% rate of a side effect. Let's take that as an example. Double that

would be 20%, so 20% of all the people who had the drug would have this side effect comparing to if they didn't have the drug.

If, on the other hand, this was something which happened only at a rate of one in a million, then doubling it turns it to two in a million but means that nobody else gets it. So the doubling is the same but the actual number of people affected out of all the people who are exposed, is very, very different.

Q. So if I can interpose there. If the reality is that a particular vaccine gives rise to a serious side effect in one in a million people, why is there any debate of what the percentages might be in terms of a relative balance or a relative increase? Is that not misleading?

A. Well, I think both are useful and my own view is that particularly for very rare events but rare -- but -- serious or rare but very important in the other way but rare events -- actually presenting both of them alongside one another is useful. One of them tells you that the drug or vaccine is going to protect or harm you to, you know, more than or less than would happen if you didn't have that drug or side effect, but the other will actually give you an absolute number of the probability of that happening, and that's what the absolute numbers give you.

And personally, I think most people make their individual decisions based on absolute numbers. They may not call it that but if I'm told I have a one in a million chance, I have a very different view about it than if I'm told I have a one in ten chance. So that's really why I think it's useful to have both.

Q. Thank you.

The final topic is the therapeutic Evusheld, the AstraZeneca-produced therapeutic, I think it was Project Astronaut, AZD4772, or something like that. There were two aspects of the Evusheld decision-making process. One was the decision to make an advance purchase, and that was an issue on which yourself and Sir Jonathan Van-Tam opined during the course of February, March 2021 in particular. Then there was a second issue which concerned whether from, in particular, January 2022 onwards, a decision should be made to buy Evusheld for use as treatment.

For the first decision, the possibility of an advanced purchase, the JV -- the Joint Vaccine -- the Vaccine Taskforce sought the views of yourself and Sir Jonathan Van-Tam in the autumn of 2020, and it's plain that you advised, along with Sir Jonathan, that the recommendation or your recommendation should not be to proceed, not to proceed. Why, very simply, did you

reach that view?

A. So I think the key thing to have in your mind on this is that the date at which this got MHRA approval was the 17 March 2022.

Q. So much later?

A. Much later. So this is -- in fact, I gave advice in, I think it was December 2020; Sir Jonathan gave it, I think in February 2021, from memory.

Q. Yes.

A. And the reason that, you know, we firstly agreed with the Vaccine Taskforce that this was a potentially very useful drug under certain circumstances, and we also thought that the science behind it from AZ was very good in terms of developing it. So there wasn't any dispute about that. The reason, though, for an advance purchase, it has to fulfil two criteria: the first criteria is you have to be pretty sure, if you're -- particularly for something that's expensive -- and this was an expensive drug, that wasn't the principal point but that means that it makes it a live question -- that you're actually going to want it in the end, otherwise what you've got is a very large stock of a very expensive thing you can never use.

And the second thing is that you need to have a reasonable view that at the point you want it, that it

would be much less easy to get hold of or much more expensive than if you bought it at an earlier point.

Now, the second one is not for me, principally, but the first one, to some extent, is. And our view was we have no clinical data on this, we don't know anything about the side effects, we don't know who the groups are we'd give it to at this point in time.

Very importantly, this was two monoclonal antibodies. Now, monoclonal means they only address one single thing on the spike of the virus, as opposed to the vaccines, which have multiple things which they interact, and it only protects people for a short period of time, at the time we thought probably about six months. I think that probably was correct, and so therefore, there is a high -- there is a reasonable chance that by the time that we actually have this drug available we have clinical data, we know what the safety, is, and it's got licensing, that either it'll prove not to be as encouraging as we currently think, because it's going to be quite a long way in the future, or that the virus will have evolved to such an extent that this is no longer an effective treatment.

So our view therefore was not, is this a good drug or not? The answer was at this point it looked promising but we couldn't be sure, but should we

actually -- is there such a strong argument that we should buy it now rather than wait until we actually have some clinical data and we have licensure, or at least a path to licensure.

Q. Can you explain why, however, in the context of vaccines, a different path appeared to have been taken insofar as they were subject to advance purchase, at risk, a chance was taken, nobody knew whether they would work, whether they would even be produced and manufactured and delivered. There was a punt. Was the clinical position prospectively for vaccines different at that time than that for Evusheld?

A. Yes, fundamentally different.

Q. Why?

A. So -- so vaccines, as I've said, they have multiple hits on goal, and therefore they can deal with evolution of the virus to a much greater extent than something that's only got two -- two points on the virus spike that it's dealing with, which is what we were dealing with.

Secondly, a vaccine builds on itself. So if you have one vaccine, generally, if it works, you have a second shot, it's going to increase the effect? Even if you then have a slightly different vaccine, that -- it broadens the protection. So it's got multiple advantages from that point of view.

It affects both the antibodies themselves, which the cocktail has, but also the T cells -- this is a point Sir John Bell and others make. So it actually affects the immunological system in multiple ways, and actually much of the protection for people we thought might not be protected by vaccination probably came from that. So very good data subsequent to this decision has demonstrated that most of the people we were worried would not respond to the vaccine in fact did.

Q. But --

A. It had a very high level of protection.

So -- and a third -- the final -- well, in fact, the final two points were: the flash to bang time between making the purchase decision and the vaccine being available was much shorter, so you have less risk associated with that; and, although this was only a third order question, additionally, vaccines were coming in at somewhere in the low tens of pounds per person protected. The Evusheld was in the high hundreds. You can dispute if that -- that amount. But that's -- that only matters once you get to the final point.

But therefore I think to treat them as the same thing would be to misunderstand these are completely different products. You have to keep on giving Evusheld

over and over again, and it is less and less likely to be effective as the virus mutates.

And what in fact happened -- so we had, sort of, have three stages of decision making and the reason --

Q. Yes, I'm less concerned with the later stages because obviously by then the vaccine had been rolled out, you're in 2022, there are obviously very live issues as to whether or not the material that was by then available clinically would support a decision to buy it as treatment, but I think we're going to leave it there, Professor, unless --

A. Can I just finish this point, because I think you've several times during previous witnesses essentially said this was my decision, and I want to be clear that (a) it wasn't actually my --

Q. I don't believe we have. It was ultimately a decision for RAPID C-19 when it came to treatment?

A. Well, the way it worked was I gave some advice, Sir Jonathan did, end of 2020, beginning of 2021, then it went to RAPID C-19. And by the end of December 2021, their view was this is looking very promising. And that was their advice to me.

And then Omicron came along, and that was so different that their view, and then subsequently the view of the American authorities, European and others,

was this is no longer going to work against this virus, because it's evolved.

Had Evusheld been available and licensed in early 2021, even with vaccination I think it would have had at least some niche use, and if there hadn't been vaccines, it would have had widespread use.

So I think the reason we ended up where we did was a combination of how long it took to get to licensure and the fact that the virus evolved and the fact we had the vaccine and, indeed, multiple other --

Q. And the lack of clinical data at the start --

A. Yes, and multiple other issues. But I think sometimes it's made to be a rather simpler issue than actually, in reality, it was.

MR KEITH: Not on our part, Professor.

We've galloped through a wide range of issues, but there we're going to leave it in terms of the questions by the Inquiry.

LADY HALLETT: A couple more issues to be dealt with, first by Mr Wilcock, I think you're asking a couple of questions.

Questions from MR WILCOCK KC

MR WILCOCK: Professor Whitty, good afternoon, thank you for giving up your lunch break for us. I'm asking you questions on behalf of the Northern Ireland Covid

Bereaved Families for Justice, and I've got three short questions on the participation of Northern Irish residents in vaccine and therapeutic trials for you.

So the first question is, you quite rightly told us that the UK is fortunate to have a strong tradition of the public taking part in clinical trials. But according to Professor Michael McBride's statement for this module, Northern Irish residents were only able to take part in the UK-wide Novavax Covid trials. Do you know why this was?

A. Unfortunately I don't, basically because, as was highlighted right at the beginning, health in this area is a devolved issue. Certainly, had investigators or clinicians from Northern Ireland said they wanted to be involved in any studies that were within my kind of purview, I would have seen absolutely no barrier to that being the case.

You of course do need to have a local investigator, you need to have people who can run things on the ground. The reasons why that happened in this case I don't know and I wouldn't be the right person to answer.

Q. Are you the right person to ask whether there might be a way in which this problem might be addressed in the future?

A. I think that the principal thing is really to strengthen the clinical trials capacity across the whole of the UK. I think that it is important that trials in particular, but also observational studies, are available to people across the whole of all of the communities of the United Kingdom, all four nations -- as, indeed, more internationally -- but take the UK, for multiple reasons, fairness being one, but actually also representativeness of population is another. So there are good scientific as well as ethical reasons why that is a desirable thing to have, yes.

Q. Thank you.

Final question on behalf of the group I represent: do you know if Northern Ireland residents were able to participate in the RECOVERY trial for repurposed therapeutics?

A. I cannot recall that. I suspect you do know the answer to that. I don't.

Q. I don't either, that's why I was asking you.

A. Well, we can easily find that out. But certainly there would have been no barrier from the point of view of how it was originally conceived and indeed how it was funded. There may have been barriers operationally but that's very easy to find out.

Q. Is that partly because it was a platform trial rather

than --

A. Yes, it's a platform trial, yes. But you do -- again, need a local investigator who can lead it. You can't -- it has to be done locally in terms of the practicalities of running a trial on the ground. And it has to be someone who has some experience, usually, of trials.

Q. I've also been asked to ask you three questions on behalf of the UK Covid Bereaved Families for Justice, on a totally different topic.

Can you tell us what the extent was of the Chief Medical Officer office's involvement in relation to the development and/or availability of therapeutics for children?

A. I -- so we weren't, and I wasn't, involved directly, but what we were keen to do, and this was led in particular by colleagues from Southampton, was to make sure that therapeutics for children were extended out from the base. Unfortunately, and this goes back to a previous point that we had when we were talking about studies in pregnancy, is that the default has for many years been for many people who do trials, to exclude both pregnant women and children, and indeed, even more, in my view, shockingly, elderly people or people with co-morbidities. And all of these are problematic. And I personally think we should try to extend trials as far

as you can, both on age and other indications. Again, it goes back to making the trial population representative.

But this is pushing against quite a long-established way in which things have been done, and I personally regret it. My own background actually is in doing trials in children, but in part.

Q. Second question was, are you -- as far as you were aware, was there any difference in the type and efficiency of therapeutic treatments as between adults and children, or does it --

A. I would -- well, the big difference to remember is that fortunately -- and this will not necessarily be true in a future pandemic, which is why I think this is a really important question, children were much less likely to have severe outcomes than adults.

Q. Yes.

A. So for the same side effects, and we discussed this slightly when we were talking about vaccines, the risk-benefit for children in this particular infection is much less clear. So if you have a drug that had, let us say, a side effect rate of 1 in 100,000, the risk-benefit is less good for a child because actually the benefit is going to be smaller than it would be for an adult.

Q. Yes.
A. But were we to have a pandemic in which children were heavily represented -- and flu would be a very good example of that, in flu children are some of the people who are most affected -- then it would be a very serious problem if we didn't have children involved in the studies that are done and trying to examine how they worked.

Children do handle both infections and sometimes drugs differently to adults. So you can't make an assumption that a child is just a small adult for the purposes of trials and other things. You do have to pay attention to the fact they are biologically distinct in some ways.

Q. I follow. But sticking to Covid-19, do you think there was sufficient prioritisation of reach into therapeutic treatment for children with Covid-19?
A. I think, for the reasons I've just given, I think that it was a lower priority only because of the fact that children were much less badly affected by the outcomes. There are some exceptions to that, of which there is something that's called PIMS-TS, it's probably the most well known, which is an immunological response, there were some children who did come to harm. And certainly for severe disease, children who got to hospital,

I would want them to have at least as such emphasis, in terms of treatment, as for adults, but of course the numbers are much smaller and therefore it would take longer to accrue the evidence you need as to the effect and, indeed, side effect of drugs in that age group.

MR WILCOCK: Professor Whitty, thank you very much indeed.
LADY HALLETT: Thank you, Mr Wilcock.

Ms Morris.

Questions from MS MORRIS KC

MS MORRIS: My Lady.

Professor Whitty, I ask questions on behalf of the Covid Adverse Reaction and Bereaved groups, and these groups represent those who have suffered either injury or bereavement following their voluntary acceptance of one of the Covid vaccines, and I'm going to focus my two questions on the topic of monitoring after the vaccine, after it was rolled out for any adverse reactions or injury.

I'm going to ask you to start, please, with a WhatsApp exchange you had with Mr Hancock, the then Secretary of State for Health, on 9 January, in which he asked you about pharmacovigilance -- I think you've got it in mind already, I don't need to call it up.

He asked you, "How strong is our pharmacovigilance system in order to check events post-rollout?"

He said, "I was told, we were doing it", that being the DHSC, "but I worry that the details will be shonky."

And you said then:

"Reasonable but needs to get better."

