HOUSE OF COMMONS

Science and Technology Committee

Oral evidence: UK Science, Research and Technology Capability and Influence in Global Disease Outbreaks, HC 136

Wednesday 24 February 2021

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Watch the meeting

Members present: Greg Clark (Chair); Aaron Bell; Dawn Butler; Chris Clarkson; Katherine Fletcher; Mark Logan; Rebecca Long Bailey; Carol Monaghan; Graham Stringer; Zarah Sultana.

Questions 2103 - 2189

Witnesses

I: Professor Anthony Harnden, Deputy Chair, Joint Committee on Vaccination and Immunisation, and Professor of Primary Care, University of Oxford; and Professor Wendy Barclay, Head of the Department of Infectious Disease, Imperial College London.

II: Madelaine McTernan, Director General, UK Vaccine Taskforce; Professor Sarah Gilbert, Professor of Vaccinology, University of Oxford; Dr Philip Dormitzer, Vice President and Chief Scientific Officer of Viral Vaccines, Pfizer; Nadhim Zahawi MP, Minister for Covid Vaccine Deployment, Department of Health and Social Care.

Examination of witnesses

Witnesses: Professor Harnden and Professor Barclay.

Q2103 **Chair:** The Science and Technology Committee is today taking evidence on questions around the vaccine programme. In our first panel of witnesses, we will hear from the deputy chair of the Joint Committee on Vaccination and Immunisation and from a leading scientist on the New and Emerging Respiratory Virus Threats Advisory Group, who is a member of SAGE. Then we will hear from one of the leaders of the Oxford vaccine group, the chief scientist responsible for vaccines at Pfizer and the director general of the Government's Vaccine Taskforce.

To kick off, I am very pleased to welcome our first two witnesses this morning. They are Professor Anthony Harnden, who is deputy chair of the JCVI and professor of primary care at the University of Oxford, and Professor Wendy Barclay, who is a virologist, head of the department of infectious disease at Imperial College and a member of NERVTAG and SAGE. Thank you very much for joining us this morning.

I will kick off with some introductory questions to our witnesses, starting with Professor Harnden. From your point of view as deputy chair of the JCVI, would you summarise your latest estimate of the impact that the vaccination programme is having on cases of Covid, on hospital admissions and on deaths from Covid?

Professor Harnden: Yes. Thank you for inviting me, Chair. We are delighted with how the vaccine programme is going so far. One of the overall aims that we had was to save as many lives as quickly as possible. In that, we tried to construct advice that was both simple and deliverable and could be delivered at speed. The early data is incredibly encouraging. We have immunised 18 million people to date with their first dose of vaccine. We have had emerging data from a number of studies showing the effectiveness not only against infection but against hospitalisation and death.

Three studies that are interesting have been published this week. The first is the SIREN study, which followed 40,000 healthcare workers over a 12-month period to investigate reinfection rates and immune response. As part of the study, participants are tested every two weeks, whether or not they have symptoms. Data in the study shows that one dose of the vaccine reduces the risk of catching the infection—both asymptomatic, which is very important, and symptomatic—by more than 70%, rising to 85% after the second dose.

There is routine testing from Public Health England that shows that one dose is about 57% effective. That rises a further 30% after two doses. However, it is important to say that this is in the over-80-year-old age group and that the risk of dying is actually another 50% lower in those who have been infected. Therefore, according to this study, the overall

risk of dying from Covid after one dose of the vaccine is estimated to be about 75% lower.

Moreover, there has been recent data from Public Health Scotland. It is what we call a real-world study, where they looked at the whole population. They showed that the risk of hospitalisation from Covid was 85% with one dose of the Pfizer vaccine and 94% with one dose of the AstraZeneca vaccine.

Q2104 **Chair:** Do you mean a reduction of 85%?

Professor Harnden: Yes. It reduces the risk of hospitalisation by 85% and 94%.

Those are really encouraging data. Of course, they are very early data. It is important to realise that the data from Public Health England, both in its SIREN study and in its community testing study, are based on the Pfizer-BioNTech vaccine, because the Oxford-AstraZeneca vaccine was introduced at a much later stage. The Pfizer-BioNTech vaccine was introduced at the beginning of December, and the Oxford-AstraZeneca at the beginning of January. The data show very encouraging preliminary results, and that the one-dose, delayed-second-dose strategy has been quite effective in reducing deaths very quickly.

Of course, deaths are going down in any case, so it is quite difficult to untangle, but I believe that there are data to suggest that the rate of reduction of deaths in the elderly population is considerably more than the downward bit of the wave in the first wave. They are complicated data and quite difficult to untangle completely, and we will see more data as they emerge, but everything that we have seen so far is very promising indeed.

Q2105 **Chair:** Thank you. We will go into a bit more detail with my colleagues. We know that the AstraZeneca vaccine started late, but what are the latest figures that you have on its impact?

Professor Harnden: The best figures are from the Scottish data, which suggest that it has an impact of 94% on hospitalisations and deaths. The data that we have seen from the AstraZeneca vaccine is very early, but it seems that it is reducing infection rates reasonably well. That is all I can say on the detail at the moment, because it will be published in due course.

Q2106 **Chair:** Before I turn to my colleagues, I will put a similar question to Professor Barclay. From your perspective on NERVTAG and SAGE and as a virologist, you are looking at this very closely. Give us your headline assessment of what we have found so far.

Professor Barclay: What Professor Harnden said is absolutely correct. The vaccines are working remarkably well, bearing in mind the speed with which they have been brought to licensure and rolled out. As a virologist, I would like to add that the vaccines in the UK are being used

in the face of a variant virus, known as the UK variant, or B.1.1.7. We may discuss variants later. There has been some concern that the variant is different from the original strain against which the vaccines were generated, but the good numbers that Professor Harnden has just relayed give us some reassurance, which can be backed up now by laboratory studies, that this variant is still susceptible to the vaccine. Combined with the efficacy that we could have hoped for from clinical trials that were used before the variant emerged, the fact that we are now seeing good numbers in the field with the vaccine says that, at least for this variant, the vaccines remain efficacious and are working well.

Perhaps I could elaborate a little on the doses. There are data that say that there is a difference in the antibody levels generated after one dose versus two, particularly in older people. Whether to go for two doses or not has been a very difficult decision, but we are seeing good evidence in the field that a single dose is having a significant effect. That is very good news.

Chair: We will go into some more detail on each of these points, but I am very grateful for that. Let me turn to my colleagues, starting with Dawn Butler.

Q2107 **Dawn Butler:** I want to pick up on those two points. Thank you for joining us today, Professor Harnden and Professor Barclay. On the dosage, in the beginning there was some concern about the delayed second dose. Pfizer was completely opposed to that because it had not done any testing, but Oxford-AstraZeneca had done some testing. It showed that, with the AZ vaccine, the efficacy rate between the first dose and the second dose actually increased. I wonder why we focused on Pfizer and not on AstraZeneca, given that it had done the testing. Professor Barclay, do you want to go first on that?

Professor Barclay: Clearly, the reason was that the roll-out of the AstraZeneca vaccine started later. There is not enough data yet to reveal as much rich information about what is going on in people who have received the AstraZeneca. I do not think that there is any reason other than that. I expect more data to come through soon.

Dawn Butler: Professor Harnden, I saw you put your hand up.

Professor Harnden: Can I echo that? This is not shielding data at all. We just do not have the data, because it started in January. What was encouraging from the Oxford-AstraZeneca trial data was that it seemed that the longer you left the second dose, the better and the longer term the protection that you got from the vaccine. Not only that, but the Oxford-AstraZeneca trial data was impressive in terms of protection against severe disease, hospitalisation and death. In fact, some of the data suggested that it was up to 100% effective in that. We are therefore quite confident that this will not only protect against severe disease, but as a longer-term strategy those individuals may end up getting better and longer-term protection from a delayed second dose. We are not so

sure about that with the Pfizer vaccine, I must say, but we are much surer about it with the AstraZeneca vaccine.

Q2108 **Dawn Butler:** In percentage terms, what is the likelihood that once everybody is vaccinated you will have to revaccinate everybody because of the variant changes?

Professor Barclay: Likelihood is a very difficult question to answer in percentage terms. We still do not know enough about whether the current vaccines will work against the virus variants that are emerging around the world, and how and when we should update vaccines to incorporate new strains. That will depend on many things, not just the antigenic distance, how different the variants are, but which of them rise to the surface and are transmitted more quickly or readily than others. It is quite a complicated answer. I do not think that I could put a percentage likelihood on that at all at the moment. I am sorry.

Professor Harnden: It is important to give you a bit of background. Potentially, we have four types of vaccines that will be available. At the moment, we have the two vaccines we are using: the Pfizer mRNA vaccine and the Oxford-AstraZeneca vaccine, which is a viral vector platform vaccine. We have Novavax in trials at the moment. That shows some better efficacy against the South African variant and is a protein subunit vaccine. We have the Valneva vaccine, which we have ordered. We have not seen the data on that yet, but it is a whole-cell inactivated vaccine. Potentially, some of those other vaccines may offer wider protection, other than with spike protein. That is really important, because if the spike protein mutates readily, which is what we are seeing at the moment, offering protection with a wider vaccine might be a better strategy. We do not know that at the moment, but there are possibilities with that.

Q2109 **Dawn Butler:** That is interesting. People who are vaccinated later, if they use a different vaccine, might be better protected, in a way.

Professor Harnden: One of the things we are very interested in at JCVI is the data on mixed vaccine schedules. At the moment, our advice is clear: you should have the same type of vaccine for the second vaccine as for the first vaccine. There is no theoretical reason why you should not mix them. There are studies going on at the moment, led by Matthew Snape in Oxford, looking at mixed vaccine schedules. It may be that a mixed vaccine schedule offers you better and broader protection. We will be very interested to see the results of those studies, because we think that, potentially, a way forward may be that we mix the vaccines and tackle the emerging variants by that means.

Q2110 **Dawn Butler:** That is fascinating. What role will antibody testing play going forward?

Professor Harnden: That is probably a better question for Professor Barclay, because she is involved in some of the REACT studies that are going on at University College at the moment. Clearly, it is important to

know about antibodies. The one thing that we do not really know is what the correlate of protection is. That is very difficult. In simple immunological terms, you have a thing called neutralising antibodies, but you also have T-cell memory. We do not know what the balance between the two is in terms of importance for this particular virus. We also do not know what level of neutralising antibodies you need to offer a correlate of protection. Hopefully, that sort of information will come as we roll out the vaccines and see further immunological studies. Professor Barclay probably has more expertise in that area.

Q2111 **Dawn Butler:** Professor Barclay, what is the role of antibody testing?

Professor Barclay: At the moment, many people are working on the basis that a positive antibody test above a certain threshold can be used as a surrogate correlate of protection. Some of the studies that have been performed in experimental settings, for example, indicate that. In general, where vaccines are working well, you can measure antibodies in the blood, and that correlates with protection in the field, but a lot more work needs to be done to set that level. How much antibody does a person need to protect them? As Professor Harnden said, what other aspects of the immune system can help?

The problem with the other parts of the immune system is that they are a lot more difficult to measure, whereas antibodies are fairly easy to measure. You can take a simple blood test or even, sometimes, other body fluids, such as saliva, and find antibodies that can potentially give you an indication of whether a person is likely to be protected. There is a big piece of work going forward to try to understand how to correlate protection with antibody level.

