HOUSE OF COMMONS

Health and Social Care Committee

Oral evidence: Management of the Coronavirus Outbreak, HC 36

Tuesday 5 May 2020

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Watch the meeting

Members present: Jeremy Hunt (Chair); Paul Bristow; Amy Callaghan; Rosie Cooper; Dr James Davies; Dr Luke Evans; James Murray; Taiwo Owatemi; Sarah Owen; Dean Russell; Laura Trott.

Greg Clark attended the meeting.

Questions 387 - 445

Witnesses

I: Sir Patrick Vallance, Government Chief Scientific Adviser; and Dr Jenny Harries OBE, Deputy Chief Medical Officer.

Examination of witnesses

Witnesses: Sir Patrick Vallance and Dr Jenny Harries.

Q387 **Chair:** Good morning and welcome to the Health and Social Care Select Committee. This morning's focus is looking at lifting the lockdown and the basis of the scientific advice that the Government are receiving about lifting the lockdown.

We are very honoured this morning to have two extremely important guests: Sir Patrick Vallance, the Government's chief scientific adviser, and Dr Jenny Harries, who is the deputy chief medical officer—both very familiar faces on our TV screens over the last couple of months. I also welcome to this morning's session as a guest Greg Clark, who is the Chair of the Science and Technology Select Committee.

I start by thanking Sir Patrick and Dr Harries and, through them, their teams. We often thank NHS frontline staff for all the work they do, but I know that your teams are working equally hard, equally long hours behind the scenes, so please pass on our thanks to all of them for the very important work that they are doing.

The Government have specified five conditions that have to be met before the lockdown is lifted. This morning, we want to go through all five of those conditions to try to understand the science and the basis for your recommendations on all of them. The first one I want to look at is the condition that the rate of new Covid infections must be falling to manageable levels.

Sir Patrick, last week we heard that the current R rate is between 0.6 and 0.9. What is your estimate of the R rate today and what level does it need to fall to before that condition is met?

Sir Patrick Vallance: Thank you for your comments about the teams working behind this, which will be much appreciated.

The R, we think, is still between 0.6 and 0.9. It is difficult to get a very fine granular estimate of the R, and that is true in other countries as well. We will, I hope, get a better estimate once we can measure it more directly by measuring rates of infection in the community, with large population-based surveys. So we think it is between 0.6 and 0.9.

There is a little bit of regional variation in that number, and one of the reasons that it is quite difficult to get a more precise estimate is that there are, essentially, three different routes of infection going on at the moment—in the community, where we think the R may be lower; in hospitals; and in care homes, where there is obviously the possibility of infections coming back out into the community. Those three different sources make a very precise estimate of R quite difficult.

In answer to the question of where it needs to be, it needs to be below 1, because as long as it is below 1 the epidemic is reducing, and instead of talking about a doubling time we are talking about a halving time of the

epidemic. Obviously the lower the R, the shorter the halving time. If you want to get down to very low numbers very quickly, you have to have the R as low as possible, but anything below 1 will be a reducing epidemic. Therefore, the question about what value it needs to be is dependent on how quickly you want to get down to the total lowest number in the community that you think would be manageable for the NHS and for society as a whole. That is obviously a decision that politicians need to make.

Q388 **Chair:** One thing that would obviously slow the rate of new infections is if people who have had the disease have some kind of immunity. What is your current judgment about whether people who have had Covid have immunity and how long do you think that immunity might last?

Sir Patrick Vallance: The evidence accumulating from around the world, and indeed from the UK as well, is that the vast majority of people who have had an infection get some form of antibody response. That looks quite promising in terms of there being an antibody response. It is mainly known from symptomatic cases, so there is a question about whether asymptomatic cases also get as strong an antibody response, and I don't think we know that for sure yet. What we don't know is the degree of immune protection that provides.

Everything suggests that you can get neutralising antibodies, which are antibodies that protect against the disease. You can theoretically get them, and people have isolated them, so you would expect some degree of protection from antibodies. We do not know that it provides absolute immunity, and it almost certainly does not; it will provide some degree of protection. The other thing that we do not know is whether it is still possible to carry the virus even if you have antibodies. That is more about whether you could still be infectious to somebody else rather than whether you are protected against it.

The situation at the moment is that an antibody response is likely in most people; it is likely to provide some form of immune protection, but how much we don't know. Experience from other coronaviruses suggests that it may last for one, two or three years but not for many, many years.