And then you said then, "There will be cases."

So question in two parts, please. When you said it was reasonable but needed to get better what did you mean at the beginning of January 2021?

A. Yes, this is the one area of my written statement where in fact I've reinterpreted what I said at the time.

I have to say, trying to interpret WhatsApp messages out of context is very difficult so long after the event.

But I'm going to -- in a sense I'm going answer, unhelpfully for you to begin with, just to set the record straight, and then more helpfully as if I had meant something slightly different.

So, actually, what I subsequently realised was this was in the context of an exchange between Mr Hancock and Lord Darzi where Lord Darzi had said he had had a vaccination and subsequently got Covid. And so what in fact I was referring to was there will be cases of people who get Covid having had a vaccination.

So just to clarify that point.

Q. So that's the second part of your comment but the first part about it's "reasonable but will get better" does

refer to the monitoring -- (overspeaking) --
A. No, all of the exchange refers to were we picking up cases in people who had had a vaccination.

But I want to answer the question as if I had been answering about the other, because it could have been either way, because that was more helpful, I think, to what you are actually asking.

Q. Thank you.
A. Because, in a sense, the reason I misinterpreted it is because I would have given essentially the same answer either way, so I'm only doing that for accuracy.

The MHRA system, and I suspect the best person to get the details on this is obviously going to be Dame June Raine and there's very extensive expert evidence which I read and which I think is extremely accurate, from what I've seen, I think that lays out the mechanisms, including the Yellow Card systems, the electronic reporting, and so on, that the UK has.

The thing which was different about the rollout of the vaccine was the speed at which it happened. And usually, the rollout of any new drug will happen at a relatively slow rate so you'll pick up the early issues, if there are going to be rare effects that are so rare you don't pick them up in the initial clinical trials --

Q. Yes.
A. -- but big enough that you actually see them under operational practice, and that happens for many drugs, in fact most drugs, in reality.

But usually, the -- kind of the speed of that was going to be -- will be such that you'll pick them up fairly early on before many people are being given the drug or vaccine involved. The speed of this meant that this was more challenging, and therefore, various tweaks had to be made to try to pick up data much more quickly in realtime than would otherwise have happened.

So, to that extent, my view is there was a need to improve the system we had, although I think the system is very strong and that is the view of the expert witnesses and I agree with that. So, in a sense, I'm trying to be helpful to you by saying that had I been meaning that, it was still a relevant point to make.
Q. Understood, thank you. Because you have talked about data this morning and I think your position is that the monitoring of any side effects and the creation of high quality data after the vaccine rollout in this context is important, is this right, because public health officials need to know early signals of any emerging adverse effects, injuries, from a safety and evaluation point but also people that are injured and impacted also

need to receive diagnosis, treatment and ongoing support; is that fair to say?
A. Both of those are fair to say. So it's very important, and this is the issue where you might have someone vaccinated in place A, and then other -- their GP records are in place B, and their hospital records are in C and the three are not linked. And therefore, things can, you know, at an individual level, that might be picked up but what you don't see is a pattern across the nation as a whole. So bringing data together is one of the best ways of identifying these kind of risks at the earliest possible opportunity.
Q. But just pushing you on your answer and appreciating the context of the text now, do you still accept that there was a need for some improvements of the system to make a signal-sensitive post-rollout monitoring system at the start of 2021? Did it need to get better?
A. There's almost no situation where you wouldn't have to adjust what you're doing to the fact that this is going at such a rapid speed, for the -- to get the maximum outputs. I don't think, to be clear on this, I think the UK was actually in a pretty strong position compared to any other country. Every country was facing exactly the same issues on this.
Q. And I think the final part of my question still stands,

which is, were those areas addressed throughout the pandemic? Did it get better, in your view?
A. In my view it did get better, over time, and, you know, within this -- and I would like to just add an additional point which you haven't asked but I think is relevant to this, it is also very important that you also bear in mind the benefits that happen which may -- which are also important. So, for example, legitimately, people were concerned about the risks of myocarditis in -- with -- following vaccination. The rates of myocarditis are actually higher in people who get Covid. So that's an example where you've got to actually look at both the effects of having a drug or vaccine but also the effects of not having it, and very often it's that balance which actually gives you the correct information.
Q. I appreciate that general and specific risk assessment, thank you, but you'll appreciate that I ask questions on behalf of those who did suffer some of those severe reactions. So in terms of how it improved identifying those, could you give a specific example of how that improved from the start of the pandemic?
A. Largely this was to do with the speed at which the process was actually analysed. What it doesn't, of course, deal with is your original point about getting

the data all merged together. And it was the speed of analysis that definitely improved over this pandemic compared to where you would normally expect it to be. There was a real determination to pick up signals at the earliest possible opportunity.
LADY HALLETT: Thank you very much, Ms Morris. Very grateful.
MS MORRIS: Thank you, my Lady.
LADY HALLETT: Professor Whitty, you've been as helpful and constructive as ever and may I repeat the thanks I have already given you for all the work that you and your colleagues did during the pandemic and also for the continuing assistance that you and your colleagues provide to the Inquiry. I am really grateful. The burdens on you must be enormous, probably not as enormous as they were during the pandemic or maybe they are, I don't know, but I'm really grateful to you.
THE WITNESS: Thank you, my Lady.
LADY HALLETT: Very well, I have to return, because we have a very busy afternoon, at 2.15. Sorry for a shorter break.

(The witness withdrew)

(1.33 pm)

(The Short Adjournment)

(2.13 pm)

PROFESSOR JONATHAN VAN-TAM (sworn)

LADY HALLETT: Welcome back, Professor.

Questions from COUNSEL TO THE INQUIRY for MODULE 4

MR KEITH: Professor, could you start your evidence, please, by giving us your full name.

A. I am Jonathan Stafford Nguyen Van-Tam.

Q. Professor, thank you very much for attending today and for your continued assistance, in particular the provision of a further statement, INQ000474404 of 7 October last year, running to 79 pages.

Professor, I hope I won't embarrass you but I'm just going to summarise briefly your professional qualifications and your experience because of course it all goes to the issues on which we'll be asking you for your views on in a moment. But you are, by training and profession, an epidemiologist and physician of public health, you have a significant number of degrees, diplomas, doctorates and fellowships. You headed the Pandemic Influenza Office in what was then the Health Protection Agency Centre in Colindale.

You were, importantly, a member of the old SPI committee, which we looked at in Module 1, a member of SAGE during the swine flu epidemic. You chaired the expert advisory group on H5N1, bird flu. You were the chair of NERVTAG between 2014 and 2017, and then of

course you were appointed Deputy Chief Medical Officer in October 2017, and you remained in that post until March 2022. And you are a published author and senior editor and you've had more than 200 peer-reviewed scientific papers published.

Did you work as a vaccinator also during the course of the pandemic?

A. Yes, I did.

Q. Did you do half a day a week, I think, on a shift?

A. I did half a day a week, and it was a great relief to be out of Whitehall and Westminster with normal people for a while.

Q. The role of the office of Chief Medical Officer and the role of the DCMO, alongside the CMO, is a most important one in the context of this pandemic.

Can we just have up, please, paragraph 1.7 of INQ000474404. Thank you very much.

The heart of your role during the pandemic was you were the interface, if you like, between those bodies concerned in policy, the government, and the Government Chief Scientific Adviser, development, UKVN, the UK Vaccine Network, of which we've heard, and CEPI, the clinical trials and studies of which we've heard, their funding, which was the responsibility of the NIHR, UKRI, and its MRC, Medical Research Council, procurement, the

VTF, the Vaccine Taskforce, the TTF, the ATF and ATTF, and prioritisation and delivery, because of course you were an observer at the JCVI and, of course, you were closely connected to the other CMOs and the NHS England and the public health agencies concerned in delivery?

So you were in rather a unique spot, the interface between all these various moving parts.

Did you also attend, observe at or liaise with numerous advisory groups, such as the NERVTAG Covid-19 therapeutic subcommittee, the COVID-19 Neutralising Monoclonal Antibodies and Antivirals Access Independent Advisory Group, the COVID-19 Prophylaxis Oversight Group, RAPID C-19 committee, and so on?

A. Yes, I did, but the pressure on my time was really so great that it wasn't possible to religiously attend all of those meetings. And in truth, with the passage of time, I really can't recall a great deal --

Q. All right --

A. -- but it was my job to, I suppose, be the oil in the machinery and to try to plot out for the CMO and for ministers and understand what was happening in these various domains, some of which, of course, like the MHRA, were entirely independent in terms of the decisions they took.

Q. Indeed, but the Office of the Chief Medical Officer,

that's to say Professor Whitty, yourself, and Professor Harries, were, to a very large extent, the oil in the machine. You had a rather unique position whereby you saw what was going on at every level of the pandemic response?

A. Yes. Yes, and I think we also had to be, in many cases, the translator interfaces between different bits of science, between different types of science and between the policy-making and the political world.

Q. And the CMO and the DCMOs are entirely independent, are they not?

A. The Office of the Chief Medical Officer, that function is, by statute, independent. Professor Sir Chris was always my boss, and I wouldn't have considered myself to be able to act entirely independently of Chris. In any line management structure, you know, there's always a boss.

But equally, Sir Chris was always extremely accepting of, you know, good scientific arguments, whoever they came from.

Q. And so, at every level, the proprieties were always observed in terms of the independence of the various bodies.

If you could have up INQ000071697, by way of an example, Professor, on 17 November you yourself wrote to

Dr Raine, now Dame June Raine, head of the MHRA, we can see from the third paragraph:

"... the Department [DHSC] wishes to supply the vaccine [this a reference to the Pfizer BioNTech vaccine] in response to the COVID-19 pandemic. We therefore seek your views on its suitability for temporary authorisation under Regulation 174 ... so that we may promptly and safely deploy the vaccine ..."

If we just go to the end of the letter we'll see your name on the left-hand side. There we are.

As with many other parts of the complex machinery, it was very important, wasn't it, to preserve the independence of the various bodies. So you were formally here asking the MHRA to consider its position, but only on authorisation, which was exclusively for the MHRA, and you refer to the advice which, whilst relevant, is not the same thing as authorisation from the JCVI?

A. Indeed so, yes.

Q. Right.

A. And, you know, for the record -- and I hope you won't mind me being colloquial -- I've lost -- I lost count of the number of times I would have had a telephone call with Dame June and said, "June, at all times, if you think I or anybody else in the wider system is, you

know, nudging you or treading on your toes in some way, you know, put the phone down and complain about it, because it's absolutely sacrosanct and importantly so that your work remains independent."

Q. And indeed on 16 November, by way, again, of example only, 71886, INQ000071886, here's a letter in fact from Sir Chris Whitty, copied to Sir Patrick Vallance as he then was, saying exactly that.

A. Yes.

Q. "You've got to preserve your independence and if you need help in preserving your independence, please let us know."

And so that we're absolutely clear, decisions on authorisation were absolutely and exclusively for the MHRA. Decisions on procurement were for ministers on advice of the various taskforces but in particular the Vaccine Taskforce, and following advice from the Office of the Chief Medical Officer, the Treasury, and no doubt anybody else with a view on matters. And decisions around vaccine eligibility and prioritisation, again were for ministers, but on the advice which they agreed to take and accept in advance, of the JCVI, the Joint Committee on Vaccination and Immunisation.

A. Yes, that is entirely correct but I wouldn't want to give the impression that VTF and then subsequent

ministerial approval of procurement decisions were made in a vacuum --

Q. No.

A. -- without advice from the VTF clinical adviser, which was me, in relation to the likely number of vaccines that would be needed, for example.

Q. Yes, indeed.

A. And I, in a way, had to kind of second-guess where I thought the JCVI discussions were going because the JCVI couldn't make a decision until there were vaccines. But equally, we had to buy things early on that didn't exist. You know, we were putting money behind contracts in the hope that there would be a vaccine, but, you know, you have to decide whether you want 30 million doses or 60 million doses, and you can't do that in a vacuum so, absolutely, I gave that advice.

Q. That's an important topic. And in fact, either yourself or Sir Chris Whitty or often all of you, including your fellow Deputy Chief Medical Officer, Jenny Harries gave advice in relation to the purchasing of vaccines and therapeutics, the prioritisation and eligibility for therapeutics and the offering of vaccination as well as, as we'll see, dealing with multitude, a multitude of issues concerning vaccine confidence or hesitancy, delivery take-up, the whole gamut.

A. Yep.

Q. Right.

Vaccine development. It is very clear from evidence before this Inquiry, and in particular from Module 1, that pre-2020 the majority of government effort and resources was focused on the possibility of a flu pandemic.

A. Yes.

Q. I'm going to ask you some questions about onshore manufacturing capability in a moment, and on research and development. But in a very general sense, do you think that the United Kingdom was well prepared for what is known as Disease X, that is to say the yet unnamed, but likely to happen, prospective or future pathogenic outbreak?