Going to the variants, that becomes important for understanding how big the gap would need to be for us to think that a vaccine would stop working against a variant. Tests of that nature can be done and may indicate the necessity to update vaccines, based on the mutation that Professor Harnden was describing. We are not there yet, I am afraid.

One of the problems is that lots of different scientific groups and Government groups around the world measure antibodies using many different platforms. There are commercial platforms and in-house, in-laboratory platforms. The biological assays, which are probably the most relevant assays, are quite difficult to do and require special labs at high containment, working with live virus, so a lot of other assays are used. We need a good standardisation process so that levels of antibody measured in one place can be correlated, drawn across and translated, so that everyone understands what that means.

Q2112 **Dawn Butler:** That makes sense. The SAGE meetings from early January suggested that the group did not readily receive all the health data that it needed on vaccination uptake, the Government roll-out plan and so on. Do you have enough data?

Professor Barclay: I chair a subgroup called the vaccine science co-ordination group, which was set up partly with that issue in mind, to make sure that as vaccines were rolled out in the UK everyone who can contribute to the science behind the roll-out had access to data. We have met three times. The group combines people working on behaviour, hesitancy, modelling, clinical science, virology and immunology. The communication is good. I have confirmed that, for example, all the modellers are completely comfortable that they are now receiving the data that they need to do the modelling that they are going to do.

Q2113 **Dawn Butler:** Cool. There is no lag or delay. You have the data that you need on time, with no problems.

Professor Barclay: Yes.

Dawn Butler: Brilliant. Thank you very much.

Q2114 **Chair:** On that point, Professor Barclay, does the modelling behind the road map that was released on Monday reflect the up-to-date evidence of the efficacy of the vaccines and the pace of roll-out?

Professor Barclay: I believe it does. I checked specifically with the SPI-M group and secretariat that they had all the data and information that they needed. I am not a member of SPI-M, but before I came to give evidence here today I reached out to the SPI-M secretariat to check that they had received everything they needed.

Q2115 **Chair:** Do you know, through the inspection of their work, whether they have based it on the most up-to-date information?

Professor Barclay: I have not seen their background workings, so I do not know that. I could ask them and bring that back.

Q2116 **Chair:** Okay. We may come on to that.

One other matter arising concerns the two doses. We understand the public health benefits of vaccinating more people more quickly by having a delayed second dose. What do we know about the efficacy for the individual? Does that have an appreciable impact on it?

Professor Barclay: Are you asking about one dose versus two doses?

Q2117 **Chair:** The timing of the dose. In other words, if you have the second dose at 12 weeks, rather than three or four weeks, we completely understand that that is good for public health reasons, but does it make a difference to the ultimate efficacy of the inoculation you have had?

Professor Barclay: We do not have information on that, because the clinical trials did not test for it. We have data, which was seen by JCVI very early on, about the antibody responses, from the Oxford-AstraZeneca vaccine in particular. In fact, the overall antibody response was better in people who had a delayed second dose, compared with the three to four-week second dose. Therefore, in the longer term, it may well be that protection is better by delaying the second dose. That sort of

analysis has not been carried out by Pfizer, for example, as a vaccine manufacturer, and is not available, but clearly work looking at that at the moment in the UK in the real world will reveal whether or not that is also the case for the Pfizer vaccine.

Q2118 **Mark Logan:** Good morning, Professor Harnden and Professor Barclay. My question relates to something that my colleague Dawn asked about in relation to vaccination. This time around, it is taking us about six to seven months to roll out the vaccine to most of the adult population. Does that mean that, going forward, it will be different from the flu jab, which usually we have for just two or three months during the winter? Do you expect the Covid-19 vaccines to be an ongoing thing all year round?

Professor Harnden: That is a very difficult thing to predict. Clearly, we are in the middle of a pandemic at the moment, and the priority is to roll out to the whole of the adult population as quickly as possible. That has been very successful so far and will continue to be successful, provided that we keep the programme simple and deliverable.

Looking forward, what happens with booster vaccinations is something that JCVI will consider very carefully. It depends on the epidemiology of the coronavirus, both in the UK and worldwide, at that point, and the emergence of variants. It is likely that this is a winter illness; we know that it is a virus that likes indoors rather than outdoors, so it may become a cyclical winter phenomenon and we may have to immunise every year with a booster dose of the coronavirus vaccine tailored to the variant strains circulating at the time. That is all speculation at the moment. It is something we will look at very carefully over the next few months, because it has implications for the autumn and winter of 2021.

Professor Barclay: I agree with Professor Harnden. The most likely scenario is that a combination vaccine would be given in the future that would combine influenza with an updated SARS-CoV-2, but that is crystal ball gazing, to an extent. The next year will tell us much more about how the epidemiology of this new coronavirus will settle down, how quickly it might mutate and necessitate vaccine updates, and how long the immunity from the current vaccines that we are going to roll out to a large proportion of the UK population will last and, therefore, how necessary it will be to give boosters. There are a lot of unanswered questions. We are in new territory.

Q2119 **Mark Logan:** Professor Barclay, with your specialism in mind, at this point in time do you envisage us emphasising the same groups of people who are encouraged to take the flu vaccination every year?

Professor Barclay: Yes. It is clear that the people at most risk of severe disease, hospitalisation and death from coronavirus are the elderly. That is the same group, in general, as for influenza. There are other at-risk groups. Whether they will be exactly the same at-risk groups that we have highlighted at the moment for influenza and SARS, I am not sure,

but the largest population who are at risk are the elderly, and those are the people who will need protecting by vaccination going forward.

Q2120 **Mark Logan:** Professor Harnden, how should we prioritise if we find that the vaccine reduces transmission? Should there be a change in prioritisation groups?

Professor Harnden: Clearly, we do not have that information yet. We do not fully understand who the main transmitters in the population are.

There are two parts to that question. We would have to demonstrate that the vaccines prevent transmission. It is starting to look promising, because of the reduction of asymptomatic cases in the SIREN study and the early data from the Oxford-AstraZeneca trial, but we are still not absolutely clear who is transmitting. It is a very complicated epidemiological pattern, and it is very difficult to say. You are absolutely right in the assumption that if we found that the vaccines prevented transmission, and that older children, for instance, were transmitting more infections, a strategy of immunising older children to protect the elderly—much as we do with the influenza vaccine in younger children—with the so-called indirect protection that that offers, would be an interesting potential strategy.

I emphasise that this is not the same as influenza. It has some similarities, but the illness is very different. It is not just a respiratory illness; it is a vascular illness. Age seems to be a predominant risk factor, but there are many other risk factors. Social deprivation is one of them. Obesity is another. Being from an ethnic minority is another. There are lots of other risk factors that we would need to consider rather than just making it exactly the same as the so-called influenza programme. All those factors will be taken into consideration if we decide to do a booster vaccine programme. What are the current risk factors that we know at that stage, and what are the issues about transmission?

Q2121 **Mark Logan:** I have one more question, as my colleague Aaron Bell might have something related to vaccination in children and transmission. Professor Harnden, how have local teams on the ground been exercising the flexibility that has been provided for by the JCVI?

Professor Harnden: That is not a JCVI thing. It is our wish, and it is an NHS England and devolved nations operational issue. My understanding is that they are well aware, as we are, of the variation in uptake between different communities, and are working very hard both at outreach to those communities and at making vaccines accessible for them. I believe that they have quite granular data on certain areas of London, for example, where they may well want to put extra vaccination centres in pharmacies in between mass vaccination surgery sites, or within communities, in places such as mosques and other religious communities. They are well aware that we are doing brilliantly on overall coverage, but there are pockets where we are not doing as well and we need to get

better at that. My understanding is that the NHS is on to this and is looking at it very carefully. We will monitor that data on the JCVI.

Chair: Thank you. We will come to Aaron in a couple of minutes. We now have Zarah Sultana.

Q2122 **Zarah Sultana:** Professor Harnden, figures show that people with a learning disability are up to six times more likely to die of coronavirus. Currently, people who have severe or profound learning disabilities have been placed in priority group 6 for a vaccine. In Scotland, Nicola Sturgeon said that it would be expanded to those with mild and moderate learning disabilities. Has Scotland got it right?

Professor Harnden: This is a really interesting but quite complicated question. The ONS data included, in terms of risk, all those with Down's syndrome. We know from the data that Down's syndrome is a significant risk factor for severity of Covid. The reason for that might well be that people with Down's syndrome have a biological age greater than their chronological age. We do not know that for certain, but it may be. The risk for Down's syndrome is probably reflected in the fact that a 50-year-old man with Down's syndrome is, from a Covid risk point of view, behaving like a 70-year-old. We put all Down's syndrome straightaway into group 4, and they should have all been offered immunisation by now. When we looked at the data taking out Down's syndrome, and we looked at QCovid data on that, it was apparent that the overall risk in learning disabilities was approximately one and a half times the population. That group included the whole spectrum of learning disabilities.

It was our decision on JCVI that the risk was probably reflected by those with more severe learning disabilities, and that is the reason why we put those into group 6, alongside all those in residential shared accommodation who had learning disabilities, because of their exposure risk. There has been a lot of controversy about this area, and I fully understand that. We want to be absolutely clear, and we are going to make another announcement very soon—in fact, it may even be while this Committee is taking place—that all those on the learning disability register, as registered by their GPs, should be eligible for immunisation now, and all those in shared living accommodation should be immunised. This will include about another 150,000 individuals with learning disabilities.

However, there is no evidence at all that the individual risk for someone with very mild learning disabilities is any different from that for someone else of their age. I am personally very concerned about this issue, as is JCVI, because people with learning disabilities are a hugely disadvantaged sector of our society, and I implore any GPs who are immunising within group 6 now to reach out to those they know have learning disabilities and prioritise them in group 6.

Q2123 **Zarah Sultana:** Thank you for your response, Professor. Some CCGs have already deviated from national guidance and have been prioritising

all patients with learning disabilities. Should it have been left to CCGs and GPs, considering the severity of learning disability conditions? Is it usually noted on GP records, and might it lead to a postcode lottery?

Professor Harnden: The health service is a fantastic organisation, but there are inequalities in the health service, as we all know. We wanted to give the guidance in a very loose sort of way because we realised that there would be operational difficulties on the ground, so our guidance was quite clear that, operationally, people could interpret it how they wanted, but that we felt that the more severe end of the spectrum of learning disabilities is where the risk was.

It is a bit like the asthma analogy, if I might bring that in. Asthma is a continuum, as is learning disability. The higher end of asthma risk is risk for Covid, as is the higher end of learning disability, whereas the lower end of asthma and the lower end of learning disability are no more at risk than the general population. It is where you draw the line, and it is very difficult to define. On JCVI, we felt that saying that those with the more severe learning difficulties should be immunised within group 6 and leaving it up to people at operational level to interpret how they defined more severe learning difficulties was the most straightforward way of doing it. I accept that it has led to some inequalities throughout the country, which is why I am saying publicly that all those on the learning disability register should be immunised now.

Q2124 **Zarah Sultana:** I have a question about who makes up the JCVI. Do you have people who work in the learning disabilities background and who are professionals in that sector? Is there representation of people from marginalised backgrounds in general?

Professor Harnden: Although I am a professor of primary care in Oxford, I am a working GP. In many ways, the committee consists of a lot of very expert vaccinologists, immunologists, health economists and mathematical modellers, but it includes me, a GP who understands some of these issues, and it includes a nurse representative who is understanding of the issues. Like every committee, we could do with being more diverse—I accept that—but the committee as a whole functions very well with a blend of people with a science background and understanding of science, but also understanding the practicalities and the issues on the ground.

Q2125 **Zarah Sultana:** Schools have been described by the Prime Minister as vectors of transmission, and the National Education Union analysis of DFE stats on the impact of the coronavirus on the school workforce found that the rate of infection among primary school teachers and secondary school teachers is 1.9 times higher than in the general population. With planned reopening of schools in the next few weeks—phased returns in the devolved Administrations, but a big bang reopening in England—did the JCVI consider vaccinating teaching staff ahead of the reopenings?

Professor Harnden: We have had a look at this data for phase 2 of our programme. We have been quite clear that phase 1 of the programme is our first nine priority groups, which included 99% of all hospital deaths. Teachers form quite a large part of that group, because any teacher over the age of 50 or any teacher with an underlying health condition is eligible for vaccination as part of phase 1. We are looking at phase 2 at the moment, and we have made some deliberations that will go to Government. It is important that I state that we are an advisory committee; we do not set policy. We look at the data, and we looked at the data very carefully on this.

The Office for National Statistics data, particularly the schools infection survey data, does not suggest that teachers are any more at risk of acquiring infections from coronavirus than any other member of the population. In fact, there are other occupation groups that are usually more at risk than teachers. In terms of infection and in terms of disease, there is not a strong scientific argument to immunise teachers, outside those aged 50 or those with underlying health conditions. Then it becomes a political decision, which is why JCVI decided that we will be steering our advice based on science, and it will be up to you as politicians to decide on what you do in terms of teachers.

One of the key reasons that the programme has been so successful is that it has been simple, it has been deliverable, it has been rolled out very quickly, and people understand it. If you start picking out certain groups, it will make it more complicated, and the risk of doing that is slowing the programme down. If you slow the programme down, it may be that some people will be exposed to virus and actually suffer harm who would not have otherwise. These are difficult decisions. There is a certain amount of equity and fairness because we know that people who work, for example, in processing plants where they are in closed environments without ventilation, with a great amount of noise and having to shout, are quite a lot more at risk than teachers who, with the children, are wearing masks and have adequate ventilation. These are difficult decisions, but, ultimately, we need to stick with the science, and you politicians need to decide the other things.

Q2126 **Zarah Sultana:** In Parliament, Ministers often point to the JCVI when we question them about the priority list. The buck lies with politicians, but it is interesting how it is ping-ponged when we ask those questions in Parliament. When are we likely to see the priority list for phase 2 from the JCVI?

Professor Harnden: We have decided it. It is with Ministers at the moment.

Q2127 **Zarah Sultana:** They have it at the moment. Is that correct?

Professor Harnden: Yes.

Zarah Sultana: Thank you very much.

Q2128 **Chair:** Returning to the point about people with learning disabilities, Professor Harnden, your message is that anyone, or the family and friends of those with learning disabilities, should now come forward for vaccination at the centres, or they can expect to be contacted by their GP. Have I understood that correctly?

Professor Harnden: No, you have not understood that completely correctly. I have not said friends and family. I said individuals with learning disabilities that are on the GP register as severe learning disabilities should be called up.

Q2129 **Chair:** To be clear, Professor Harnden, when I mentioned friends and family, I was talking about people listening to this who may be friends and family of people with learning disabilities. They should take the message that those people should now come forward for a vaccine. Is that right?

Professor Harnden: I am sorry, I confused you. We have carers in group 6 as well, which has caused some confusion, and I can talk about that later.

It is really important that any of those with severe learning disabilities on the GP register—I am not talking about mild learning disabilities; it is severe learning disabilities—or those who are living in shared accommodation or residential accommodation should be immunised now as a priority.

Q2130 **Chair:** Given your experience as a GP, Professor Harnden, are you confident that all of the people in that category will be registered? Does the register miss people who may be at risk and, therefore, ought to be vaccinated?

Professor Harnden: It is a perceptive question. One of the reasons we did not put that on the list in the first place and left it to be operationalised by calling them severe and profound learning disabilities is that we were worried that the GP learning disability register would not reflect all those with severe and profound learning disabilities.

We want to try to capture in whatever way we can all those with severe and profound learning disabilities, but we do not want everybody who has a relative with a mild learning disability to come forward to be vaccinated now. That would cause problems because there are over 1.5 million of those individuals. It is important that we try to define who has severe and profound learning disability, and saying those on a GP learning disability register is another way of doing it, but not a comprehensive way of doing it.

Q2131 **Chair:** If people are on the GP register, that is clear. What would your advice be to your fellow GPs about contacting people who are not on that register but whom they may know through their dealings with them over time?

Professor Harnden: I hope that they would be on the register because, if they knew about those individuals, the GP would have coded them as having learning disabilities. It is only if they have not been coded properly that it would be more than appropriate to reach out to them. I emphasise that we are talking about the severe end of the learning disability spectrum. What I do not want is lots of families who are rightly concerned about their relatives with a mild learning disability to start banging at the door of their GP and overwhelming them. It is really important that we stick with the severe end of the spectrum.

Q2132 **Chair:** Will you publish some very clear guidance on this because, as you say, if we are talking about a spectrum, it is very difficult to distinguish one person from another? There will be a lot of concern on the part of people who either have learning disabilities or who love and care for them. Will you put out some clear guidance today so that they can refer to that to inform themselves?

Professor Harnden: I can go back and ask our chairman to write a letter to the Department of Health to outline what our views are on it.

Chair: Thank you, Professor Harnden.

Q2133 **Graham Stringer:** Good morning, Professor Harnden. Can you explain something that has been puzzling me? You said that, when the top nine groups are vaccinated, that covers about 90% of the categories of people who have died because of Covid. The Imperial modelling group seems to have told us that, if we come out of lockdown too soon, tens of thousands more people will die. I cannot correlate those two factors. Can you help?

Professor Harnden: No. 1, vaccines are not 100% effective. People who are vaccinated still have risk of infection and severe infections. No. 2 is that the data were based mainly on wave 1 because, when we decided phase 1, it was based on wave 1 data. We know that there are pockets of new variants. It is more than possible that, with transmission in the community, other people will get exposed, and that will lead to more deaths. It is important to remember that it is a two-pronged process. Vaccination is incredibly successful, but it is only one part of the process.

The other part, which is equally important, is the social distancing and the lockdown. Coming out of lockdown slower enables us to get more people vaccinated, and it reduces the transmission risk. When viruses transmit—Professor Barclay will know more about this than me—they have much more propensity to mutate. What we do not want is new variants emerging, or existing variants that are in smaller numbers in the community transmitting readily so that we get vaccine escape. Vaccines are not 100% effective, and, therefore, you will get further deaths if you get higher infection rates. You will get higher infection rates if you come out of lockdown too quickly.

Q2134 **Graham Stringer:** There will not be an end to deaths by Covid because of vaccination. Are you saying that the modelling that has been done that has given those projections has built into it more dangerous variants of

the virus, rather than looking at the efficacy of vaccination against the groups who are most vulnerable to death if they catch the virus?

Professor Harnden: I am not privy to that particular modelling information, because it comes more into the SAGE remit than the JCVI remit. Clearly, there is no doubt that we will get further deaths if we see much higher infection rates. You have to remember that the immunisation groups are based on risk. Nobody has nil risk. Even young people have risk.

The statistics are quite startling. If you had 100% vaccine effectiveness, you would have to immunise 20 care home residents to prevent one death, whereas, under 60, it would be something like 60,000. There will still be deaths in the younger communities. Nobody has nil risk. That is really important to realise. You need to keep infection rates down, otherwise it becomes more prevalent too quickly. You will have a smaller proportion of people dying, but they will be larger numbers because you will have more infections.

Q2135 **Graham Stringer:** That is helpful, thank you. The numbers of people being vaccinated in the over-70s and over-80s group have been very high indeed. There has been very good take-up. International experience seems to indicate that, as you go down the age groups, take-up, for different reasons, is lower. Do you expect that to happen in this country? Are there any steps that Government, the NHS, and GPs could take to increase uptake if indeed that happens?

Professor Harnden: As you are probably aware, I have been on media on a regular basis, trying to—

Graham Stringer: I have your quotes in front of me.

Professor Harnden: I have been trying to give people confidence in the vaccination programme and the safety of the vaccines. It is important to remember that this is not influenza. The perception that it is a mild illness that just affects older people is not true. There are many younger people throughout society who have been incredibly affected by this virus and have had symptoms. We have not even begun to talk about symptoms like long Covid, which younger people can get. It is important that clear messages come out from not only JCVI but the health professional community, who will lead by example by being immunised and who will communicate a simple and clear message about the importance of the vaccination and the safety of the vaccination.

People are concerned about safety, but as we roll out millions and millions of doses we become even more confident about the safety of the vaccines. We know from previous vaccine history that most of the major safety signals for a vaccine come out within the first three months, and we are not seeing those safety signals at the moment. It is a combination of communication, leading by example, reassurance about safety, and

information to be absolutely clear that this is not a benign illness. It is a very nasty virus.

Another issue is that young people like travelling, and it is almost inevitable that countries outside the UK, independent of what the UK decides, will want vaccine passports. Those young people will need vaccination certificates to be able to travel to some parts of the world that they want to go to.

Q2136 **Graham Stringer:** It shocks me that two specific groups of people whose take-up of both Covid vaccinations and flu vaccinations is not close to 100% are clinicians working in hospitals and people working in care homes. There has been a study in Leicestershire showing rather low take-up among doctors. When this Committee did an investigation into flu, again, the take-up of flu vaccination was low. That means that clinicians and people working in care homes could be killing the people in their care and their patients. Should it be a professional qualification or a professional standard that people working in these situations have to have the vaccinations?

Professor Harnden: It is a very interesting point. Surgeons require a hepatitis B vaccine certification to operate so that they do not transmit hepatitis B to their patients. We are not quite there yet with Covid. We know from the Covid vaccinations—I do not know where your figures come from—that doctors have one of the highest uptakes of the vaccine.

Q2137 **Graham Stringer:** There was a particular study done in Leicestershire.

Professor Harnden: The national data seems to suggest that it is over 90% of doctors and 80% of nurses. It is 66% of care home staff, where we have a problem of vaccine coverage. I think what you are saying is occupational compulsory vaccination. We have never gone along the route of compulsory vaccination in this country. It is something that we would need to debate more at a political level. There could be an argument. I agree that if these vaccines prevent transmission—one of the rationales for putting frontline healthcare workers in priority group 2 was not only their exposure risk, but the fact that they were treating lots of vulnerable, older people who could potentially get the virus from them—that would need some consideration. I do not know where we are going with that at the moment. It certainly would not be a JCVI decision to make it compulsory. It is something that may be a political consideration.

Q2138 **Graham Stringer:** It is clearly a Government decision. I was interested in your views.

For cultural reasons, some religious groups and ethnic groups have very low take-up of the vaccine. Do you have any particular advice to give to Government on how take-up among those groups could be increased?

Professor Harnden: You need to know which those groups are, and you need to work out ways to reach out to them. That may be through community leaders, local clinicians and faith leaders, and through

information that is given readily and repeatedly. I spoke to the Sikh Council for two and a half hours, and reassured a number of people listening from that community about the safety of the vaccines. I spoke about the misinformation that a lot of communities receive through social media about vaccine effects and the mistrust of information that comes from authoritative sources. That is where faith leaders and local community leaders come in. It is a two-pronged effort—from us nationally to explain, but also locally to provide reassurance and easy access.