A. So the answer to that is, I think, in two parts.

Q. Please.

A. Part one that I think I agree with what the Inquiry has already said: that there was a very substantial focus on pandemic influenza, as the threat, perhaps the only threat, and there hadn't been that diversity of thinking to the same extent about other pathogens. In other words, a Disease X such as Covid-19, SARS-CoV-2. Equally, I would say now that my personal scientific view is that a future pandemic is a racing certainty,

and by far and away the most likely pathogen to give us the next pandemic, based on probability and the number of data points we have, which are small, is influenza.

So in a way, that was, and should have been, the primary forecast, because for me it still remains the most likely next pandemic threat, though, if you make those kind of predictions, you can always be wrong.

Q. Of course, we were hit by coronavirus in 2020. What do you say to the opinion of many people, which is that attention must also be paid to the Disease X on the premise that it's not flu?

A. Yes, I agree with that, and the WHO has a list of high priority pathogens, and I think we should take note of that.

Q. You were intimately involved in the process by which vaccines were successfully identified, procured and delivered, and I just want to look at the position that prevailed on the cusp of the pandemic in January 2020 so that we can see just how unlikely it was that a vaccine would successfully be developed and manufactured.

Can we have INQ000047554, page 1.

This a note you did for ministers, dated 24 January, on coronavirus, and you make it absolutely plain: there are no vaccines available for the Wuhan, it was then known as the Wuhan coronavirus virus, and a vaccine is

unlikely to be available for at least 12 months even in experimental or unlicensed form and probably far longer.

There has been considerable research done already and a lot of funding already provided, so the UK is in a good position, but the likelihood of successful development and manufacture was relatively low.

A. Yes, I think we all felt it was relatively low at the time. I would say that if you asked me the same question again now, knowing what I know about the messenger RNA platform technology that we did not know in 2020, it is clearly very agile -- in essence -- and I'm over-simplifying -- once you have the genetic sequence of a new organism you can almost dial up a candidate vaccine.

So that kind of timeframe that I gave then was right at the time. We could be a bit more optimistic for the future.

Q. Right.

A. I think particularly with the agility that the messenger RNA platform is likely, though unproven, to give us against other future pandemic pathogens.

Q. Had there been some -- well, there had been a few -- there that been some advance and a considerable amount of research done on mRNA vaccines pre-2020, I think in the context of the possibility of using them to battle

cancer; is that correct?

A. Science has been working on the idea that messenger RNAs could be used in vaccine form for about 20 years --

Q. Right.

A. -- prior to the emergence of the pandemic. So we shouldn't believe that these things just appeared in a puff of smoke in early 2020, they were actually the efforts of scientists over 20 years that were just about mature enough to give us a solution at that time. But let's be clear, if the pandemic had happened in 2015, I don't think the messenger RNA platform technology could have come to our assistance in the way that it did in 2020.

Q. There's much material before my Lady which suggests that one of the reasons, one of the many reasons in the complex picture of why there are degrees of vaccine hesitancy or lack of confidence is the notion that the vaccines were built on technology that was entirely new, untested, appeared as if by magic in this country and other countries in 2020. So I want you to be clear. The mRNA technology had been worked on for a number of years beforehand.

A. Yes.

Q. Had also the vaccine vector technology, the use of the adenoviral vector --

A. Yes.

Q. -- for the Oxford AstraZeneca vaccine also been worked on and been around for some time?

A. That had also been worked on for many years and indeed, as Sir Chris referred to this morning, the funding in 2016, I recall, from UKVN to help the Oxford vaccine group take the adenovirus vector technology towards a, I think it was a MERS vaccine, really gave them a head start in 2020.

Q. And you are aware of course that the United Kingdom Government, through a number of bodies but not least UKRI and the NIHR, the National Institute for, then, for Health Research, had funded, to a very significant extent, different teams of researchers and investigators, working on vaccines --

A. Yes.

Q. -- for example, the Oxford group, as also with the team led by Robin Shattock at Imperial College London?

A. Yes.

Q. Can we have INQ000047660, please.

This is another document you prepared in those very difficult days in January 2020 about the way forward, and you were asked to consider how vaccine discovery might be accelerated. And you set out what you openly describe as the difficult picture, which is that a new

vaccine often requires 15 to 20 years, financial resources output of a billion dollars to reach licensing. There are obvious complexities in the passage of time in both the pre-clinical and the clinical stages.

If you could go over to page 2, paragraphs 18 onwards, you set out there some of the existing research, and you have just referred to MERS, and you identify a number of vaccine candidates.

So the picture wasn't one of unalloyed gloom, as you say. A lot of research had been done, and a significant degree of progress had already been made. But it was a question of building on all that in order to be able to reach the promised land.

A. It was, and, you know, for the Vaccine Taskforce, literally we -- they -- the Vaccine Taskforce -- had to back multiple technologies in order to have the chance of at least one winner. So it was a form of spread betting by any other name. But it was necessary, and indeed, all of the modalities that the Vaccine Taskforce backed have now produced licensed vaccines for Covid-19, somewhere in the world. So it was --

Q. A great success.

A. It was good hunting in terms of my colleagues, and not myself, who did the really hard due diligence work to

pick out not necessarily the most kind of perfect, appealing science, but the science that looked good and had a realistic prospect of delivery within, shall we say 18 months to 24 months.

Q. If we could go forward one page to page 4, please, paragraph 35. You identify a number of actions which you believe should be taken proactively to prepare for the possible arrival of the virus and for domestic preparedness. You refer to the very good regulatory environment. I won't ask you questions about that but was that a reference to the MHRA in particular --

A. Mm.

Q. -- and it's scrupulous independence and exclusive control over the issue of authorisation?

Then over the page:

"... strong facilities for Phase I trials ..."

III:

"... the continued development of vaccine candidates ..."

So looking for a spread-betting approach.

IV:

"... whether the UK should invest in nucleic acid manufacturing facilities for mRNA vaccines."

So right at the beginning you were seeking to identify ways in which the United Kingdom could get

ahead of the game, try to increase the prospects of a successful development and production of a vaccine.

A. Yes, it was clearly the number 1 priority for us, and it was my personal number 1 priority. Because I couldn't see a way of normalising our lives quicker than by having a vaccine solution at population level.

Q. In this general scheme, Professor, why is the ability to offer strong trial facilities to a prospective manufacturer of such importance?

A. Well, there's always this counter argument, if you like, that so long as somebody offers a manufacturer good phase I facilities, and so long as they bring a vaccine to licence, you can buy it later, as it were.

However, there is a kind of soft diplomacy that goes with helping pharmaceutical and vaccine companies to do their work on our behalf to develop new vaccines, and it is often the case that where you are, as a country, deeply involved in supporting vaccine manufacture, you are in a better position in terms of access to vaccine as quickly as possible.

So there's part of -- part of this is about building on the evident strength of British bioscience, but equally it's about a kind of soft diplomacy in terms of being front and centre when it comes to access to vaccines.

Q. So, in addition to having a manufacturing capability, it's perhaps no less important to have a strong platform for the carrying out of trials so that, as a country, we can be regarded as a best client, a best purchaser?

A. Yes.

Q. And that's a process which, of course, is required to be funded?

A. Indeed. It is about -- with all the safeguards of propriety and independence in place, it is about developing the best possible supportive relationship on an ongoing basis with the industry, who, in my view, are -- have always been instrumental in delivering vaccine solutions at scale when we need them. But it's about that partnership approach, with the proper respect for firewalls and integrity and, you know, commercial sensitivity.

Q. On 30 March 2020 you, personally, and Sir Patrick Vallance, as he then was, the Government Chief Scientific Adviser, signed off the objectives you identified and elucidated the objectives for the Vaccine Taskforce?

A. Yes.

Q. And the Vaccine Taskforce, as is very well known, commenced in two parts. It had an external advisory board and a programme board and the external advisory

board had bioindustrial specialists and venture capitalists, vaccine scientists. A lot of external element. And that became the Vaccine Taskforce, chaired by Dame Kate Bingham, and led by the director general of that taskforce, Nick Elliott.

In your statement you say, however, that, as a result of the constitution and development of that very successful body, you were struck by what you saw as the dysfunctional relationship between the Civil Service and pharmaceutical industry, and you appeal for the most effective working relationship that is possible to be pursued, and you also suggest that there be in the future the creation of a totally dedicated workforce, instrumental to the recreation of that vaccine success.

Why couldn't, in your view, a normal government department, just an existing part of the DHSC or BEIS, have done what the Vaccine Taskforce did? Why do you think it succeeded?

A. So let me go back to my original remark, which I want to be interpreted in terms of, prior to the VTF, the relationship between the Civil Service and the pharmaceutical industry was a bit dysfunctional, as I observed it, with -- it was just too formal, too stand-offish, and there wasn't this willingness to kind of, you know, behave as close colleagues, and share

problems and find solutions. It was all a bit too kind of stultified in some way.

What changed with the Vaccine Taskforce was partly that Dame Kate recruited a lot of people from the industry who had a different kind of mindset, and it was very helpful to me to have worked in the pharmaceutical and the vaccine industries to understand that difference in mindset. But also it was a national emergency, and it was brought with a very specific, almost task-and-finish approach to get this job done, because people were dying, and we had to put the brakes on that. And therefore, the kind of mission focus of the individuals within the Vaccine Taskforce was something that I've never seen before, and I'm immensely privileged to have been a part of that.

Q. Would you therefore recommend, with all the authority you can muster, that if faced with a similar national emergency in the future, the same -- it's an excellent phrase if I may say so -- "task-and-finish approach" is adopted?

A. Well, I think broadly speaking the answer is yes, but the important bits are the mindset and the important bits are also being able to bring together the right people as quickly as possible, even quicker than was done in 2020. So I think there is an argument. You

know, in the military there are rapid reaction units who are held at readiness from anything from two hours upwards to, you know, a month, but those units know they have a kind of stand-up role if there's a problem.

I think we almost need a cadre of experts who understand that they are on, kind of, you know, call down, as it were, in case there's a problem. We don't want to be looking for those in the heat of a crisis. We ought to know who they are, we ought to manage the membership, a little churnover time as people retire, new people come along. So I think there's some argument in that. But the most important thing is not what you call it; the most important thing is the mindset.

LADY HALLETT: You, I know, were here in the hearing room this morning when Professor Chris Whitty was giving evidence, and at one stage he said something that I've personally always believed: it's not so much the structures, it's the personalities.

A. Mm.

LADY HALLETT: And you also had in Dame Kate Bingham a personality who was determined to get things done.

If you had this cadre of experts, would it not depend upon whoever, in an emergency, was in overall charge to get things done to change the mindset?

A. Yes, it would, and I wouldn't want to predefine that for

the future too much, but I think I would say, and I have said it publicly on many lectures that I've given, that I think it was a stroke of genius to have a venture capitalist who understood biotechnology at the heart of moving at pace to bring science to the marketplace, as it were. I think that was an inspired choice.

And, you know, of course, you're right: a lot of it had to do with Dame Kate's personal characteristics and how driven we all know that she is, and she was, but equally, it was an inspired occupational choice, in my view.

MR KEITH: And we're not calling him as a witness, and therefore I hope I can say this without causing him undue embarrassment, that that choice was in large part down to the judgement of Sir Patrick Vallance, as he then was. And it's important, I think, also to note that the external advisory board, that part of the Vaccine Taskforce in its original emanation, was chaired by Sir Patrick Vallance, and also that the notion of the Vaccine Taskforce in its final form was significantly contributed to by Alex Jones of BEIS --

A. Yes.

Q. -- a witness from whom we heard earlier.

Before I ask you for your overarching recommendations on this in this field, can I ask you

a couple of questions, please, about VMIC, the Vaccine Manufacturing Innovation Centre.
A. Mm-hm.
Q. It's obvious from the emails and the submissions put to ministers and the paperwork before the Inquiry that by January 2021 it was obvious that hundreds of millions of pounds had already been spent by way of funding on this centre and there was a request for a further 80 million, but that there were cost overruns and slow delivery, the site was effectively not -- it hadn't been developed to the extent that it was wished it would be, and there was a prospect of a sale, and a risk in fact the site would become unused or broken up?
And I think the view was taken that the best option to try to get the site completed and get the site operational would be to sell the entity to a foreign multinational that could re-capitalise the project. Did you have any views yourself on the merits of the sale of VMIC to Catalent?
A. I didn't have any specific views on the sale of VMIC to Catalent other than I understood them to be a contract manufacturing organisation and it was a sensible sale, but I inherited the VMIC concept, if you like, and it was introduced to me when I was in office, it was either the late part of 2017 or early 2018, and I think

I probably didn't make many friends with my VMIC colleagues because I was a bit unenthusiastic about the whole thing. And I realise I may be at variance with other, you know, super scientific experts, but my view is that VMIC was tending towards the idea of a state-owned solution for pandemic vaccine manufacturer, and I haven't seen that work outside of, you know, the more totalitarian schemes of the world. In the Western world, it has always been about the vaccine industry being able to delivery a pandemic vaccine at scale, as was the case in 2009.
And so for me, the kind of approach that I think is more important is, you know, onshoring and backing vaccine manufacturers to do their work and keep a plant warm lit in the UK through their normal routes of business, but to have step-in rights in the case of a pandemic.
Q. And by step-in rights, do you mean an ability on the part of the government to say, "Right, you're turning the entirety of your manufacturing processes to creating a -- manufacturing a vaccine for us"?
A. We are probably getting into detail here that I don't think I'm qualified to talk about.
Q. Just in a general sense --
A. But --