Chair: The next questions are from Aaron Bell and Chris Clarkson. Could we keep answers as short as possible please, as we are coming to the end of our session?

Q2139 **Aaron Bell:** I will try to be brief. I want to pick up on a couple of bits from the earlier answers that the witnesses gave. Professor Harnden, the public health imperative is to stretch out the supply we have to protect people as quickly as possible. What work has the JCVI done on some of the ideas that are being floated or used elsewhere in the world, such as only giving one dose to people who have had coronavirus or perhaps only giving half-doses on the basis that the protection seems to be fairly similar from half-doses of Pfizer? That would, at a stroke, double the supply capacity.

Professor Harnden: That is interesting information. We have not decided that, because we were not secure enough about not giving the second dose; we think it is important for longer-term protection. However, the issue about people who have been previously exposed is interesting. I keep going back to this: the reason why we have been so successful is that we have made it simple and easily deliverable. If you have to test people to see whether they have Covid antibodies before you give them the immunisation, you immediately complicate the immunisation programme considerably, and, therefore, reduce the speed of roll-out. It has been our assessment that, although this is a very interesting scientific question and it may well be right that you only need one dose initially if you have already been primed by natural infection, we do not think that, practically, at the moment, that is a very straightforward way of delivering it, and we do not think that we have enough evidence to say that it is the right thing to do.

In terms of the half-dose, the half-dose data that came from Oxford-AstraZeneca was actually, we think, complicated by the fact that those who received the half-dose initially had a delayed second dose. Maybe it was the delayed second dose that was giving the protection rather than the half-dose. In fact, the MHRA licensed the vaccine on the basis of two standard doses. I do not think that will be helpful.

The third point that is really important is that vaccinating capacity is not the problem. Supply is the problem. I agree that that would be more in favour of the argument for splitting the doses, but it would be against regulatory approval. We do not have the data to suggest that, at the

moment, that would be the right way forward, but it may be a future option.

Q2140 **Aaron Bell:** Mark Logan referred earlier to vaccinating children. Professor John Edmunds of SAGE said at the weekend that there is an argument for turning to children as fast as we can, although obviously we do not have trial data yet. Professor Barclay, do you agree with that assessment? Professor Harnden, has the JCVI done any preparatory work on when children would be prioritised if they get the safety data that we need?

Professor Barclay: I agree with the fact that we need to consider vaccinating children, but I am not aware of any trials or data about the efficacy of the vaccines in children and what they do. I would want to see some trial data first to reassure me that it was a good thing to do. It hinges on knowing with surety that the vaccines are preventing transmission. We are beginning to see some good signals that suggest that is the case, because the number of infections picked up, for example, in the SIREN study is lower in vaccinated healthcare workers. If you reduce the number of infected people, there should be less transmission.

That is a very early signal on one particular cohort, and we need a bit more data before we are assured that the vaccine policy, which was originally designed to reduce severity and protect people from severe illness, hospitalisation and death, should shift in quite a major way to begin to think about interrupting transmission. It is a good idea, and we need to start putting things in place, like those trials and studies, to affirm that that is what we would do. It is perhaps a more long-term option than what we are currently engaged with.

Q2141 **Aaron Bell:** Professor Harnden, has the JCVI done any prep work?

Professor Harnden: We are waiting for the results of the trials. The key thing about all these vaccines is that we have to demonstrate safety. From an ethical, scientific or any other perspective, we cannot start immunising children for the indirect protection of adults, which is what we would be doing, because we know it is a much more benign illness in children, until we are absolutely sure that it is safe and that it reduces transmission.

Q2142 **Aaron Bell:** I quite agree. We need to get the trial data in first. On new variants, Professor Barclay, we discussed this a little bit earlier, but there seem to be some suggestions that these vaccines may be less effective against the new variants, particularly the South African and Brazilian variants and those with the same mutation. Some work will need to be done on that. Do you anticipate that future vaccines will have multiple strains of coronavirus in them, in a similar way to flu? In your assessment, when would be the right time to update and administer those vaccines assuming the virus continues to mutate?

Professor Barclay: We can clearly see that some of the variant strains, including the South African and the Brazil P1 and P2 variants, are less

readily neutralised by antibodies raised against the old vaccines. There are some data from trials carried out in South Africa, particularly with the Oxford-AstraZeneca vaccine, where the efficacy against mild and moderate illness was not good. On the other hand, as has been mentioned, there are other vaccines like Novavax that have been trialled in South Africa where the efficacy was still decreased in comparison to trials in the UK but was not as dramatically down as to cause worry.

Taking all of that together, going forward we will need to update vaccines, and the choice of strain will be difficult. As you point out, one way to get around having to choose a single strain and then worry about what other variants might be introduced from other parts of the world, is perhaps having multivalent vaccines that cover several different strains. I am confident that this is being thought about by the Vaccine Taskforce, by vaccination manufacturers and many other scientists around the world.

We do not yet know that mixing the vaccines together will work efficaciously. Studies and trials will need to be done to show that. It may be that by analysing lots of different strains we find that one can induce cross-reaction with others. As you know, there is a particular amino acid change in one part that is common to many of the escape variants, and it may be that by having a vaccine with that change in it we might get cross-neutralisation. We do not necessarily have to go for multiple strains of the vaccine, but it may be an answer.

Q2143 **Aaron Bell:** This is probably a larger piece of work for the Committee, but I was very struck by the idea that we actually had vaccines against coronavirus almost developed as soon as last January. We had to go through all the processes of safety trials and so on. Is it your understanding that it could be speeded up in the future, and should it be speeded up? It has been incredibly fast by normal standards, but given the cost of lockdown and the cost to the whole world and the lives lost, it seems to me that there is a case for us re-evaluating on a global scale how we develop vaccines and how we can get new vaccines for new pandemics out more quickly. Would you agree with that?

Professor Barclay: Yes, we have done incredibly well. It has been very quick. There are two aspects to your question. One is that, if we think about updating Covid vaccines, there will need to be a conversation with the regulatory bodies—MHRA, EMA and so on—about a fast-track process similar to what is used for flu, to update vaccines based on a much shorter period, so that we do not need to go through a full-blown clinical trial every time there is a strain change. That should be straightforward, but I do not think the pathway is sorted out with those regulatory bodies, and there is an urgent need, in my opinion, to make sure that it is smooth and fast.

The whole vaccine field has been revolutionised by this experience. It is about conversations with regulatory bodies about what has been learned from the current very fast delivery and how we can trim that even more,

but at the same time emphasising safety. There is a limit to how quickly you can go, because you must perform safety studies properly.

Aaron Bell: Thank you both. That has been very helpful.

Q2144 **Chris Clarkson:** I want to ask about pharmaceutical interventions. Modelling from Imperial College suggests that, to start lifting restrictions from next month, we need to average around 3 million doses a week. Some sources suggest even higher numbers, up to 6 million. How feasible and sustainable is that? How much should we allow the rate of vaccination to guide our response to lifting restrictions?

Professor Harnden: All of those are feasible. We have a good vaccinating capacity. The question is about supply. If we have enough supply, we will be able to vaccinate.

I refer to my original answer about vaccination not being the only way out of this pandemic. We must go slowly, and the reason is that we want to keep transmission down and we want to keep infection rates down. If we do not, we will lose all the benefits of the vaccines that we have acquired in the last few months and will continue to acquire, because we will give the environment for new variant strains to emerge and have vaccine escape. It is really important that we do not rush it, so I welcome the gradual unlocking.

Professor Barclay: The question refers more to operational and vaccine supply issues than any wish not to go faster with vaccine roll-out. I absolutely agree that there is more to it than just vaccines. Vaccine will give us confidence that we are protecting the vulnerable people in the community, but we absolutely have to get the amount of virus in our community down, otherwise the virus will come back, and that gives it the opportunity to escape within our own country.

Chris Clarkson: Gently does it. Thank you very much.

Q2145 **Chair:** Professor Barclay, you are a very renowned virologist. Looking at the new variants that emerge from time to time, and combining that with the vaccines, in your experience, looking over the year ahead, how would you rate the chances of a variant emerging for which the current vaccines will not have a significant effect? Is that almost unthinkable or is it a significant risk?

Professor Barclay: The evidence shows us that some of the variants are less well controlled by the vaccines. Vaccines work in a combination of ways. First of all, they produce antibodies with a polyclonal response, which see lots of different parts of the virus; even the spike protein, which the vaccines home in on, has several different patches of vulnerability in terms of the polyclonal response—all the different antibodies that a person makes when they get immunised—to different parts of that protein. Complete escape is very unlikely.

It is not only that; the vaccines induce T-cell responses that lay down some form of memory that means that there is a fast response when a person is reinfected, and that allows their immune system to fight off the virus quickly. Those T-cell epitopes, the parts that the T-cell system sees, vary less at the moment in the variants that we see, and in general vary less in pathogens like this. I do not think we will see a complete escape. We will see a gradual loss of efficacy, and at some point we will need to make a decision about how low that mismatch goes before we need to update the vaccine.

Chair: Thank you very much indeed. That was very clear and reassuring.

We are very grateful to you, Professor Barclay, and to Professor Harnden for your evidence and guidance to the Committee this morning, and we very much appreciate all the work that you are doing on behalf of the country, and indeed the world, in your scientific endeavours. Thank you very much indeed.

Examination of witnesses

Witnesses: Madelaine McTernan, Professor Gilbert, Dr Dormitzer and Nadhim Zahawi.

Q2146 **Chair:** I am pleased to welcome the next panel of witnesses. Professor Sarah Gilbert is professor of vaccinology at the University of Oxford and, as is well known, one of the leaders of the group behind the Oxford-AstraZeneca vaccine. Welcome back to the Committee, Professor Gilbert. We are pleased to see you. We are very pleased to have Dr Philip Dormitzer, the vice president and chief scientific officer of viral vaccines at Pfizer—thank you for joining us today—and Madelaine McTernan, who is the director general of the Government's Vaccine Taskforce.

I am also pleased to welcome Nadhim Zahawi, who, as is well known, is the Vaccines Minister. The Minister is always very assiduous in being available to parliamentarians, and, notwithstanding the fact that he is coming back for a longer session with us in a couple of weeks, is attending today in case we have any questions that need to go to him. Thank you for coming.

I welcome all of our witnesses, and I thank and congratulate you all for the extraordinary work that you have done during the last year with your colleagues to have got us into the position that we are able to have this session today to talk about the roll-out of vaccines and ask questions about their impact. It is a huge scientific accomplishment that, in history, will be long remembered. As I am thanking people, I particularly thank Dr Dormitzer, who is joining us this morning from New York, where I think it is just after 5.30 in the morning. That is a further contribution to public service. Thank you very much indeed for coming today.

Professor Gilbert and Dr Dormitzer, first of all, what is your latest assessment of the impact on the transmission of Covid of the vaccines for which you are principally interested and responsible?

Professor Gilbert: Thank you. Looking back to the first time I came to talk to this Committee, we have moved on such a very long way. When I first came to talk to you about what we hoped to do with vaccine development, it was about our plans and our hopes and our need for funding. About a year on, things have changed massively, and I am really pleased to see the work that has gone on with all the vaccine developers, because we need multiple vaccines not only to protect this country but to protect the world. It is important that we do not start focusing too much on individual vaccines. We need data on how individual vaccines perform, but we need to prioritise use of all of them as they become approved and available in different countries.