Q. You've used the phrase "step-in" --
A. Yes, so step-in could be about make the vaccine for us. But the whole world needs a pandemic vaccine when there's a pandemic. But it could also be about priority access.
Q. All right.
A. And so there are different degrees of how you step in, and that's not for me to --
Q. But you'd like to see a number of manufacturing plants owned by manufacturers but in relation to which the government has the ability to turn the production towards their own use --
A. So I think it's potentially a very big advance that the UK Government now has a partnership deal with the messenger RNA manufacturer. I am --
Q. Do you mean the Moderna deal?
A. I do, and I'm agnostic to which messenger RNA manufacturer it is, so long as they manufacture messenger RNA vaccines. But equally, you know, it is a case in point that the vast majority of the vaccines we use in day-to-day public health practice are protein sub-unit vaccines, and I think we ought to think seriously about onshoring protein sub-unit manufacture in the UK as well.
Q. Would what you've said apply equally, Professor, to

factories for the production of --
A. Antibodies.
Q. And also factories for what is called fill and finish, the sort of syringes, the vials, the adjuvants --
A. Right.
Q. -- the bits and pieces that go with the vaccine?
A. So, with respect, the consumables are the vaccines and the needles and so forth, and the sharps bins, and you do need those in very large quantities in order to do a national vaccine campaign as we did, and one of the detailed conversations I remember having with the procurement people was about making sure that we had however many tens of millions of syringes bought before they came into short supply, and that we made sure that the graduations on the side could cope with a 0.3 or a 0.5ml administration, because you can get some that just go 0.5, my Lady, and that would be guesswork then for the 0.3. So there was a lot of work that went into consumables.
But in terms of fill and finish, that is really what I suppose in common parlance we would call the kind of canning and bottling bit of vaccine manufacture, and for that, you need a line that has -- able to move at very high speed and fill vials. You need all the glass, the medical-grade glass that goes with the vials. It is

internationally in very short supply. And so yes, that is often the bottleneck for any vaccine manufacture.
Q. And you were intimately concerned, in fact, with trying to release that bottleneck in the course of the pandemic?
A. Yes.
Q. So to summarise and to draw those threads together, Professor, do you advocate for a cadre, as you've described it, a national vaccine committee or cohort, not necessarily a statutory agency, to be concerned with everything to do with the vaccines from surveillance to research and development, to procurement, to the point in fact of national delivery, in order to be able to replicate what the VTF did but also to give them a wider reach in terms of surveillance and research and development.
A. No, no, I really don't want to go as wide as surveillance, which is done very well and -- by the UKHSA, and really to the envy of many people across Europe and the world.
Q. Right. So not surveillance?
A. I think it's about understanding the cadre of people that you are going to bring in if there is a need to -- again, to move at real speed in this area.
Q. Right. So, to a very large extent, reflective of what

was or what became the Vaccine Taskforce?
A. Yes.
Q. Thank you.
Secondly, do you call for further research and development in relation to vaccine technology, but particularly to try to see whether it's possible to identify generic or a prototype vaccine that can be tailored towards the particular pathogenic outbreak?
A. So I think that's a very, very deep question, because vaccine development is so expensive. You can't take every potential human pathogen on the planet and necessarily have the resources to make a vaccine prototype.
But you can do things such as the UK Government has done very recently. I'm not close to the details, only what's been released in the public domain, but with the continued advance of H5N1, for example, in dairy herds in the US, the UK, I gather, has made a decision to procure in advance, for stockpiling, several million doses of H5N1 vaccine. That is the kind of measured, proportionate step commensurate with changing risk that the US BARDA organisation has been doing for years and years, and it is something that we could do.
But I want to be clear -- I have great admiration for a senior military officer who said to me: the public

need to understand that freedom is not free. And in the same anyway, vaccine pandemic preparedness is not free. It is very expensive.
Q. That's very clear, thank you.
And then thirdly, and finally, based on what you've said, you call for a resilient onshore vaccine and antibody manufacturing capability?
A. Vaccines.
Q. Thank you.
Could we now address, please, some of the discrete issues, and only some of them, which were considered by yourself and the Office of the Chief Medical Officer during the course of the pandemic.
The dosage interval was an issue on which you were asked to advise. You wrote, along with Antonia Williams, of the DHSC, to the MHRA on 22 December 2020, pointing out that, of course, the new -- I think it was the Alpha strain had arisen and was becoming dominant. Covid-19 was on the increase. You ask the MHRA expert working group, because it had a number of working groups, and also the Commission on Human Medicines, to provide a steer as to whether or not the interval between dose 1 and dose 2 could be extended.
Briefly, what would be the prospective advantage of

extending the interval?
A. On theoretical grounds, if you give one dose of vaccine time to mature in the human immune system, it's going to respond better to the second dose. There were some very persuasive early data from the SIREN study showing that, in healthcare workers, those who had the longest interval between doses had the highest protection against infection. And so I say that in a theoretical world where, for example, if -- we're February now -- no, January now -- if we could predict there was going to be a pandemic in 2026 and we could make the vaccine now and we could offer vaccine to the UK population in advance of that, my vote would be for an interval between the doses of at least three months.
So that was the kind of theoretical basis for it. The hard-nosed reality at the time was that although we had very substantial contracts for vaccine futures, if that's the right word --
Q. Supply was still --
A. -- the rate at which it was coming through was not high to begin with, and we were faced with a difficult choice of whether to fully vaccinate a smaller number of people or to first dose very many more. And, you know, it was controversial, and I remember the fan mail, if that's the right word, in my inbox at the time from the public

and the medical community about this.
Q. And I want to be clear, there were people all around the world who said: well, why are you doing this? But you were right, were you not, because the degree of protection given by the first dose, if prioritised, allowed a larger number of people --
A. Yeah. We didn't do this in a vacuum in terms of, you know, let's just guess that the protection from the first dose was this much. We actually had a bit of data coming through on that, and the modellers helped us with it, and I believe in the fullness of time the World Health Organisation, which had been in opposition to our position, came round and agreed it was the right thing to do.
Q. And your colleague, Sir Chris Whitty, together with the other UK CMOs, all wrote a letter of advice on 30 December on this issue of the dosing schedule. And I'm going to summarise it if I may, Professor, I hope you'll forgive me, in this phrase: it's better to give two grandparents 89% protection than to give one 95% protection and the other one none at all.
A. Did I say that?
Q. You did.
A. Yes, and I --
Q. You said it in the Daily Mail on 3 January, so I'm

presuming that is a correct summation.
A. Well, I wouldn't have put it in the Daily Mail in those figures unless I absolutely substantiated them with data, so, yeah.
Q. Another deeply contentious issue was the issue of vaccination as a condition of deployment.
A. Yes.
Q. Which is the policy by which one may mandate that if one is to be deployed in a patient-facing role, for example, then one must be vaccinated.

You were very closely connected to the debate in February and March 2020 as to whether or not the Coronavirus Bill, which was then passing through Parliament, should include a mandatory vaccination provision for both Covid and flu; is that correct?
A. **(No audible answer)**
Q. Did that come to pass? Was there a provision made in the Act for mandatory vaccination for Covid and flu?
A. I can't remember, to be truthful. I've --
Q. Will you take it from me that there wasn't?
A. I think it was withdrawn.
Q. You wrote on 5 March --
A. And I think --
Q. -- saying, "I think we can let this one drop" --
A. Yeah --

Q. -- so I think not.
A. Yeah.
Q. Right.
A. I think where I felt I had got a contribution to make was that I had been studying academically influenza vaccination in healthcare workers for many years and, indeed, had advised the WHO, prior to being DCMO, on this subject. And I was kind of very clear on where the evidence was, but also where the evidence ended in terms of mainly the US, mainly hospitals, and the mandation as a condition of employment in various private hospitals in the US. And I understood where that had been studied and what the data readout was, and I felt that was important that that was on the table for ministers to understand as part of what was absolutely their decision.
Q. It was a political decision, in truth?
A. Absolutely.
Q. You were sent a copy of a paper that had been prepared for the committee, which my Lady will remember well, Covid-O, which was then in play. This was in June 2021. And the paper discussed what the levels of coverage might be, whether or not VCOD would lift the uptake of vaccination, but also, the degree of opposition and also the risk that members of staff in the care sector might

give up their jobs.

And on 26 June -- can we have this, please, INQ000153996 -- you sent an email which refers indeed to the work that you'd done on the flu issue for the World Health Organisation prior to 2017. But at paragraph 1 you said:

"There is essentially no evidence base for the effect of Covid vaccination of [healthcare workers] on protection of patients/residents."

But:

"There is plenty of evidence that nosocomial Covid-19 is a problem in ... healthcare and residential care".
A. Yes.
Q. Can you just elaborate on that --
A. Yes.
Q. -- because from a layman's perspective it would seem self-evident that if you vaccinate carers in a care home, you will reduce the risk that their cares, the residents, become infected?
A. So I'm glad you've asked me this question because this is typical epidemiology medic speak.
Q. Thank you.
A. When I say there is essentially no evidence base for the effect of Covid vaccination of healthcare workers or the

protection of residents, it doesn't mean that vaccinating healthcare workers doesn't protect residents; it means that no one has studied it and therefore no one has generated the evidence by which I can say there is proof that it will prevent infection. It is a perfectly reasonable supposition, as Sir Chris said this morning that, actually, if you're not infected with Covid, because you're being prevented from being infected with it for some -- by some means, including vaccination -- then you can't pass it on to anybody because you don't have it.

So yes, it's common sense, but this is written in a very specific medical way, and I am worrying now that it was misinterpreted by others at the time, but there is no evidence base for it --

Q. But you've made it absolutely plain what you meant, so that's very helpful, Professor.

And indeed, the government took a view as to -- well, it decided to implement a policy of VCOD in registered care homes on the basis that that mandatory vaccination of care home workers would reduce transmission --

A. Yeah.

Q. -- and would protect residents more. The issue then became to what extent would there be opposition, to what

extent would people walk away from the care sector because they didn't wish to be subject to mandatory vaccination?

A. Well, indeed, and all the issues which Sir Chris very eloquently laid out this morning.

Q. All those issues. Indeed.

Another topic, please, in relation to safety. In September 2020, part of the clinical trials -- and I can't recollect which phase of the trials it was, but part of the clinical trials in relation to the Oxford AstraZeneca vaccine, was paused because of safety signals coming to light, emerging, concerning the possibility of a condition known as transverse myelitis, which I think is to do with the inflammation of the spinal cord.

A. Mm.

Q. Could we have, please, INQ000152797, dated 11 September 2020.

Obviously, the question of authorisation was absolutely for the MHRA, and the question of prioritisation was for the JCVI. But as you said earlier, the Office of the Chief Medical Officer plays a very important part in being made privy to information, and expressing its views and giving advice?

A. Mm, yes.

Q. And you say, having been told that a review of safety information had been conducted, and the Independent Data Safety Monitoring Board set up by Oxford for the trial had met and recommended vaccination could resume, you said this:

"Thank you for the update. Participant safety and indeed the safety of any vaccine are of paramount importance and I thank the MHRA for its independent oversight."

A. Yes.

Q. So a nod to the independence of the MHRA again.

In your position as the Deputy Chief Medical Officer, are you aware of any instance in relation to any of the Covid-19 UK vaccines where safety was not regarded as being of paramount importance?

A. No. With vaccines, you are giving, offering a medical intervention to someone who is generally perfectly healthy. That is a bit different to somebody who is offered a medical intervention who is at death's door because they're so ill with a particular illness. And so the risk/benefit, in terms of the acceptability of safety, is even higher stacked in terms of safety when you're intervening in a perfectly healthy patient. So I think what I said there is true, that safety is absolutely -- was paramount.

And what was going through my head of course, when we got this signal, was separate to the MHRA's independent judgement about what should then happen in terms of whether --

Q. Quite.

A. -- the trial proceeds, but at the back of my mind is the thought that if that independent judgement is that this vaccine goes down at this point, then I, not me personally, but the VTF, we've just lost one of our spread bets here, and, you know, less important than the betting is the fact that our anticipated downstream supply of, shall we say, 20 or 40 million doses -- I'm making the figures up, but whatever it was -- that's just gone, and we've got to compensate for that somewhere else in our other contracts, and that was -- (overspeaking) --

Q. But in the second paragraph you make absolutely plain that the practical consequences in terms of access to vaccines was secondary to the independence of the safety review?

A. Yes.

Q. Right. And over the page, page 2, do you refer to a number of the other steps that were taken, the bodies that are concerned in the safety process. You refer to the manufacturer's own data safety monitoring board?