We are now beginning to see effectiveness data from the public health bodies—we have heard from Scotland, and from England this morning. England has not yet reported in particular on the real-world effectiveness of the Oxford-AstraZeneca vaccine, which, as we heard, began to be rolled out a month later. In Scotland, we have seen extremely good and very reassuring effectiveness data on both vaccines of very high protection against hospitalisation. There are different point estimates, but the confidence intervals overlap, and both vaccines are working extremely well to prevent hospitalisation. We are also seeing in the over-80s, who were predominantly immunised with the Oxford-AstraZeneca vaccine, very high efficacy against hospitalisation. We know that it will never be 100% in the over-80s, when the vaccine is being used in care homes in particular, but it is very reassuring to see, I believe, 81% protection in those over 80 against hospitalisation, with a mix of vaccines, but predominantly the AstraZeneca vaccine.

We wait to see more real-world effectiveness data coming out from the public health bodies over time. They agree well with the data from our own clinical trials, where we saw a two-thirds drop in infections overall after the first dose, and we see that again from the Public Heath England data. It is always reassuring when the real-world effectiveness data agree with the clinical trial data, but it is the real-world effectiveness data that we need to focus on now because that is from very large numbers of people, in real-life situations, and that is what finally will count.

Q2147 **Chair:** Dr Dormitzer, the same question to you. What is the real-world data telling you about the vaccine for which you are responsible?

Dr Dormitzer: The real-world data are just starting to come out now; the UK and Israel are the first places where we are starting to see those data. As Dr Gilbert said, it is very gratifying because we are starting to see the efficacy that was seen in controlled phase 3 trials reflected in real-world effectiveness, with remarkably similar numbers coming out of those early studies.

The early studies start to give us some information that goes a little beyond what we could say based on the efficacy data. For example, in both the UK and Israel, many of the early studies are being done among healthcare workers. They are people who are monitored closely enough

that, in addition to getting information on prevention of illness, you pick up asymptomatic infection in those people because they work in healthcare facilities. We are starting to see the first indication that, in fact, there is some impact of vaccine on infection as well as on disease. It is not yet the robust, well-controlled data that we have for efficacy against disease, but we are starting to see hints of that.

Q2148 **Chair:** Thank you very much indeed. In looking at that data, have you formed a view from the research as to the optimal interval for the two doses of the Pfizer vaccine?

Dr Dormitzer: We have controlled data on a single interval, and that is 21 days. Robust information on efficacy, and data that will emerge on duration, will come from that interval. Effectiveness data, as opposed to controlled clinical trial data, will start to come up in all the ways that people are in fact using the vaccine. As of today, the robust data that we can really stand behind come from the 21-day data.

Q2149 **Chair:** Why was the 21 days chosen as the interval to test and therefore the basis for it to be approved?

Dr Dormitzer: At the time that decision was made, we had two sorts of information. We had animal testing that we had done at that time, and we had general knowledge of typical intervals for vaccines, because you have to pick an interval or a limited set of intervals to start the studies. It was a best judgment on an interval that would both give an effective boost and give protection early in the pandemic, so that we did not have a very long time to wait before protection was observed.

We have been very pleased that protection starts after the first dose. We do not know how long that protection lasts after the first dose because, in our trial, about 98% of the participants got a second dose on day 21, so we did not have the opportunity to observe in a significant number of people in the control trial what protection looks like beyond day 21.

Q2150 **Chair:** We now have more data because it has been administered since before Christmas. Do you now have sight into whether a longer dosage is conferring sustained protection?

Dr Dormitzer: We do not have controlled clinical trial data, but the real-world effectiveness data are just starting to come in. At this point, we do not have a robust picture, but as people look at the real world, where people do not administer exactly that day 1 and day 22 schedule, we will collect real-world effectiveness data as it starts to come out.

Q2151 **Chair:** The UK Government, advised by the Joint Committee on Vaccination and Immunisation, substituted a 12-week dosage interval for the 21 days on which the clinical trial was conducted. Did you agree with that?

Dr Dormitzer: As a vaccine manufacturer, we are restricted to recommend use for a vaccine as we are authorised. Groups other than

the manufacturer have more latitude to make their own recommendations and judgments. I am not in a position to second-guess the groups or public health agencies who take into account additional considerations to those that we as a manufacturer can take into account in how we recommend the vaccine be used.

Q2152 **Chair:** It reflected the approvals coming out of the clinical trials rather than a different sort of advice to agencies?

Dr Dormitzer: That is right. We need to stick to our authorisation, given that we are the manufacturer. Public health agencies have a broader remit and can consider many more things in their judgments.

Chair: That is very clear.

Q2153 **Rebecca Long Bailey:** Dr Dormitzer, thanks so much for attending today. There is some confusion over the data that is available, as has just been discussed. On 21 January, the *British Medical Journal* cited a report from the Clalit Research Institute, which suggested that the efficacy of the Pfizer vaccine was 52.4% between first and second dose based on 21 days apart. Subsequently, data assessed by our own Public Heath England indicated that there could be as much as 89% protection from day 15 to 21. Last week, we saw research by the Sheba Medical Centre that found that it was up to 85% effective after the first dose. I know it is difficult because you have illustrated that the data is not there at the moment, but do you have any level of data to determine effectively first dose protection across all age cohorts? What is your professional understanding of the implications on protection of spacing out the second doses beyond the original 21-day window?

Dr Dormitzer: It is a little confusing on first glance, but there is a way to make a coherent picture. I will focus initially on the data that we obtained in our phase 3 trial. It depends on the interval over which you measure. Immediately after the first dose, we can look at the Kaplan-Meier curves of rate of acquisition of disease by people who received placebo and acquisition of disease by people who received vaccine. For the first 10 to 12 days, there is no difference. There is no protection for the first 10 to 12 days, and then the curves start to separate. Depending on where you measure the interval, you will come up with a different number. If you measure from the time of the first dose to the time of the second dose on day 21, you compare the first 10 to 12 days of no protection with the time from 12 days to 21 days of increasing levels of protection, and that is where the 52% comes from.

If you look at trend lines, and you say, towards the end of that interval, what the protection rate is, ignoring the first 10 to 12 days before protection is started, you come up with much higher numbers. What we do not have from the trial in more than 2% of the recipients are data that go beyond 21 days, when they got their second dose. That is where we really cannot comment. There are two things we did not see in that study. We did not have an opportunity to look at protection beyond 21

days without a second dose. At the time of the study, the new variants were not circulating. That is where we have to look at real-world effectiveness data to extrapolate beyond the design of the phase 3 study and the timing of the phase 3 study at a given point in the pandemic.

Q2154 **Rebecca Long Bailey:** Thank you, Dr Dormitzer, that is really helpful. Professor Gilbert, thank you too for attending today. It is very helpful.

Data from Oxford University in early February suggested that the Oxford vaccine may be more efficacious with a dosing interval of 12 weeks or more than the initial trial suggested. I think it was 76% protection in the first 90 days with one dose. However, I understand that Azra Ghani, the professor of infectious disease epidemiology at Imperial College London, urged caution over those results, stating that participants who received a single dose were younger, more likely to be female, more likely to be a healthcare worker, more likely to be resident in Brazil, and more likely to be white than those who received two doses. What is your assessment of that study now, compared with the real-world data and, as with Dr Dormitzer, what is your understanding of the implications on protection of spacing out second doses beyond the original 21-day window?

Professor Gilbert: As you rightly said, we tested protection from different intervals between the two doses in the clinical trials that we ran. Those were in the UK, South Africa and Brazil, with most of the participants in the UK and Brazil. We published a paper to show that from 21 days after the first dose we see 76% protection going out as far as 12 weeks. We do not see any decline in that protection over the period up to 12 weeks, which is now the time that the JCVI recommend that the second dose should be given. We also looked at protection after the second dose for people who had a short or a long interval between doses, and were able to show that it increases when the interval is long between the two doses. It increased to 84% protection in the trials in those who had a three-month interval, as opposed to a figure of, I believe, around 66% protection in those who had a short interval, a four-week interval, so we can be confident that that is absolutely the right strategy to use with this vaccine. We are getting good protection with the first dose, no decline before the second dose at three months, and better protection after the second dose is given.

As you say, those are not from very large numbers of people. It was the people who were in our clinical trials who happened to have had the dose at different intervals. We know that the trends that we see in sustained protection over time, and improved efficacy after a longer interval between the first and the second dose, will be consistent across populations. The exact numbers will not be the same. We will always see somewhat less vaccine effectiveness in the very elderly population, who are the priority groups to be immunised, but the trends in good protection after the first dose, and improved protection after a long interval between the first and second dose, are expected to be maintained. As we now start to get the real-world effectiveness data, we

will be able to be reassured on those points, but I expect that is what we will see.

Q2155 **Rebecca Long Bailey:** I appreciate this will not be an easy question to answer. Dr Dormitzer and Professor Gilbert, with the datasets that you have available from both studies, what is your professional view in relation to concerns that partial immunisation of the population with one dose at this time could fuel more dangerous coronavirus variants, particularly as lockdown restrictions begin to ease in the UK and non-vaccinated groups begin to mix?

Dr Dormitzer: One relevant piece of information I can provide on that is from looking at the neutralising antibody responses after the first and the second dose. At the time of the second dose, when people have only received one dose, most people do not have detectable neutralising titres, and those who do, have rather low titres. Within seven days of the second dose, neutralising titres are very high—higher on average than after natural infection. If you believe that weaker neutralisation can help select for variants—in a classic laboratory virological experiment sense—you want to have high neutralising titres and high levels of the other forms of immunity to prevent the emergence of variants. One of the risks of not giving a second dose is less ability to block the emergence of mutations, based on typical laboratory findings with virus, rather than based on specific data looking at the generation of variants against this virus in the real world.

Q2156 **Rebecca Long Bailey:** Thank you. Professor Gilbert?

Professor Gilbert: To make sure that we have the lowest chance possible of new variants arising, we need to prevent the virus transmitting between people. We are now doing that very effectively with the vaccines. The second dose will be given. It will be given at a longer interval rather than a shorter interval, and that has enabled us to give the first dose protection, which as we have heard is high, to many more people than we would have done had we given all doses three or four weeks apart. That is important in increasing protection across the population, which we need to do. We need to continue with the vaccine roll-out to get as many people as possible protected, and we need to make sure that nothing can slow that down. The more people we have given protection from the vaccine, the less transmission we will see.

We also need to be aware that the vaccine cannot be used in everybody immediately. We are currently not vaccinating children, and there will be transmission among children. We have to use the other measures available to us to keep the transmission of virus as low as we possibly can. We cannot allow only the vaccines to do all the work of protecting the population while, at the current time in the UK, we still have relatively high levels of transmission. There is a danger that, if measures are lifted too quickly, transmission could increase, and that puts us at greater risk of selection of new variants that are not so effectively neutralised by the vaccine. It will not be all or nothing, but it could be a significant change,

and we want to minimise the chances of that happening as much as we possibly can.

Q2157 **Aaron Bell:** I want to talk about variants and further vaccine development. Following your answer to my colleague, Rebecca Long Bailey, just now, Professor Gilbert, my understanding is that your opinion of what the Government did with going to 12 weeks is that not only has it been for the benefit of public health, but that because of the reduced transmission that it should cause, looking at the data we have, it will reduce the risk of further variants developing in the UK. Is that a fair assessment?

Professor Gilbert: That is a fair assessment. Given the amount of transmission we had in the UK, that was the best way to use the vaccines at the time. In other countries, with lower rates of transmission, it might not have been the best decision, but for the UK I believe that it was. It is still only part of the answer. We have a long way to go.

Q2158 **Aaron Bell:** How confident are each of you that your vaccine, your company's vaccine, or your project's vaccine in your case, Professor Gilbert, will be effective against new variants, the ones that are out there at the moment, particularly the South African and Brazilian variants, but the UK variant as well, I suppose, and new variants in the future? Professor Barclay told our Committee in the previous session that she anticipated a gradual loss rather than an escape. Is that both of your interpretations?

Dr Dormitzer: From real-world effectiveness data, both in the UK and in Israel, where the UK variant is common, we are starting to get our first direct evidence, and that is that we are seeing protection against the UK variant that is equivalent to the protection we saw in controlled trials before that variant was circulating. For other variants, at this point we have to rely more on laboratory data. The laboratory data thus far are quite reassuring.

We see with the South African variant some reduction in the level of neutralisation, but it is important to point out that the level of neutralisation that we see against that variant is still much greater than the level of neutralisation we saw in our phase 3 trial at the time that vaccine protection from disease started. Yes, these mutations can reduce the level of neutralisation, but they do not reduce the level of neutralisation anywhere near as low as the neutralisation that was observed at the time that people were protected in the trial. We think it is likely that the vaccine will protect against the variants that we have seen to date, but the way to be sure is the real-world data, because laboratory measures of immunity cannot be translated directly to known protection. That requires observing protection in the field.

Aaron Bell: Thank you. Professor Gilbert?

Professor Gilbert: We have seen in the UK clinical trials, and now the real-world effectiveness data, efficacy and effectiveness of the vaccine

against the UK variant equivalent to the original clinical trials. That is a really important finding because that variant is one that transmits much more readily than the original virus, and is tending to take over wherever it is found. The fact that we have good efficacy against that particular variant is very good news.

You will have seen the data that came out of the phase 2 study that we did in South Africa. It is a limited amount of data showing only 20% protection against mild disease in a population of young people—median age 31 years—who had had the vaccine with a four-week dose interval, the short dose interval, which is not as immunogenic or as effective as the three-month dose interval. It was not possible to assess efficacy against severe disease and hospitalisation in that population, because there were no severe cases in the control group in that study. It was 2,000 people. They were young. We did not observe any severe disease in the control group, so we cannot tell you what the efficacy of the vaccine is against severe disease.

What we know across the board is that we see a much greater level of protection against severe disease than we do against mild disease. It is the protection against severe disease that keeps people out of hospital that really has a big impact on healthcare systems.

We have a phase 3 trial in Brazil. We do not yet have the data on which virus is causing the infections in that study. We need to get the sequencing done on swabs taken from people in the clinical trial, so that we can get more information about protection against the Brazilian variant. That is still to come. There is some reduction in efficacy against mild disease, but we would expect to see better protection against severe disease. However, we cannot ignore the variants. We have to make plans for how we will deal with them, and we have to keep remembering that variants arise when the virus spreads between people. If we can stop that happening, we have much less chance of more variants arising.

Q2159 **Aaron Bell:** What work is being done to develop your respective vaccines in response to the variants we have already seen? How long do you think that work will take? What conversations with regulators might you have, to work out how we can best expedite that and get it out to the population at large? What support or funding is required from the Government or various world Governments to help you do that? Do you anticipate that future vaccines might have more than one strain in them? That is a lot of questions, but it is probably easier if I do it that way to save a bit of time.

Dr Dormitzer: Although we have not to date seen a need to change strains, the fact that we see mutations that alter laboratory measures of immunity tells us that there is a possibility that we could some day see the variant that requires a strain change. We are taking steps to test that. Our approach is couple-fold. First, as we test variants, we make the substrate, the DNA substrate for making RNA. That substrate is made for a variety of strains. With one strain, we are taking a prototype approach,

where we take a single strain and we intend to make a batch of vaccine to test it at least in a safety and immunogenicity trial. It is not because we believe that we need to change strains now, but we believe we need to establish an efficient pathway for doing so rapidly if necessary, and we need to start gathering data, for example, on what boosting immunity looks like, say, six months after the primary two-dose series.

We know from studies with, for example, H5N1 pandemic flu that a single boost six months or more after a primary series gives tremendously high levels of neutralisation, not only from the principle that a rising tide lifts all boats, but because it gives you very broad immunity. Will that be the case for SARS-CoV-2? That is an answer we want. Similarly, is there an advantage in that case to boosting with an updated variant, or are you essentially as well off if you boost with the original vaccine?

Similarly, we want to look at what a primary series with a variant vaccine looks like. The hope is that by doing this work now, when it is not yet an emergency, where we do not yet have evidence, at least for the Pfizer vaccine, of escape in real-world data, we can get the answers so that, if some day it is an emergency, we can go as rapidly as possible down a practised path to make the strain change quick and reliable.

Q2160 **Aaron Bell:** Thank you. Professor Gilbert?

Professor Gilbert: The approach that Oxford and AstraZeneca are taking together is very similar to the one that Pfizer has just outlined. We are working to produce new versions of the vaccine. Both of these vaccine technologies are platform technologies. They are designed to easily accept a new antigen, whether it is from a different virus or just a different version of the virus that we were already working to protect people against. That is being done. We are generating in Oxford initial stocks of new variants of the vaccine that get passed on to AstraZeneca, who then upscale manufacturing. We have plans for clinical trials to take place from the early summer with batches of the new variants of the vaccine.

We have been discussing with regulators the approach that we will need to take for a strain change. This, as we heard from Professor Barclay this morning, will be quite similar to the approach taken for a strain change in flu. It is not expected to require any further efficacy trials, any phase 3 trials. It will be a trial in hundreds of people, rather than thousands or tens of thousands, to examine the ability of the vaccine, when it is changed, to induce antibodies that have a better rate of neutralisation of the variant virus that they are then being produced to vaccinate against. The exact plans for those clinical trials and what the regulators will need to see are still being finalised, but discussions are being held.

We need to bear in mind that we want to be able to work with regulatory bodies around the world. Although for this country the MHRA will need to approve any strain change, we also want a strategy that will work with other regulatory authorities as well, and with the WHO. Before we have

the final design of those clinical studies, we want to take into account opinions from different regulatory bodies, to make sure that we can satisfy all of them when we conduct trials in preparation for a strain change. I emphasise that it is not certain today that we need to change the vaccines. We need to be ready now. We need to make preparations, so that everything is in place if it turns out that we need to do it. There is always the risk of another variant arising later on.

Currently, the plans are to be ready with an immunisation campaign in the autumn. Before going into the winter season, we will have a new variant vaccine available if it turns out that that is what will be required. If we see emergence of a new strain very close to that date, it will be difficult to go through that whole process, because we need to conduct a clinical study and get regulatory approval in time to vaccinate before the winter. We need to do everything that we can to prevent virus transmission and prevent the risk of further variants arising.

Q2161 **Aaron Bell:** Thank you, Professor. That was incredibly helpful. Clearly, the global problem is the constrained supply of vaccine. It has been a problem in every country, and it will be a massive problem in getting this rolled out to the whole world, which I know we all want to do.

What trials and studies have you conducted on how we can minimise the amount of vaccine needed for each individual to be vaccinated? Dr Dormitzer, some early studies have suggested that those who have already been infected with Covid-19 might achieve sufficient protection from only one dose of an mRNA vaccine. More generally, what assessment have you made of the potential of reducing the size of the dose, whether to a half or three quarters? Obviously, if we can get the same or very nearly the same effectiveness from a smaller quantity, we can get to more people quickly.

Dr Dormitzer: We do not yet have the data on exactly what is needed for immunisation after infection. In our phase 3 trial, we screened people for both serological and virus-shedding evidence of infection at the time of enrolment, and those people were enrolled. We will be looking at our data to see what we can extract from the phase 3 data that might inform that question. Those analyses are not ready yet.

Q2162 **Aaron Bell:** What about smaller doses, Dr Dormitzer?

Dr Dormitzer: We have some immunogenicity data from the central part of the trial when we were doing dose escalation. We do not have efficacy data from there. We may in the future look at additional immunogenicity data at that time. The data that we have now is from the current dose, and the efficacy data in particular come from the 30 microgram dose. That is what we can back up with solid information at this point.

Q2163 **Aaron Bell:** Thank you. Professor Gilbert?

Professor Gilbert: By giving a half-dose, particularly two half-doses spaced out, we see lower immunogenicity. That would be a concern.

What we do not want to do, having achieved great success in getting the vaccine licensed and vaccination rolled out, is to start reducing the effectiveness of the vaccine by reducing the dose. It is likely that that would have more effect in the more vulnerable populations who tend to respond less well to vaccination than younger people. With the full dose, we have seen excellent immune responses across the board, even in the oldest people involved in the trials. If we start reducing the dose, that will decline.

As we heard from Professor Harnden this morning, the success of the vaccination roll-out has a lot to do with its simplicity—not needing to test people before we decide if we will vaccinate them, not trying to have different dose levels. I assure you that if we complicate the programme by introducing different dose levels, things will go wrong. We have already seen some mistakes being made by healthcare professionals administering vaccines when they have not quite followed the instructions that they were supposed to follow. If we make it more complicated, there will be further errors, because these things always happen. Keeping it simple and keeping it fast is the best way to go.

In terms of supply, it is not just the actual manufacturing of what we call the drug substance, the bulk vaccine; it is getting it put into vials that is limiting, and then getting it to the vaccination centres and getting it into people's arms. We are probably best off sticking with the doses that we know work, and getting it rolled out as fast as we can.

Aaron Bell: That is very clear. Thank you.

Q2164 **Chair:** On the discussion you had, Professor Gilbert, about the possibility of an extra vaccination round being needed in the autumn, have I understood correctly that you think we should be ready for an extra round of vaccination in the autumn if one is needed, but currently there is no reason to expect that? Is that a fair summary?

Professor Gilbert: We need to make the decision over the summer. We will start to get data from the clinical trials on the immune responses to the variant vaccine, both against the virus variant and against the original virus, and we will then be able to monitor the situation and decide what should be happening in the autumn. As last year, we were working out risk for much of the time, making plans to be able to move as quickly as we could if it was needed. That still applies now. I do not think the decision is finally made about exactly what will be done in the autumn, but we need to be prepared if there is a need for an autumn vaccination campaign and if it needs to be with a new version of the vaccine.

Chair: Very good. Learning the successful lesson from the way we approached vaccination, we should prepare for the risk, even though we may not need it. That is very helpful to understand.

Q2165 **Graham Stringer:** Good morning, Professor Gilbert. You have worked wonders since we first spoke 12 months ago. I hope this is not too naive

or silly a question. Is it possible to go one step further and develop a universal vaccine for this virus that will bash it whatever variations and tricks it gets up to?

Professor Gilbert: That is a very difficult question to answer. All of the vaccine development has been focused on making a vaccine against what we have circulating now. We have never had a vaccine against the seasonal human coronaviruses that circulate every year. We have never paid much attention to them, but we are starting to think about that now. In parallel with the work that we are doing on new variants, we are starting to consider how we might make the protection broader, but that will be a difficult thing to achieve and will take quite a lot of testing before we get there.