A. Yes.
Q. That's comprised -- it comprises independent external individuals --
A. Yep.
Q. -- who comprise a board which gives advice to the manufacturer. But also the CHM -- is that the Commission on Human Medicines?
A. Yes.
Q. Is that an independent advisory body that gives advice to ministers alongside the MHRA?
A. It advises the MHRA.
Q. It advises the MHRA. And also, a reference to "international regulators". Do you see, halfway down the page?
A. Yes.
Q. "We are not aware of imminent decisions by other regulators ..."
A. No.
Q. In truth, the safety field is extremely well populated by bodies, individuals, regulators, in this country and abroad --
A. Yes, it is.
Q. -- all focused on safety, monitoring safety, and on analysing emerging safety signals?
A. Yes. And the point about international regulators is

that all of these vaccine manufacturers are manufacturing for the world, as much as they possibly can, subject to affordability of course. But they are intending that there is a global distribution. And the UK is now, particularly after having left the European Union, is a very small market in the eyes of vaccine manufacturers now, and there are -- there's no more important regulator to us than the MHRA, but actually, if you look at the FDA and the EMA, in terms of the population bases they serve, they're massively larger. So there is also this tension, if you're a vaccine manufacturer, about which regulators are interested in whatever is going on in your trial.
Q. But it is obviously of assistance to the UK regulator, the independent MHRA, to see what other fellow and similar regulators are doing in Europe and America?
A. Indeed.
Q. And they know all the time what they are doing, do they not?
A. Now there's more of a separation now we've left the European Union, but of course there was none at all when the MHRA was basically one of the members of the EMA.
Q. Was that because we were party to the EU's EudraVigilance system --
A. Yes --

Q. -- for safety --
A. Yes, and our regulator, you know, made a very major contribution to European regulation.
Q. Since the transition period, 11 pm on 31 December 2021, do you assess that we are in a less good position in terms of understanding the data available to --
A. I mean, mine's a lay assessment and I think you need to ask that question of Dame June or other professional regulators.
Q. I will.
I want you to look at a particular document, please, dated 8 December 2020, INQ000153551.
Professor, this is a document published on 8 December 2020 online, and it deals with the safety and efficacy of the Chimpanzee Adenovirus Oxford 1 vaccine, that is the Oxford AstraZeneca vaccine, AZD1222, against SARS, so coronavirus, an interim analysis of four randomised controlled trials.
A. Yes.
Q. So two points, please. One, the AstraZeneca vaccine was trialled not just in the United Kingdom but trialled in Brazil and South Africa?
A. Correct.
Q. With different participants, different ethnic and racial mix?

A. Very much so.
Q. And indeed, in South Africa, the figures for black African participation as opposed to white British were, of course, massively in favour of the former?
A. Yes.
Q. The second point, though, is this: looking at this sort of document, were these documents giving facts, figures, detail of the safety processes and the trials very much in the public domain?
A. Once a letter is -- once a paper is published in something like The Lancet -- and this is The Lancet, I believe -- if it's under an open access licence, the very bottom line, cc'd by 4.0, then it's a gold access open article: literally any citizen on the planet with access to the Internet can open and download this for free.
Q. Right. And if we could just be good enough to scroll through, rapidly, the 13 pages constituting this article, we can see that it is -- that the detail and the scientific knowledge that is imparted by this article is at a very high level, isn't it? It's extremely detailed. It's extremely learned. And it would appear to hold nothing back.
A. And yet it would be a very small document compared to the actual regulatory submission that the manufacturer

will have put in to the regulatory bodies, including the MHRA. This is a précis --

Q. This is a mass of documentation --

A. This is just a précis --

Q. All right. This is just a single public article.

All right. In 2021, just before Easter, on 14 March, the UK bodies, the MHRA, the JCVI, yourself, DHSC, were alerted to an issue of whether or not the AstraZeneca vaccine was causing what's known as thromboembolic events, so blood clotting, and also associated in some cases with low platelet levels.

I'm not going to ask you questions about the extreme rarity of the event and how rare it was at that stage as well, but an issue arose about whether or not, having been alerted, the MHRA and the JCVI should put out into the public domain their advice and a concluded position before the Easter Bank Holiday weekend. Do you recall?

A. Mm.

Q. And the JCVI met repeatedly, the MHRA met repeatedly, and you gave a press conference, I think, on --

A. On 7 April.

Q. On 7 April. You also attended a JCVI meeting on 4 May.

Do you assess that although the final determined position by the MHRA and the JCVI was not formally put into the public domain until after Easter, that there

was nevertheless a very significant amount of information about this thromboembolic event put into the public domain before the weekend?

A. I think there was information in the public domain before the weekend and I don't think people did nothing -- well, I absolutely recall that people didn't do nothing over the Easter weekend and kind of downed tools and said, "Look, it's Good Friday, we can't do any more, we'll knock this on the head until next week". It wasn't like that at all. It was the fact that this was going to be an extremely complex piece of messaging, that if it had gone wrong in some way it would have undermined confidence in the whole of the UK vaccine programme, and therefore, it was really important that there was time to properly assemble the right messages, factual, truthful, but correctly worded, and that enough organisations who would essentially, kind of, pick up the tab for this after the announcement, understood how to respond and were not on the back foot.

Q. So, if the information had been put into the public domain hurriedly or in a way that caused the horses to shy and the vaccination programme to halt or to be damaged, Covid-19 would carry on killing people and that would be an unacceptable risk?

A. Yes, I don't know what the death rate per day was at

that point but it wasn't --

Q. But it was obviously significant --

A. And the other point is that the data by then were beginning to suggest -- and it wasn't my job to at adjudicate on this, it was the job of the JCVI and the MHRA -- that the data were beginning to suggest that this was an age-related signal, and I recall that the eligible cohorts at the Easter weekend were over the age of 50 at that point. We hadn't gone down into those younger cohorts that would have been affected by any change in advice.

So actually --

Q. And in respect of whom there might be a difference in the extreme or very rarity --

A. Exactly.

Q. -- of a thromboembolic event --

A. And so the advice to use from JCVI and MHRA in terms of -- particularly JCVI -- in terms of vaccines that are suitable for the over-fifties, which was where we were at on the Easter weekend, didn't change, because of this. So we weren't at that really difficult point, and it could have been a lot more difficult if we'd actually been in those lower age cohorts at the time when this signal emerged. So, you know, that was just fortuitous.

Q. The JCVI, which obviously was due to give its advice on

whether or not the AstraZeneca vaccine should continue to be offered --

A. Yes.

Q. -- was obviously doing so in the context of realising that it was, in fact, the higher priority cohorts who were in the currency of being offered that vaccine, not very much younger people.

A. Yes.

Q. But they said that, with substantial discomfort, they'd come to the decision not to release, because they didn't want to jump the gun and get it wrong, an independent public statement.

A. Yes.

Q. And in a letter -- I don't think we'll bring it up because I'm not sure it's on the list, but there's a letter from Mr Hancock to Professor Lim of the JCVI on 2 April.

A. Yes.

Q. INQ000416158. And Mr Hancock says obviously individuals "should be fully informed of the benefits and risks in a timely manner", but the letter refers to the fact that even if the JCVI doesn't issue a full statement then and there, the MHRA had updated its weekly Yellow Card reporting. There were also published weekly reports referring to the possibility of thromboembolic events,

very rarely, and letters had already been sent to all NHS medical directors and all primary care networks.

So even if the JCVI had not issued a formal press statement, had the information about the occurrence of these events nevertheless been disseminated across a very wide scale already?

A. I think it was handled as expeditiously as it could have been in a safe and controlled way.

Q. The mRNA vaccines --

A. Yes.

Q. -- so Moderna and Pfizer BioNTech, it's well known, very rarely indeed, can have the side effect of causing myo- and pericarditis, but importantly they can also be caused by Covid-19?

A. Yes.

Q. In April 2021, news emerged in Israel of a small number of young men reporting cases of myocarditis. What did you do to try to get as much information about what was going on in Israel as possible?

A. So I recall that I had a contact in the British Embassy in Israel, I think it was Keren Shurkin, I can't quite remember, and that I asked her for a rapid introduction to the scientific authorities in Israel for a bit of feedback on this and I think I also contacted -- probably it was Phil Bryan at the time, at the MHRA, and

said, "Look, I've just heard this; what have you heard? Are we awake to this?"

But you might need to remind me through some exhibits.

Q. So you emailed, I think, a number of your contacts and tried to get as much information as you could, and was this the position, that the MHRA had already, of course, convened to look at it, as had its expert working group?

A. Yes.

Q. As had the Commission on Human Medicine. And the figures showed, at least as of 12 May, 16 reports of pericarditis and 19 of myocarditis for Pfizer. What was the context? How many -- very roughly, how many doses had been given worldwide by that stage?

A. I just can't give you a proper answer to that, but my --

Q. -- (overspeaking) --

A. -- hazard is millions, at that point. One of the things about safety signals with vaccines is that they're a bit like fog on the motorway, that you can be driving along and it looks a bit misty but you don't yet call it foggy, you call it misty, but your passenger might well say, "Oh, it's a bit foggy". And there's another decision about when the fog lights go on on your car, and so forth. In other words, what I am saying is that these things emerge very gradually as the numbers build

up, and you have to decide when it's the signal and when it's not, and you have to also decide if the signal is likely causative or not, and that is such complex stuff. It is best left to people who do this for a living, which is the professional regulators and their pharmacovigilance arms.

So my view was make sure everyone is alert to this, and then just leave it to the experts to work it through.

Q. And did you ever see any attention falling short of the utmost importance being paid to the issue of safety signals and their investigation?

A. No, because I wouldn't have let it drop.

Q. And would you say the same in fact in relation to the EU regulator, the EMA, of course from whom you heard regularly, as well as, of course, the FDA in America?

A. Yeah.

Q. It was taken incredibly seriously?

A. Yeah, I mean, I don't have much experience of the FDA but I've worked with officers from the EMA over the years and I have the highest regard for them, particularly in the vaccine sector.

Q. Finally, I would like to ask you some questions, please, about therapeutics and in particular Evusheld. If it proves not to be possible to identify, develop, and

manufacture a vaccine, or if there is a vaccine, people are unable to take it, or if they do take it, unable to benefit significantly from it, in such scenarios, is it vital to have an alternative medicine available?

A. The very short answer to your question is yes, but I would, my Lady, if it's possible like to really try and elucidate for the Inquiry the relationship between vaccines and therapeutics, because I don't think that's necessarily come across clearly enough.

So at the start of a pandemic when you have a new pathogen and you have nothing to throw at it other than public health measures, vaccines and therapeutics are both equally important, because you do not know which will succeed and you already know that the likelihood, in 2020, of getting a vaccine was relatively low. And so you have to go after both immediately.

As our pandemic in 2020 evolved, by quite early in 2021, it was -- we were already, you know, steaming away with the vaccine programme, and it was becoming self-evident that alone, via the UKHSA surveillance, that vaccines were really turning a handle on this and making a material difference. And at that point therapeutics do become less important on a population basis, but still incredibly important for people who fall through the net with serious illness, and require

some form of rescue.

Now, into that space come the antiviral medicines, and we, of course, had deployed molnupiravir and I think we'd deployed Paxlovid as well, as the specific antivirals.

Q. Is that the combination of --

A. -- that's the combination for -- (overspeaking) --

Q. -- monoclonal antibodies.

A. But to your wider point about phase I and phase II development, both of those medicines didn't come through those programmes, they came direct from manufacturers who had it themselves or licensed it themselves and wanted to pursue it through their own, kind of, clinical trials development. But actually, when we, for example, evaluated molnupiravir in the PANORAMIC study which I know you've talked about, a platform study across primary care, we found that molnupiravir in a fully vaccinated population did not reduce the likelihood of hospitalisation by any significant amount. That's in very stark contrast to the manufacturer's phase III results which showed a 30% reduction in hospitalisation. That was in an unvaccinated population.

So I think that illustrates how, if the vaccine is doing the heavy lifting in a population, there is a changed emphasis on antivirals.

Now, just to go on for one more second.

Q. Please.

A. On the therapeutic antibodies, there are two ways you can use those. One is in a patient who is already unwell, and because of their immune state, requires a bit of extra support, and indeed, those antibodies have been used by the NHS for high-risk patients.

The second way is, of course, to administer the antivirals as a prophylaxis that will last a finite but not indefinite period of time, that will need to be re-administered, and whenever you, in an individual patient, make a decision to stop using those antibodies, that patient is returned to a state of full susceptibility to the virus, unless they've acquired infection along the way, and unless they've also been vaccinated.

And to Sir Chris's point, our estimation of the number of people who would not be helped by a vaccine has dropped very, very substantially now. As we've seen, even people who don't respond to a standard two-dose prime, do respond to successive doses, and have important T cell protection and so forth.

So I feel it's been presented as a bit binary that either you can benefit from the vaccine or if you're immunosuppressed you can't. It isn't like that. There

are a great many patients with a degree of immune compromise who, in my view, now have benefited very substantially from vaccine, particularly as they're called twice yearly at the moment by the JCVI for boosters.