We are also thinking about second generation formulations of the vaccine. As you know, all the vaccines are being given at the moment as intramuscular injections. That is not necessarily the best way to provide protection against a respiratory virus infection, where we want the immune system to be active in the upper respiratory tract and in the lower respiratory tract, which is where the virus is causing the infection. We have flu vaccines that are given by nasal spray. That could be a very good approach in the future in using vaccines against coronaviruses. It is also possible to consider oral vaccination, where you take a tablet that will give you immunisation. It would have a lot of benefits for vaccine roll-out if you did not have to use needles and syringes on people.

Both of those are approaches that we are beginning to assess. They will take time to develop. They will have to be tested for safety and then for efficacy as well. The immune responses that will be generated by both approaches will be a bit different from what we get from an intramuscular injection. They have potentially large advantages, so we will be focusing our attention on working out if we can use different delivery routes in the future for those vaccines.

Q2166 **Graham Stringer:** But it is not theoretically impossible to have a universal vaccine.

Professor Gilbert: It is not theoretically impossible, but I have been attempting to work on a universal flu vaccine for many years. We have not been successful yet. It is a lot to ask for. I am sure there will be a lot of attention paid to it, but it is not an easy thing to do.

Q2167 **Graham Stringer:** Can I move on to the Vaccine Taskforce? What level of supply can we expect over the next three months?

Madelaine McTernan: Was that addressed to me or the Minister?

Graham Stringer: To you, please.

Madelaine McTernan: You will have seen that the Prime Minister announced in the Covid road map on Monday some new vaccination targets: cohorts 1 to 9 to be vaccinated by mid-April, and all adults to

receive their first dose by the end of July. Clearly, we are confident that we will have a sufficient supply to meet those targets.

Q2168 **Graham Stringer:** Is the implication of that that, when we get to late March and April, and the commitment to give people who have had the first vaccination a second vaccination, there will be a severe drop in first vaccinations during April and early May?

Madelaine McTernan: Clearly, we will need to be giving people their second vaccinations as well, so that will be factored into the deployment planning.

Q2169 **Graham Stringer:** Will there be a severe drop in first vaccinations in April?

Madelaine McTernan: I am not responsible for deployment. I am responsible as part of the VTF for supply, so I do not want to stray too far outside my remit.

Q2170 **Graham Stringer:** I am sorry. Maybe the Minister has an answer.

Nadhim Zahawi: Thank you very much, Graham. I am very happy to comment. I have a brilliant team both on the supply side, under Maddie, where we have real confidence about our supply and our visibility of supply—the line of sight I have described to your Committee before—and on the deployment side. We will be doubling the rates, over the next 10 weeks, of deployment through the NHS infrastructure, whether hospital hubs, national vaccination centres, primary care, which has been the backbone of this—I thank them for that—and pharmacies. We will meet our target.

To meet that target, there will not be a drop, because we have to offer 32 million people the first dose. The NHS has already begun reserving second doses for the end of this month, and then the bigger second dosing begins from March onwards. The two things will go hand in hand. Anyone who has had a first dose will get their second dose within 12 weeks. If you had Pfizer, you will get Pfizer within 12 weeks. If you had Oxford, you will get Oxford within 12 weeks. I do not envisage a drop.

Q2171 **Graham Stringer:** For first vaccinations. What is the implication of that for the total number of vaccinations in March and April?

Nadhim Zahawi: As I said, we are confident that we will meet our target.

Q2172 **Graham Stringer:** I do not want to get into the dispute we had in the last meeting, Minister, but what is that per month? I know there is a final target, and I am delighted that the Government met the 15 February final target. What will the number of vaccinations be in March and April? Just the total.

Nadhim Zahawi: I am afraid I will disappoint you like last time. I am focused on a single target, which has been set for me by my Prime

Minister, to say that by the middle of April we will have offered the vaccine to all over-50s and given the second dose to all who are eligible for their second dose as well. That is my target. The numbers will fluctuate day by day and week by week. We get into a whole other world of forecasting that I am not willing to get into.

Q2173 **Graham Stringer:** Clearly, you are not. It is not a trick question, but the Adam Smith Institute has suggested that it should be possible to do 6 million vaccinations a month. Is that realistic, and, if not, why not?

Nadhim Zahawi: We built an infrastructure that can do many more doses than we are currently doing. If you recall, about three or four Saturdays ago, we got to just shy of 1,000 doses a minute. We have built an infrastructure that can do double the rate of what we did in the first 10 to 11 weeks, reaching the mid-February target of the top four most vulnerable cohorts and those who look after them—the 15 million target. We are looking to double that in this target sprint till the middle of April, and then we go on to offer the vaccine to all adults by the end of July.

Q2174 **Graham Stringer:** We have had one threat to the supply from the EU. Do you see any more potential threats to the supply of vaccines?

Nadhim Zahawi: I pay tribute to Maddie and her team. We talk to the vaccine manufacturers almost on a daily basis, and we are very confident of our supply of both the current vaccines under deployment. There is more to come in the spring, with Moderna, which has been approved, and others, such as Novavax, which is still going through its approval process. We are very confident that we can meet those targets, because we have enough line of sight of our deliveries that we will be able to deliver on those stretching targets set by the Prime Minister.

Q2175 **Graham Stringer:** It was always a very optimistic scenario, going back to before the epidemic, that we would be able, in the middle of an epidemic, to buy and source vaccines from elsewhere. In the immediate future, hopefully at the end of this epidemic, will this country be self-sufficient in the manufacture of vaccines?

Nadhim Zahawi: It is a great question. That is exactly what the Vaccine Taskforce thought through very early on and have delivered on. You can look at the investment in the Vaccines Manufacturing Innovation Centre, VMIC, in Oxford, which will produce around 70 million doses every six months when it is fully up and running, at the Braintree site, which is doing so well for us, or at Oxford Biomedica, and at fill and finish, where we effectively booked enough production capacity to be able to deliver on this.

If you look at what we are doing now—I was listening to the previous session—in terms of future-proofing the programme, there are three elements. One is talking to the current manufacturers, Oxford, Pfizer, Moderna, Novavax and others. Secondly, Maddie and the team secured a brilliant deal with a messenger RNA company called CureVac, which will work with us to sequence all the mutations and then be able rapidly to

develop a messenger RNA vaccine that will be manufactured in the United Kingdom.

The third element is the Valneva vaccine, which is being manufactured in Scotland. We have invested there to increase capacity and add more volume for next year—40 million doses, in addition to the 60 million that we had already procured. That gives us a whole inactivated virus vaccine—a bit of a mouthful. We are very hopeful that that strategy of talking to the current manufacturers, looking at further strengthening our manufacturing base, and delivering the manufacturing investment that we have already made, will put us in a very strong position in being able to be self-sufficient.

It is great to hear Sarah Gilbert say that we are in a good place at the moment. At the moment, we do not feel that we need to do other than plan ahead for the winter. Our current deployment continues at pace, and that is what we are focusing on. I am confident that the Vaccine Taskforce will continue to do its job and will be backed by the Prime Minister to deliver future-proofing of the vaccination programmes.

Graham Stringer: Thank you.

Q2176 **Carol Monaghan:** Madelaine or the Minister, we know that at the moment, while we are pushing ahead with the vaccination programme, there are 130 countries that have yet to administer a single dose. In fact, 75% of all vaccines that have been given have been given in only 10 countries. What has been done to ensure that our vaccines are able to be accessed in a more global nature?

Nadhim Zahawi: That is a great question. From the inception of the Vaccine Taskforce—some of you will have heard Clive Dix, the interim chair of the Vaccine Taskforce, talk about this in the media—Madelaine McTernan and her team had two instructions. One was to secure vaccines for this country, the best candidates, and secure further production of those vaccines in the UK, as you have seen with the AstraZeneca-Oxford vaccine, Novavax, Valneva and others.

The second instruction from the inception of the Vaccine Taskforce was also to think about the rest of the world and how we help the rest of the world. In the Vaccine Taskforce, there is a senior civil servant, Tim Colley, who does exactly that, working with COVAX and the WHO. We have put £540 million into COVAX to help those countries.

It was great to see at the G7 that the Prime Minister managed to work with other G7 countries to add another $4.3 billion to COVAX to help low-income and middle-income countries. The Prime Minister has already talked about excess doses. The bulk of those will go through COVAX when we are able to deliver them. The work continues at pace because, as I have said regularly, no one is safe until we are all safe, which is why we collaborate. Maddie can talk more about this. We sent at least 10 expert engineers to Europe, to the Halix plant, to help them with the

manufacturing process of the Oxford vaccine that is being delivered for Europe, and for us of course.

Q2177 **Carol Monaghan:** The idea that no one is safe until everybody is safe because it is a global pandemic leads to my next question. Are our efforts to share vaccines globally being done for a humanitarian reason or because there is a real risk to the UK, to our citizens, if we do not have a more united global effort in terms of vaccination?

Nadhim Zahawi: Our interest is the world's interest, which is to protect as many people as rapidly as possible. Any Government's priority has to be the safety and protection of their own citizens, and that is exactly my focus and the team's focus in both supply and deployment. Nevertheless, it is equally important, which is why it was at the inception of the Vaccine Taskforce, that the remit was both to secure the vaccines for the UK and to think about and secure and help the rest of the world. As I said, until everybody is safe, the virus will continue to spread, and that is why it is so important that the Prime Minister led on this at the G7 and secured it.

Q2178 **Carol Monaghan:** I want to come on to that. The Prime Minister was quite clear that excess vaccines would be shared with poorer countries, but only once the majority of citizens here in the UK were vaccinated, whereas President Macron took a different view. He wanted countries in the G7 to start sharing 5% of their vaccines now both in terms of the global fight against Covid and for diplomatic reasons. China and Russia are making great efforts in this area. Who is right? Should we not be taking the view of President Macron and moving to shift some of our vaccines to the developing world?

Nadhim Zahawi: Each country will take its responsibilities seriously in its own way. Suffice it to say, before any vaccine was shipped anywhere, we made the commitment to COVAX of £540 million really early on—the largest financial commitment of any country, per capita certainly—to help to make sure that COVAX can begin to focus on delivering for the countries that need it. We have already made the commitment that we would share excess doses with the rest of the world as well, at no profit to the United Kingdom. This is not us trying to look at helping in economically advantageous ways to us.

Our first priority has to be, and as the Minister for the vaccine deployment mine has to be, to protect our citizens as quickly as possible, which we are doing. Our targets are pretty ambitious—mid-April and end of July for all adults to be offered the vaccine. At the same time, we have leant heavily into COVAX. That is not even beginning to talk about the CEPI initiative and GAVI. Last year, we held the fundraising conference here; from memory, we raised $8.8 billion for those initiatives to help the world. We take those responsibilities very seriously, and we are in the right place vis-à-vis how we deliver that help.

Q2179 **Carol Monaghan:** Thank you, Minister. I have a final question for Professor Gilbert. I am asking you because of your expertise, Professor,

and not because you have been involved in global efforts in the vaccine. How much of a risk are new global strains that are able to develop? How much of a risk are they to the population here in the UK, even after vaccination in countries that have not had a proper vaccination programme?

Professor Gilbert: Variants of the virus can arise anywhere, and if they can evade the immune response that is induced by either infection or the vaccines and spread effectively, they can potentially spread around the whole world in the way the original virus did. It is really important that we manage to protect the whole world because, if we do not, we will keep having problems coming back to haunt us.