So that's the kind of complex interaction between the two, and I hope it explains to an extent to the Inquiry the emphasis on different -- on the acquisition of different products, at different stages of the pandemic.

Q. And does it follow, Professor, that -- well, is it your position therefore that there was no strategic inappropriate prioritisation of vaccines in 2020 over the pursuit of therapeutics --

A. Yes.

Q. -- particularly bearing in mind that throughout 2020 there was a focus on the reprioritisation of already authorised drugs which led to dexamethasone?

A. Yes.

Q. And in 2021, the development, manufacture, authorisation and then making available of molnupiravir and Paxlovid in particular?

A. Yes, along with some monoclonals.

Q. Along with some monoclonals.

A. Yes.

Q. And does this second proposition also therefore follow: is it your view that there was a lacuna, whether prophylactically or by way of treatment following infection, for the immunocompromised, a gap, they were essentially left hanging, or is it your view that, to a very large extent, everything that was done reasonably was done in terms of trying to procure therapeutics?

A. I think history speaks for itself, that those immunosuppressed patients can access treatment, whereas those of us who don't those kind of conditions can't. So yes, I think so. I think the notion that -- I think the notion that was laid out before Sir Chris this morning that what we said in February 2021 about Evusheld was a kind of permanent no, that certainly wasn't the case. It was a "no, not now", and not in these quantities.

You know, we didn't have any clinical trials results. The MHRA approval was later. The vaccine programme was moving at real pace. We don't have a virus that is obviously winter seasonal in the same way that influenza is, and so timing of administration would have been very tricky indeed.

We also had a promised very short shelf life for any bulk manufacture and, with hindsight, we also discovered that there was going to be a potential resistance

problem with the Omicron variant, though we did not know that at the time of writing the letter. And so that's --

Q. Is that reference -- I'm sorry to interrupt. That reference to Omicron is a reference, is it, to the fact that at the end of the process, so by 2021, when there was an issue about -- and into 2022, whether by way of treatment -- sorry, whether prophylactically Evusheld shall be offered to people who were infected, Omicron had changed the game?

A. Yes.

Q. It changed the rules?

A. Yes.

Q. Because such clinical data as there was made plain that it was less effective against this variant?

A. Yes.

Q. And secondly, I think the point will be put to you on behalf of the immunosuppressed: well, look, great risks were taken in relation to vaccines, great advance purchase, at massive cost at risk, before one knew with any degree of certainty whether they would work, and certainly in advance of the majority of the clinical data becoming available. Ultimately, Evusheld was put through the RAPID C-19 committee process and a decision that to be taken as to whether it was appropriate to

decide to proceed with it, and buy in large amounts.

Why wasn't Evusheld given the same crack of the whip? The same degree of at-risk purchasing that the vaccines were.

A. Because it was moving at so much slower a pace. And it's -- you know, at the time at which enough data surfaced to understand what it would do, we were in a completely different phase of the pandemic by then.

Q. Because the vaccination programme?

A. Yes --

Q. -- was essentially complete?

A. Yes.

Q. Because the population had thereby been immunised?

A. Yes.

Q. And therefore transmission was lower?

A. Yeah.

Q. And it was a different ballgame?

A. Yeah. And indeed many of the immunosuppressed population would -- well, all of them, pretty much, would have been vaccinated, and a substantial majority, we now have understood, will have some degree of protection from the vaccine programme, and how it is applied to them.

MR KEITH: Thank you.

My Lady.

LADY HALLETT: Thank you very much, Mr Keith.

Ms Morris.

Questions from MS MORRIS KC

MS MORRIS: My Lady.

Professor Van-Tam, good afternoon. My questions are on behalf of the Covid Adverse Reaction and Bereaved groups, and my questions are going to focus on public health communications about risk. You've touched on one example of that with Mr Keith a moment ago, the Easter pronouncements, but I'm going to ask you in general terms, please.

You said in your statement that no vaccines are without risk.

A. Mm.

Q. So the question when offering clinical advice to the public is whether the benefits exceed the risks?

A. Yes.

Q. And you said in your statement that you consider that the Chief Medical Officer's office contributions to the public messaging about vaccines adequately reflected both the risks and benefits of vaccination?

A. Yes.

Q. So my question is: would you agree that enabling an individual to make an informed decision requires providing more than just a general statement that

benefits outweigh the risk, but also specific information about those risks to allow them to make an informed, independent assessment of whether the vaccine is something that they want to undertake?

A. Yeah. So I want to be clear that the assessment of risk-benefit itself was done by the JCVI, not the UK chief medical officers.

Q. Understood.

A. It was our job to communicate it.

I think there were a multitude of sources available to explain what the potential adverse events were. That communication is generally in the domain of the UK Health Security Agency, but I think we did our very best to be fair and realistic about that.

And indeed, at vaccination sessions, I would say pretty much every patient I saw was given a patient information leaflet at the time of vaccination by either the vaccinator or the clerk helping the vaccinator in the booth. So I think there was a very substantial amount of opportunity --

Q. Thank you.

A. -- to ask questions.

Q. Thank you. Well, the Inquiry may hear more evidence about patient information leaflets throughout the evidence, but you say further that -- in your statement,

that:

"... relative risks can [themselves] be misleading when communicated to non-experts if the effect of the size is very rare ..."

And you said as well that that doesn't mean that you shouldn't use such statistics but that they should be put into context, and therefore reducing the risk of harming public confidence in a vaccine, and therefore reducing the risk of vaccine hesitancy.

So it seems to be you're sort of talking about the way that information is packaged and put forward in public messaging; is that fair to say?

A. Yes. I don't think I want to, unless, my Lady, you want me to, to go through again relative and absolute risk. I think that was very well taught this morning.

I think the things you talk about are important, but I think they were very well handled.

Q. Okay. My next question is: do you believe that the messaging you referenced sufficiently empowered individuals to understand those risks in detail rather than relying on, sort of, general and consistent pronouncements that the benefits outweighed the risks?

A. So I'm a great believer in doctors treating their patients as if they were their relatives, their loved ones, because I think that way, you get the very best

out of doctors, and, you know, my doctors quite often get asked, "Well, what would you do if I were your relative?" Because I think that's, you know, you hit the nail on the head there.

I have been very public in communicating with the public that I told my mother, and that she was to have her coat on, and to be ready for the first available vaccine slot that I could get her, wherever it was in the UK -- as it happened it was where she lived -- but I think that's important. And I think we know from influenza vaccination that the strongest advocate of vaccination, the strongest advocate of helping a patient to understand risk and benefit, is for a practitioner to say whether they themselves have been vaccinated; and we know that is very effective in terms of flu vaccine uptake.

So that's the most important -- they're the most important communication facets.

MS MORRIS: Thank you, my Lady.

Thank you, Professor.

LADY HALLETT: Thank you, Ms Morris.

Ms Mitchell, who is that way.

Questions from DR MITCHELL KC

DR MITCHELL: I appear as instructed by Aamer Anwar & Company on behalf of the Scottish Covid Bereaved.

Earlier in your evidence you mentioned controversial decisions and it's on the issue of difficult decisions to be made during a pandemic that I'd like to ask you about.

The Inquiry heard last week about the MEAG, the Moral and Ethical Advisory Group which was closed in October 2022. The Scottish Covid Bereaved suggest that a body be set up to deal with medical ethical issues which could provide advice, for example, as to what to do in a pandemic when demand for vaccinations outstrips supply, if that ever comes to pass.

Is this an issue that might helpfully and workably be considered by such a body, and if so, do you think that the CMOs of each country should be part of that body?

A. So, first of all, the idea of ethical decisions in medicine and public health practice is definitely not new, and MEAG, to which you refer, was, as far as I understand it -- and I didn't follow that committee greatly -- an evolution from CEAPI, which was the Committee on the Ethical Aspects of Pandemic Influenza, which I remember being set up to consider ethical issues in relation to a pandemic, particularly -- well, obviously, a flu pandemic, but around potentially the use of very scarce resources such

as the intensive care unit, were they to be overwhelmed.

Now, we never got into a position, the scenario described of running out of vaccines, but I imagine that we would have put that back to JCVI saying that we can't deliver what you recommend; what do we do about it? And I imagine that there would have been a discussion with MEAG at the time.

So yes, I think ethics is very important in these big public health crises, but I think the question you're asking about should such a body exist in a kind of standing way is probably one that ought to be addressed to the Department of Health and Social Care, or even to the Cabinet Office, rather than me as the DCMO as was.

Q. Sorry, just one final question on the point of who might be involved in that body, do you think it would be helpful if a CMO or Deputy CMO would be part of that process?

A. I think the expert groups need to have the right constitution of experts and laypeople on them. I think there's a point about a CMO or a DCMO being present as an observer in the same way that I was privileged to be an observer at JCVI meetings whenever I could manage it, which was most of the time.

But CMOs and DCMOs in a pandemic crisis are pulled

a thousand ways each time of day and I don't want to give you a dishonest answer that I could necessarily have prioritised those meetings had I been invited.

DR MITCHELL: Thank you.

MR KEITH: My Lady, it may assist if I simply observe, very briefly, that in the three witness statements of Clara Swinson from the DHSC, the Department of Health and Social Care, there are references to the role of MEAG. It reported on age, morality issues, the vulnerability of people who work in frontline occupations, VCOD uptake amongst minority communities, younger adults, wastage, passport certification and a host of other issues. And there is a witness statement from the chair, the co-chair of MEAG, Sir Jonathan Robert Montgomery in the written material.

LADY HALLETT: Thank you very much, Mr Keith.

Professor, thank you so much for your help, all that you did, obviously, during the pandemic and the help that you've provided to the Inquiry. I hope that you don't go near Whitehall soon, when you referred to the joy of leaving Whitehall. So thank you very much for everything you've done.

I think the stenographer, apart from everybody else, deserves a break, so if Dame Jenny Harries will forgive me, we shall take a break now and I shall return

at 4.00.

(The witness withdrew)

(3.43 pm)

(A short break)

(4.00 pm)

LADY HALLETT: I'm sorry we've kept you waiting so long, Professor Harries, as you've probably heard, we've had quite an intensive day.

MR MANSELL: Thank you. Could the witness be sworn, thank you.

PROFESSOR DAME JENNY HARRIES (affirmed)

Questions from COUNSEL TO THE INQUIRY

MR MANSELL: Could you give the Inquiry your full name please.

A. Jennifer Margaret Harries.

Q. You are Professor Dame Jenny Harries, I will refer to you Professor Harries, if that's okay.

Thank you very much for attending today to assist the Inquiry. You have kindly provided witness statements and oral evidence to the Inquiry previously. In fact, you've given evidence in all three previous modules of this Inquiry.

In terms of Module 4, you have provided two witness statements: the first is INQ000492334. That is the corporate statement on behalf of the UK Health Security

Agency, or UKHSA.

And the second is INQ000474715, that's a short supplementary statement, again provided by you on behalf of the UKHSA; is that right?

A. Yes.

Q. Are those statements true to the best of your knowledge and belief?

A. Yes.

Q. Thank you. As I say, you've given evidence to the Inquiry before, so I can deal with your illustrious professional background rather briefly, but you are the chief executive officer of the UKHSA?

A. That's correct.

Q. Prior to taking on that role, you were one of the Deputy Chief Medical Officers for England from 15 July 2019 to 31 March 2021?

A. Yes.

Q. Before your appointment as DCMO you were regional director for the south of England within Public Health England --

A. Yes.

Q. -- from 2013 to 2019. Alongside that, you were interim deputy national medical director for PHE from 2016 to 2017?

A. Yes.

Q. And from April 2017 until you commenced the DCMO role, you also formally held the strategic incident deputy medical director role at PHE?

A. That's correct.

Q. And in terms of your training, your background is as a clinical doctor with specialist training in public health medicine.

A. Yes.

Q. Could we start, please, by just establishing some things about the UKHSA. It is an executive agency of the Department of Health and Social Care, and is it right that it became fully operational from 1 October 2021?

A. That's correct.

Q. Its role is to protect the public not only from infectious diseases but also from external hazards such as chemical, radiological, nuclear, and environmental threats?

A. That's correct.

Q. You explain that UKHSA brings together expertise from several predecessor organisations, and those include PHE, and the Vaccine Taskforce, or VTF?

A. Yes, and the Joint Biosecurity Centre as well.

Q. Your witness statement addresses the work of the VTF. The work of PHE is addressed by your colleague, Dr Mary Ramsay from whom we'll be hearing later in this

module, but is it right that you will be addressing the "Lessons for the Future" section of Dr Ramsay's witness statement?

A. That's correct. And if I could just step back to the VTF, as UKHSA we only absorbed a small component of that so it wasn't the whole of the previous function in VTF.

Q. And we'll look at that in some more detail as well but that's an important clarification. Thank you.

Your main Module 4 statement helpfully sets out a narrative of events in terms of the work of the VTF, and there's no need for us to rehearse all of that evidence. Instead -- although it is very valuable to the Inquiry -- but the focus of my questions today will be in two parts. First, on some discrete issues relevant to vaccines and therapeutics, including some advice you gave as DCMO during the pandemic, and also on lessons learned and recommendations in terms of what can be drawn from the work of the VTF, looking ahead to the next pandemic.

So can we start, please, with the topic of vaccination as a condition of deployment, or VCOD, and in February 2021, in your role as DCMO you were asked for your view on DHSC advice about making vaccination a condition of deployment in care homes.

We can see the relevant email at INQ000153737. And

this is an email from you on the issue of VCOD, 15 February 2021.

I think there was an attachment earlier on in the email setting out some -- the DHSC policy position, and this is you expressing your view.

You say at the top of that page:

"I have been quite outspoken on the attached. I am hugely supportive of getting care homes protected, but I have seen no evidence to suggest that this policy is going to result in more benefit than harm. My personal gut feeling (agreed not a scientific parameter!) is that it is hugely risky with the workforce we are dealing with in areas with the most deprivation and likely issues with attracting staff."

And you go on to set out your views. In the last bullet point of that email, on that page, you say:

"Of most significance is my concern on potential racial 'antagonism' when such a large proportion of the workforce in critical areas are from ethnic minority backgrounds and particularly when low rates of uptake are not being addressed in this way in doctors and nurses."

And you go on:

"Most of all, I am concerned about the impact on wider vaccine uptake and subsequent health inequalities.

If Covid goes well, we could boost vaccine uptake for the ethnic minorities in all communities and gain years of life now and in the future. If it goes wrong, we lose children and parents and the communities spiral down with ever increasing inequality."

Do you think that sufficient consideration was given to the potential impact on health inequalities when it came to implementing VCOD?

A. So I think the position around inequalities was well understood, and what you don't see behind this is a significant amount of discussion within the Department of Health. And I wouldn't like to suggest this is the only opportunity I had to input.

I think there is a point here which is -- and it applies to many things through the pandemic, that there is often a drive or a push or a feel that inevitably one has to respond quickly to something, and what I was trying to flag here was, in the midst of gloom, there was actually a potential long-term opportunity, that if, at a time when people saw vaccines, quite rightly, as something which was going to pull us out of the pandemic, that would be a positive lever for the future, for other vaccination programmes, that start to reduce inequalities. That's a very difficult position to hold in the middle of the pressures of a pandemic. And so

although you can see that in general I was leaning away from it, if I had a personal view, that was one of many views at the time, and there were many good, logical reasons that I also understood for why you want to maximally protect a care home immediately.

Q. You're writing this in February 2021. Here we are in January 2025. In your view, did Covid go well, or go wrong in terms of vaccine uptake and subsequent health inequalities?

A. So the short-term impact of this was that care -- vaccination of care workers rose in the immediate time period. And one of the critical underlying factors here was, at this time, the workforce -- I was thinking particularly about London, where 50% or more of the workforce in minority and ethnic areas and most of the deprived areas was from minority and ethnic workers. They are the bedrock of providing services.

So if, as I think I -- one of the opening statements suggested, people had perhaps taken a break rather than been forced to have it, the whole system would have collapsed and we would have had then risks to life, potentially, because we would not have workforce for those elderly people needing care.

I think, from some of the evidence that's been put forward, and it's difficult to estimate this in

scientific parameters, statistically, but I think what we have seen is it is the trust element behind this which goes.

I actually personally think every clinician, every hear, every frontline support worker, absolutely it's their responsible to do what they can to protect those that they care for, but I would rather see it introduced in a way which is longer term, sustainable, and based on trust and good information.

Q. Finally on this, did we get it right, VCOD for workers in this situation, or is there anything to be learned in terms of lessons for the future in the next pandemic and how we go about it?

A. So I think my comments here are a microcosm of what I've seen in more general programmes. So, for example, you're probably aware of the measles outbreak around in Birmingham, Wolverhampton, and I was struck when I was visiting that many of the communities there, it is a long-term trusted relationship. It's not about an occupation or a transactional reaction or an ethnic background; it's about a community and individuals in it, and they need to have those long-term sustained relationships, on a non-transactional basis, where people understand what is important to the community as well as what we see as important to protect the

population.

Q. That can come down. Thank you very much.

Next topic is prioritisation decisions of the JCVI and how those decisions are taken, which groups are prioritised. And you may be aware that the Core Participant group, Covid-19 Families for Justice UK, has raised concerns about whether teachers and perhaps other key workers should have been prioritised for vaccination.

And indeed, the Inquiry heard moving evidence last week from Helena Rossiter about her son, Peter, who was a teacher. And he sadly contracted Covid-19 and passed away in August 2021.

In February 2021, the director of public health at Liverpool City Council contacted you about piloting a scheme which prioritised vaccination for teachers, something that would have been outside of the JCVI guidance on prioritisation. It was said that such a pilot would reflect the priority of reopening schools, keep infection rates low in schools, and build confidence among parents and school staff. And we can see your response to that idea at INQ00072914, please.

And here we go. This is your email response, 25 February 2021. Now, you were against such a pilot, and you set out in your email a number of points why,

and we can see that as we move down. Thank you.

You say:

"The rationale for appearing to be unhelpful in your immediate ask is because of the wider implications."

And you set out your logic there as follows:

"1. The agreed prioritisation of vaccinations being to save lives.

"2. ... mortality and morbidity rates amongst school teachers are either lower than or similar to relevant comparator occupational groups.

"3. Children themselves rarely get seriously ill ...

"4. All teachers who are clinically extremely vulnerable should have been vaccinated by now ..."

And you go on to list some further factors there. And you say at the bottom of this email, a bit further down the page:

"Quite apart from this more logical discussion, such a move would inevitably open the flood gates to every other group of workers who may feel they lack confidence in the current pandemic ..."

You give some examples.

"... all public facing and essential for current ability to maintain a relatively normal and probably all meeting a higher number of new social interactions

through their workplaces than teachers."

So you're talking there about the floodgates being opened.

You do go on in the next paragraph to stress that having a really clear and simple rollout programme for the UK has enabled delivery of the vaccine, but you do so:

"Whilst you will know I am usually hugely in favour of local variations and process adaptations this is one where I think [the] outcomes could ... be different ..."

What did you mean when you said you were usually hugely in favour of local variations and process adaptations?

A. So, first of all, can I just say, I did listen in detail to Ms Rossiter's hearing appearance, and so my condolences to her because she will be very interested, I'm sure, in the logic that went through this, but obviously we are looking, as we've heard, at population health and the delivery of a whole-country vaccination programme.

The reason I put that is because my background, which you didn't get to, is actually I've spent more time as a director of public health in local communities and the starting point for where I think is in communities, not in a Whitehall office somewhere, and

Matt Ashton was one of my previous fellow directors of public health and I would often have directors of public health emailing me to keep in contact, if you like, or if there were queries around why we were doing something or if something had been announced, if they had information, they would come to me. So as a friendly voice, if you like, a friendly contact in CMO's office.

So that's what this means here and what -- Matt will know that, I understand sometimes you need to use local variation to get the right impact, to reach people, as we've been speaking about, I think, a lot during the Inquiry. And so what I was saying was I understood why he might be trying to do something differently, but why, unusually for me -- I'm very supportive -- in this case I didn't feel that was the right approach. And quite apart from the overall logic about the epidemiology and the evidence that we had to date, two things: one is, it would have been a study and it would have required ethics approval, and I didn't consider the logic would actually have given that. So that would be a no-goer.

But actually, there is a very simple point here, which is the rollout of the programme, the vaccination programme in the UK, was unprecedentedly quick. And actually, stepping across, trying to put in variations, if Matt had gone in one direction and another director

of public health in another, very soon what you'd find was the whole of the programme would have been disrupted and we would have been focusing on small groups with much lower risks of mortality rather than covering the whole population very rapidly in a systematic and clinically prioritised way.

So again, broadly very supportive of local variation and seeing things from a community side. In this case, I didn't feel it was the right thing to do for the reasons stated.

Q. Is an important lesson for the future here about the clarity and simplicity of the JCVI approach and how effective that was?

A. Yes, I think we've spoken a lot about communication and you can never do too much communication and there will always be a problem with it somewhere, but for something of this size, in trying to protect a whole population, that simplicity, to my mind, was a really important part of the success of the vaccine rollout.

Q. Before we move on to VTF, lesson learning, one more email, please. And it's INQ000534168.

It's an email chain between Dr Ramsay and others including, eventually, you. And I'll just say at the outset, this a long email chain in relation to information on the NHS website about blood clots and

Dr Ramsay raising the concern that the information there was inaccurate and misleading, and eventually she brings it to your attention, but there is no suggestion that at any stage you were responsible for updating the advice or were responsible for the fact that it may have been misleading.

So you say, or rather Dr Ramsay says, in the email at the second half of that page:

"Dear Jenny, to be aware, I have requested clearance to change NHS website which is currently out of date for information on clots ..."

And this is 2 April 2021, so we're now on the eve of that advice from the JCVI changing on 7 April, we'd heard about this critical period with Jonathan Van-Tam a little earlier. This was the weekend over which there was some correspondence about how this would be communicated to the public.

And Dr Ramsay says:

"... sort of me against DHSC comms -- CMO in between -- sub going to [Secretary of State], long story, but it was never updated after last MHRA press release because we were waiting for updated advice -- dragged on so long it was then too late. Current content links to out of date MHRA story with very bad advice about presenting -- implying you have to have

four days of headache rather than headache starting more than four days after vaccine."

If we just move down the page, please, we can see that -- just go back up, please. There we go. We can see that Dr Ramsay has put an excerpt of the MHRA advice there. And your response at the top of the page:

"Very grateful for update.

"Given the various arguments that have been elaborated", nothing further to add but keep me up to date, essentially.

That can come down from the screen. Thank you.

Are there any lessons we can learn from this, in terms of ensuring that the public is kept up to date about safety and risk? In particular, looking at that email, it seems like a lot of bodies were involved in signing off advice, you've got NHS Digital, the Secretary of State, DHSC comms, MHRA, OCMO, all of these people having a say on how this should be coordinated. Is there -- were there too many cooks in terms of getting this message out there and making sure it was accurate?

A. So normally this would flow very smoothly. I don't think there's a problem. I don't think there's -- I think it's actually important for public safety in this case that there are a lot of cooks. It means, as

there is Mary and me, and CMO, and MHRA, everybody actually trying to keep a focus on what is happening, and interrogating information. So I think the fact that there are lots of eyes looking and trying to get it right is important.

The critical point here was that, if I remember correctly, this was -- there were two elements. One was the actual articulation of the MHRA advice. So whether it had been -- and it's surprising how a change of two or three words will give a different meaning or imply something differently to different people, and I think Dr Ramsay was quite outspoken in her view of how that had been articulated.

So that was one issue, but then it ran in, and there was no suggestion that anybody disagreed that that should be rephrased. That was -- it in the public domain, it wasn't new, it wasn't being kept from the public. The difficulty was in trying to move that at the same time as putting new advice out which built upon it. And I think this was the day before a bank holiday weekend, and I think there's a general consensus from everybody, advice should go out as quickly as possible, people should always have informed consent. But in order to have properly informed consent, everybody who is part of that conversation needs to have the right

evidence and information to enable an individual to have that consent.

And so I think from around this time, there was -- and I could see in the email, which was why I didn't step in actively -- there was a discussion going on across the department and with all of the communications experts, professionals, and JCVI, as to what was the safest and most robust mechanism to get the information out to the public as quickly as possible, and it was agreed by consensus that it would be afterwards. It was simply -- there was a risk actually in the public receiving inaccurate information or half of the information and taking action.

I think also over the weekend, importantly, the advice that did come out later was going to be for the younger age group, and the people who were being vaccinated over the weekend were those in the -- 50 or above.

Q. And we heard similar evidence not long ago from Jonathan Van-Tam.

Let's move to the Vaccine Taskforce, please, and lessons that can be learned in relation to that.

On 1 October 2022, the VTF's functions transitioned to the UKHSA, the Office for Life Sciences, and DHSC. The VTF strategy and analysis, commercial and project

management office, supply management and supply readiness functions were transferred to the UKHSA; is that right?

A. Yes.

Q. Now, we've heard evidence this morning from Alexandra Jones about the manufacturing perspective in terms of vaccines and preparedness for the future. How much does UKHSA take an interest in that, and are you able to talk to us a little bit about where we are in terms of manufacturing capability?

A. So I think technically and logically, we do not have a remit to actually look at that. I think we should. And so the interest is very definitely there. And work which we have undertaken as we've come -- started to come out of the Covid pandemic and looking to prepare for the future, is very much based around the 100 day model. So the UKHSA holds the UK secretariat for the 100 day model, so trying to get diagnostics, therapeutics and vaccines, where possible, within that 100 days, alongside the -- so we're working, if you like, within the UK to try to do the same thing which we are supporting internationally.