The way Oxford and AstraZeneca are approaching that is that, from the beginning, we said that we wanted to have a vaccine for the whole world. We asked AstraZeneca to make sure that manufacturing was set up in as many different places as possible. That has enabled us, now that we have WHO approval for the use of the vaccine that is required before it can be used within COVAX, to have two different manufacturers, that are both very large manufacturers, that are manufacturing and supplying to COVAX. That is the Serum Institute of India and a group in South Korea. That is only possible because we worked to share the technology and the materials that are needed, and to share expertise and help with training in those other manufacturers so that they can efficiently manufacture the same vaccine and then it can be supplied.

There are different ways of being able to supply the whole world. What is really important, and will make a big impact, is other manufacturers making the same vaccine in other countries and supplying it to COVAX, because that will be a very large number of doses. Because AstraZeneca will not take a profit in perpetuity for low and middle-income supply, the fact that the price of the vaccine is so low means that funding given to COVAX to buy the vaccines will go a lot further than it would for other vaccines, where the price is significantly higher.

Chair: Thank you very much. We have a couple of supplementaries on the international question.

Q2180 **Zarah Sultana:** I have a few questions and I will try to run through them as quickly as possible. Annual global vaccine manufacturing capacity is estimated to be between 6.5 billion to 8.5 billion doses a year. UNICEF, using a much larger database of potential manufacturers, estimates that in 2021, the volume of that output could be as much as 20 billion. At the moment, total manufacturing capacity of the top three vaccine manufacturers—Pfizer, Moderna and AstraZeneca—is around 3.2 billion. When we look at where that manufacturing potential is, globally, half of it is in developing countries—Argentina, Bangladesh, China, India, Brazil, Egypt, Cuba, Indonesia, Iran, Mexico, Taiwan, Thailand and South Africa. Minister, do you agree that there is an artificial scarcity of supply? Are the Government looking at waiving intellectual property rights to enable countries in the global south to access and manufacture vaccines?

Nadhim Zahawi: Thank you very much for the question. I think Dr Gilbert touched on that in terms of the decision made very early on by the Oxford team, and of course by AstraZeneca and its board, to allow their technology to be shared with a number of large manufacturers at no profit. I give credit to Albert Bourla at Pfizer, who, from day one of our discussions, conversations and negotiations with them, always talked about equitable supply of vaccines for the whole world. Pfizer is increasing its production, certainly its European production, from 1.2 billion doses to 2 billion doses. AstraZeneca's relationships both in India and elsewhere have also increased their projections for their doses.

Don't forget, you have J & J, a vaccine development with Janssen, which is a single shot vaccine that will also produce very large volumes, as well as Novavax, Moderna, Valneva and others that will come online. Other countries have their own vaccine candidates. It is an endeavour for the whole world.

The important thing to stress for the Committee is the work of COVAX. We need co-ordination. When I talk to Ministers of Health in low-income or middle-income countries, the one thing they keep coming back to is greater co-ordination through COVAX. The speed at which COVAX can deploy will be critical to this programme globally, and that is something we are leaning into. I mentioned another member of Maddie's team, Tim Colley, who is focused very much on the UK sharing knowledge with COVAX, with those countries, so that we can get them operational as quickly as possible.

Q2181 **Zarah Sultana:** Should life-saving drugs and vaccines be patent-protected? Should Governments therefore exclude vaccine technology from patent protection?

Nadhim Zahawi: What the vaccine developers, the scientists, the manufacturers—these are businesses—have done is extraordinary. We need an ecosystem without the intervention of politicians, other than to back them when they need backing to do the research, as we did with the Oxford team very early on. It did not happen in 2019. It happened way back, much earlier in the decade. With that support, they were able to shift their research towards Covid vaccine discovery. That was the important bit, but I would be loth even to attempt to intervene in that world, because what they have done is pretty remarkable. Any politician would be wise not to try to do the job for the industry. The industry has really stood up and come forward and delivered. It would be unwise to try to intervene and think that we can set it up, whether it is costs of development or costs of manufacturing. These people are best placed to do that because they are the experts working with the scientists.

Zarah Sultana: I agree. Credit must go to the people who have worked on the research, but also billions of taxpayers' money has been invested in research. It is important to look at patents. I have a question on COVAX—

Chair: Before that, Zarah, Professor Gilbert wants to come in.

Professor Gilbert: I want to make a really important point about intellectual property. It does not work simply to share all the intellectual property. The reason we have been able to work with manufacturers around the world to get them manufacturing the same vaccine is by working very intensively with them. We have to share virus seed stocks. We have to share cell banks with the manufacturer. We also have to share all the expertise, and help them implement that expertise. What we have seen with each manufacturer we have worked with is that, initially, the yields are low, and as they become more practised, the yields increase. That has been particularly an issue in Europe, where the vaccine manufacturing started later and the initial yields were low. That is common. They have improved now.

We can only expand the amount of vaccine that is manufactured with a lot of help from the parent company. If they over-commit and are not able to provide that help, we will have substandard vaccines and low yields. If another company tries to take the IP and go it alone, they are manufacturing a different product. The regulators would see it as a different product; it would have to go through all the efficacy trials again, and that would be very wasteful and very slow. I want to get rid of the idea that we should be sharing the IP and letting everybody make their own vaccines. It does not work like that. We have a way of sharing the materials and the expertise, and that is what we have been working very hard to do. That is the correct way to do it, because that is how we get the right vaccines to as many people as possible.

Q2182 **Zarah Sultana:** GAVI indicates that around 27% of the developing world's most vulnerable populations are likely to benefit from COVAX vaccines by the end of 2021. That would delay the possibility of the global population being immune any time soon. In the UK, we would not accept 27% of our population benefiting from vaccines. What more can the UK Government do to increase that number through COVAX?

Nadhim Zahawi: That is exactly what I was talking about, in the sense that the team under the VTF is working with the COVAX team to deliver the funding that we were the first country to commit to—the £540 million-plus—and to make sure that we share the deployment knowledge. We are one of the first major countries in the world to deploy at scale. It is not just about getting the vaccines delivered, it is about how you deploy them. There are much greater challenges around the Pfizer-BioNTech vaccine or the Moderna vaccine because of the cold chain movement. It is much less of a challenge with the Oxford vaccine; nevertheless there are equally important protocols to follow. We share knowledge with those countries through COVAX, and we continue to want to support COVAX, as the Prime Minister announced at the G7, with excess doses as well. It is a big, serious collaboration, and it is a priority for the Vaccine Taskforce. Maddie might want to add to that.

Madelaine McTernan: No, that is a really good summary. The commitment, as and when we identify our excess doses, to transfer those to COVAX will support that roll-out as well.

Q2183 **Zarah Sultana:** Minister, there was a meeting at the World Trade Organisation where a number of developing countries—Kenya, Mozambique, Pakistan, India, South Africa—co-sponsored a waiver for intellectual property. The proposal was supported by 100 countries, most of them low or middle-income, but a small number of high-income countries and their trading partners opposed it, including Canada, the US, Japan and the UK. Why did the UK oppose that?

Nadhim Zahawi: To save the Committee's time, I refer you to Sarah Gilbert's brilliant answer, which she just gave, as to why it simply would not work. It would be in many ways disadvantageous to those who are most in need in those low-income countries.

Q2184 **Dawn Butler:** Thank you to all the witnesses. Professor Gilbert, I have followed you, and I think that when you present, especially on TV, it is very clear. I hope that the Minister will use you after this on the No. 10 appearances, because that would be very good.

How many vaccines have been delivered via COVAX? From my understanding, at the beginning of the month, none had been delivered. Has that position changed?

Madelaine McTernan: I believe that they are due to start delivering vaccines at the end of this month and the beginning of next month.

Q2185 **Dawn Butler:** No vaccines have been delivered to other countries at the moment via COVAX?

Madelaine McTernan: I understand that the AZ vaccine is due to be rolled out at the end of this month, early next month. I know that the Pfizer vaccine has been allocated. I will have to check whether any of that has been delivered yet.

Q2186 **Dawn Butler:** This pandemic has taught us that we need international collaboration. We need national Governments to work together. We need pharmaceutical companies to come together. I understand the intellectual property argument in terms of needing somebody to help countries develop it properly. The Minister explained that you sent engineers to Europe. Hopefully, we are sending engineers internationally as well, to allow that to happen. We know that India has potentially 10,000 companies with labs that have the capability to manufacture vaccines, and other countries have the potential too, given the access and collaboration approach.

This pandemic has taught us that public health should come before profit. Professor Gilbert, you said quite rightly that Oxford-AstraZeneca said that it will not make any profit from this. Dr Dormitzer, how much profit is Pfizer making from the vaccines?

Dr Dormitzer: As a research scientist, I am afraid that question goes beyond my area of expertise. I do not have particular insights of the financial aspects of the work. Most of my responsibilities are in research and development. I can refer the question back to those at Pfizer who are involved in the finances.

Q2187 **Dawn Butler:** Do you think that Pfizer should take the approach that AstraZeneca has taken in regard to profit on vaccines?

Dr Dormitzer: Again, that is a question I can bring back to people on the financial and business side of the company. My remit is really research and development.

Q2188 **Chair:** Dr Dormitzer is the chief scientific officer. That is the basis on which he has been invited. I am very grateful to the witnesses.

I have a couple of follow-ups, if I may. On the question of the mutation of the virus, Professor Gilbert, how likely is it that a mutation will occur that will escape the vaccine entirely? We heard from Professor Barclay that the most likely effect is a diminution of efficacy. Is that your view as well, rather than the likelihood or a significant possibility of complete escape?

Professor Gilbert: Certainly, what we are seeing at the moment is a reduction in efficacy against the variants rather than falling off a cliff edge. We have to remember that, for the virus to mutate to evade the immune response that is being induced by the vaccination, it may have to take a penalty. It may become a virus that does not function quite as well as the original virus did, and that will prevent new variants that might escape the immune response given by the vaccine. They may not spread so well. We have seen that the B.1.1.7—the UK variant—is still affected by the vaccine. That is the one that can spread more effectively. We are not seeing that with the South African and Brazil variants, at least so far.

Anything can happen. Viruses are infinitely able to mutate. Currently, the signs are good that we will not see a sudden escape from the vaccine with a virus that is very well able to circulate.

Q2189 **Chair:** I have a question for the Minister, while we have him here. It is kind of him to come.

We heard in the first session from Professor Harnden about the vaccine being available to people with learning disabilities. You tweeted during the morning that anyone on the GP learning disability register can now come forward. I think Professor Harnden said it was for people with severe and profound learning disabilities. Would you clear up what the advice is?

Nadhim Zahawi: I am happy to clear that up. The JCVI has reviewed its advice, and now anyone who is registered on their GP's register with learning disabilities can come forward. About an additional 150,000 people will be able to come forward.

Chair: That concludes our questions for this morning. I reiterate my very

grateful thanks to all of the witnesses, and in particular to their colleagues who have got us into the very fortunate position we are in today. I remember well Professor Gilbert coming to see us at the Committee very early in this pandemic, and expressing even then confidence and optimism that we would be in this position. She has certainly been vindicated, and we are very glad that she has been in that respect. Thank you very much indeed. I think it is 6.55 in New York. Dr Dormitzer has earned a well-deserved breakfast. I hope he will enjoy that. I wish all of our witnesses well and conclude this meeting of the Committee.