So when it comes to things like the capacity to deliver vaccines or manufacture or have substrates available for that production, to my mind those are key

components of any work we might do on surveillance, to detect new pathogens, on genomics, whether we are looking at what vaccines exist already, how we're working on the international front; because the logic is if you don't have the manufacturing capacity, there's no point having done the stuff upfront. So I see this as a whole continuum in which we should be directly involved.

So we have done work recently, probably not to discuss in detail here, around what vaccines and, to some broad extent, what capacity we have. And I think some of the comments colleagues have written in statements I would tend to agree with, which is we do not have, in this country, complete coverage, if you like, of all different technologies that we might require. And we certainly don't have a logic, I think, sitting behind it.

I suppose, from my perspective, the part that's missing is not -- is the connectivity within the Department of Health and the Department for Science, Innovation and Technology, and there is, I think, a Civil Service clunkiness in ensuring that those facilities exist.

And if I give an example, because I know it's been a topic of the Inquiry, whether or not VMIC is the right

thing to be available or should have been sold, or whatever, actually the UKHSA wasn't consulted in any way at all. And I think what this underlies is a wider issue about government internally knowing what skills, capabilities it has at its disposal in order to link them effectively in peacetime and be ready to go in a pandemic.

Q. I was going to ask you about that because, arguably, one of the great benefits of the Vaccine Taskforce was it took this global view of the vaccine journey. It was looking at what was available in terms of the market, procurement, manufacturing capability, and it also advised to a certain extent on deployment as well, limited, but it did play a role. It was that whole vaccine journey that it had a look at and had responsibility for. It sounds like -- and it's taken from your statement -- that that has now been fragmented across departments. Is that something that needs to be fixed?

A. So I -- if I step back, it was very interesting, when the part of the Vaccine Taskforce that came to UKHSA -- and I might say I very voluntarily and actively grabbed them, for the reasons which we are talking about, they came into the UKHSA as the COVID Vaccine Unit, and they came with skills and approach, a way of doing things

which we need to capture for the longer term. That doesn't mean what was happening originally was wrong; it's more horses for courses. We want slow, steady, business as usual for some programmes, and we need the alacrity of the Vaccine Taskforce to be able to go when we need it.

What was very interesting was it took me quite a while -- I stood back and said: what is it that the Vaccine Taskforce has done that makes it different? And tried to look from the eyes of those who had, if you like, come over to UKHSA. Many of the things which they cited as part of the Vaccine Taskforce, quite rightly from their perspectives, were things which I knew were not part of the Vaccine Taskforce. They were existing parts of the system. So, for example, the work which was done at Porton Down -- Porton Down was actually PHE laboratories, but it wasn't recognised that that was a scientific site of excellence to start with.

The registry, I think, was, I think -- and I may be wrong on this one -- based on a registry which existed but actually needed hauling into the 21st century.

There was surveillance systems and genomic systems that were running.

So I think what the Vaccine Taskforce did, there was some very specific things. One is it was contextual, it

did have a very, very clear mandate, with a very significant budget, and a very active leadership, and those were all good. The thing that really pulled it out was the connectivity with the -- with industry, with pharma and biotech, and that is the area which, in UKHSA, I am trying to replicate. And I can go into some of the ways that we're doing that.

Q. Let's look at the relationship with industry through the lens of the cancellation of the Valneva contract.

And just some background to this, September 2021, the UK decided to cancel the vaccine supply contract with Valneva. This vaccine was a whole inactivated virus vaccine technology, a well-established technology for developing effective vaccines. It was the only inactivated whole virus candidate in the VTF portfolio. And you will have seen the concerns that have been raised by a number of Module 4's witnesses in relation to the cancellation of that contract.

Dame Kate Bingham describes the cancellation as "inexplicable" and says that it is a hallmark of the adversarial approach that was taken to industry since she left the Vaccine Taskforce. She says it sent the worst possible message to any future UK industrial investor or life sciences partner. And Dr Clive Dix who, of course, was the interim chair of the taskforce

after Dame Kate Bingham left, is similarly critical.

Now, you were not involved in this decision but you are the UKHSA corporate witness giving evidence here at this module of the Inquiry. What lessons, if any, does the UKHSA draw from the Valneva episode in terms of ensuring positive relationships with industry?

A. So I might take that in reverse because it assumes that the relationships with Valneva and with industry are poor now, and I don't think that is the case. So I have read Dame Kate's statement, and Clive Dix's, and the assumptions that -- I mean, we actually have been working with Valneva directly, the Livingston factory is operational. There are vaccines for chikung-- well, working towards chikungunya, but Japanese encephalitis, I think, being developed there. And I think if you look at the statement from the Valneva representative, I don't know if they're speaking in due course, it actually says that we would work with HMG in the future.

So I think objectively, that is not the case and, in fact, we have -- as UKHSA, we have an invitation to go to the Livingston factory this year and they are part of our forum in the 100 Days Mission work of working within industry. They are one of our partners.

So we should not be too pessimistic, I think. That signals there's a very healthy relationship with

industry.

The issue with the Valneva contract is -- does flag, I think, attention between some of the issues to do with why the taskforce was successful, but also why it starts to fall into difficulties when we get into routine business as usual, so if you back -- I think we've said we back lots of horses, there were seven main contracts, we thought there was a 5% to 10% likelihood success. Actually, if seven of them succeed -- some of them are likely to be better than others -- it is important when JCVI makes its decisions, that those decisions are based on using the best vaccines, the most cost-effective vaccines for the population. And unfortunately, despite all of the various stages of growing things and variants and what have you, by the time we got to the critical point, I think Valneva could not deliver against its contract. It had a contract which it had agreed and the taskforce had agreed, and moreover, the product was not going to be likely under any circumstance in the future, even though it was actually given a conditional authorisation to be put forward as a preferred JCVI-recommended vaccine.

Now, I think to some extent that's inevitable, if you have seven different positive outcomes from trials, and there are two things that I think are important.

One is, I think there's an implication in many of the statements that people don't realise that -- it appears that there is a focus on mRNA vaccines. I have stood up at the World Vaccine Congress in Washington and said very clearly we need to understand and keep working on the different technical modalities because there will be -- horses for courses -- that sometimes some will work, others won't.

In this case I think there was an assumption that those who were perhaps -- it was a fairly standard vaccine platform, well used, that those who were immunosuppressed might actually have a better booster result from this. That was not what happened in practice evidentially, so we couldn't use it for that basis.

And at the end of the day the contract had been agreed. So there was a shared risk with all of these contracts, quite a wide risk, taken by government, but at some point government has a responsibility to the taxpayer and I think that was factored in, but moreover, if the basis was actually to ensure that we onshored that sort of technology, then my view is perhaps it should have been a different sort of contract, because this was a fairly standard contract that needed to be followed through.

And, you know, the decision was taken by -- with ministers' approval and with direct approval by the Chief Secretary of the Treasury, with all of the factors around employment in Scotland and the share price changes and everything else, absolutely understood.

So I think it was a very well-considered decision, albeit clearly not one that Valneva would have wished for at the time.

Q. Let's move now, please, to current preparedness and again, it's only right that I air some of these concerns that have been raised about the state of the UK's preparedness. Dr Dix expresses the view that the UK is now in a weaker position than it was prior to the Covid-19 pandemic, and that we don't have any resilience.

And Sir John Bell in his words, he says, "Someone needs to get a grip" and presumably, it's the UKHSA that is going to be foremost in getting that grip.

Is VDEC, the Vaccine Development and Evaluation Centre, an important part of gripping the situation and ensuring resilience? And if so, could you tell us more about that, please.

A. It is, but it's all the systems around it as well. And I think, without sounding like I'm on a ticket to the Treasury, it is important to understand the resource

which is available. So I think we are getting a grip, it's not just our responsibility either, but the parts that we can do, we are actively tackling within the budget that we have. I mean, our budget now is about 3% of what it was at the time when the Vaccine Taskforce was operating and the pandemic was at its height. So it is a very, very different context that we're working in. But equally, we're not trying to respond to a pandemic at the same time.

So the Vaccine Development and Evaluation Centre is sitting within a whole pathway of work that we're doing. It stems right from the opportunity to contribute to international surveillance. So I noted, for example, Professor Horby's content was suggesting we should be working, for example, with BARDA -- the American research -- we do. We are contracted with them on an indefinite contract with indefinite quantity. So, we are, I think, the only international partner who has that sort of relationship outside of the US.

We are working with their own data outbreak forecasting centre.

We, in the UK, have contributed in leading key parts of the new UK national bio security strategy, that was published in 2023. So that surveillance data allows us then to feed into and start to predict, in the same way

that and contributing directly to WHO work on the R&D, the blueprint for likely pathogens coming up, and we have done some early work -- and VDEC is involved with some of this as well -- on the priority pathogen family for the UK, if you like, and that includes endemic disease and AMR, and we are developing what we've called a tool, an R&D tool, and we have shared some of that. It's not quite finalised yet but it is doing exactly what I think many of the contributors to the Inquiry have said, which is to look ahead to develop products against the pathogen, priority pathogen families, and start to look -- scan where we have vaccines or therapeutics and where there are big gaps.

So the Vaccine Development and Evaluation Centre, what that is doing is contributing both to the surveillance but it is also supporting industry. We do contracted work, but we also start to develop novel ways of looking at things. So we -- sorry, I've had a senior moment here. There's a chip mechanism for trying to construct different ways of looking at tissue, so rather than looking at animal models, looking to see how you can test products and vaccines using different models than previously.

So lots of innovation work and that centre supports trials going right through from pre-clinical right

through to phase I, II and III, and actually was instrumental in supporting many of the trials from the Vaccine Taskforce.

Q. And maybe you can help us with this, please, because UKHSA holds the SRO responsibility for the partnership with Moderna, and this is dealt with in Dr Ramsay's statement. The aim of that partnership is to have a manufacturing facility that will be capable of scaling up to supply up to 250 million doses of mRNA vaccine per year in the event of a future health emergency. There's also the AstraZeneca investment announced in March 2024, a planned investment of 650 million in the research, development and manufacture of vaccines in the UK. I think the plan is to have a site open in Speke in Liverpool.

We heard from Alexandra Jones this morning that those two central planks of preparedness and forward-looking planning, neither of them are open yet. They're not operational. Can you help us with how VDEC, if it does, feeds into the work of these investments from industry and how that may ensure preparedness with the UK?

A. I don't think we should just see VDEC as doing that, the whole organisation feeds in. So if we know what variants are coming, VDEC, the centre is expert in

looking at -- for example in the neutralisation studies, looking to see whether the vaccines stay active against different variants, whether therapeutics are useful. So it's a whole pathway of genomics, of detecting different pathogens out there, and then looking at them in detail, and suggesting working with manufacturers and pharma to understand what the likely future products could be.

So the Moderna Strategic Partnership is really interesting. You say it actually gives us -- because the mRNA technology is likely to be a very rapid turnaround, probably more so than many of the previous ones, it means that instead, potentially, it -- once up and running, we can detect earlier, we work with manufacturers, with vaccine companies, and actually turn that round.

So, for example, I think it will be possible in the future, instead of trying to work out what the next flu variant is going to be in the winter, to actually be able to manufacture in that time period a much more specific vaccine for the seasonal flu, which will have higher effectiveness and actually deliver it within a very short time period.

On the -- so Moderna has built their site at record speed. It is actually just about due to be open very shortly. It should be operating by the end of August,

I think. To be confirmed with them. But one of the exciting things there is that part of that partnership, it's not just about the product, it's about aligning preparedness. So in July last year we did a tabletop exercise with them that said: if we had this pathogen, how would it pan out? In practice, what would happen? And in fact we'd done an even more superficial one at the end of the year before, looking at the new variant of the swine flu that arose in Yorkshire.

So it's much more than just about producing the vaccine. It's how would we connect, how would a manufacturer get the signal, all the things that the Vaccine Taskforce was doing are actually starting to become business as usual.

And I think on another company you haven't mentioned, and it's in the public domain, so it's not commercially sensitive, is Seqirus. So I have visited the Seqirus lab. So there is an advance purchase agreement there for flu but also a purchase of the avian flu vaccine. And again we're working with them, I think on the 28th of next month, to work through how would we do the rapid distribution of that if it was needed.

So these are all practical examples of trying to work with industry and embed both emergency preparedness and emergency response into those relationships so they

are ready to go when we need them.

MR MANSELL: Professor Harries, thank you.

My Lady.

LADY HALLETT: Thank you very much indeed. I don't think there are any questions from Core Participants for you. Most times we meet, you seem to be having to deal with a new outbreak of a new virus, but this time, sadly, we've got the similar viruses we had before.

THE WITNESS: We have.

LADY HALLETT: Anyway, thank you so much for your help, and appreciate the burden we place on organisations like the UKHSA, and so, please, thank your colleagues and the team that you have there for all the help they have provided. Thank you very much indeed.

I can't promise you I won't ask you to help again, sorry.

Very well, 10.00 tomorrow morning, please.

(The witness withdrew)

(4.45 pm)

(The hearing adjourned until 10.00 am the following day)

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