Q389 **Chair:** It sounds like there is still a degree of uncertainty as to whether an antibody leads to an immune response. Back on 13 March, you said the aim was to build up some kind of herd immunity where lots of people in the country had had the virus so that they could not catch it again. When you said that, which was nearly two months ago, what was your evidence then for the existence of that kind of immunity?

Sir Patrick Vallance: I should be clear about what I was trying to say, and, if I did not say it clearly enough, I apologise. What I was trying to say was that, in the absence of a therapeutic, the way in which you can stop a community becoming susceptible to this is through immunity. Immunity can be obtained either by vaccination or by people who have had the infection. We don't know, as I said, exactly what degree of

protection you get from natural infection, and we don't yet have a vaccine.

The second thing is that the higher the proportion of people in the community with immunity, the easier it is to control the disease and, ultimately, the easier it is to release measures. So vaccination becomes an important part of how you end up with protection, assuming you can get a decent immune response with vaccines, which we also do not know yet, but you would expect there to be some degree of immunity. The expectation is that antibody responses will correlate with immunity to some degree—maybe very high or maybe not so high. As to the degree of protection, whether it is to reduce the severity of the disease or to reduce the overall effect of the disease and the ability to catch the disease, we still have some work to do to find out about that.

Q390 **Chair:** You said something else that was very striking in that interview on 13 March. You said that we should be prepared to change our minds as the evidence changes. We obviously know an awful lot more now than we knew then. If we were in an identical situation now to where we were right at the beginning of March, would you still advise that it would be wrong to lock down the country at that stage, nearly three weeks earlier than we actually did, and that it would be right to go ahead with events like the Cheltenham Festival or the Liverpool Champions League match?

Sir Patrick Vallance: I will restate what I said then. This is a new virus; we don't know about it; it is something that nobody had ever seen before and, therefore, inevitably we are learning as we go along. As we learn, we will become more informed about which decisions we should take, and that is going to continue to be the case. I remind you that we are still quite early in this epidemic, actually. Although most countries are getting on top of the first peak in some ways, it does not mean that the whole thing has gone away. There is an awful lot still to learn.

In terms of what I would do in retrospect if we knew then what we know now, I think that is something for the future to look at. Certainly, there will be times when evidence did not allow decisions to be made that you could make now, and there will be times at which you look back and say that something might have been done differently. I have no doubt about that.

In terms of the timing at which we took our intervention, I think the CMO was clear about that when he spoke recently. When you look at everything that happened and the speed at which it happened, maybe days either way would have made a difference, but I think it is difficult to look back and say three weeks was an obvious point to do it. I do not think that was clear and I do not think it is clear now.

The other thing that is quite important to understand is that the investment that we made in the genomics of the virus quite early on—where we have been able to sequence thousands of viral genomes—allows tracking of the provenance of different outbreaks. One of the

things that looks clear is that early in March the UK got many different imports of virus from many different places, particularly European countries with outbreaks.

We saw a big influx of cases, probably from Italy and Spain, looking at the genomics of the virus in early March, seeded right the way across the country. Whether that was people returning from half term, whether they were business travellers or not, we do not know, but a lot of the cases in the UK did not come from China and did not come from the place you might have expected. They actually came from European imports and the high level of travel into the UK around that time.

Q391 **Chair:** The reason I asked that question is not because of the benefit of hindsight, because we all benefit from that, but, if you are saying now that it is wrong to lift the lockdown if it brings the R above 1, it is curious that before you were saying it would be wrong to introduce the lockdown when the R was between 2 and 3. I wondered how you would address the change in that advice.

Sir Patrick Vallance: When the virus first appears, its natural rate of progression of R will be something close to 3, we now know. If you have very small numbers that you can control with contact tracing, you can tolerate an R that is a bit higher because you are managing it through contact tracing and can get on top of it very quickly and bring it under control.

Where we are now is that we know we have a relatively large number of people who are infected with the virus and we have not yet brought that number down to a manageable number to totally control with contact tracing and isolation. It is important that we have that as part of the plan going forward, and that will allow you to lift the distancing measures as you go through that phase. It is really about the volume or number of infections that we have in the country. It is clear that there was a very rapid escalation of numbers in March, partly for the reasons I have just described, and that the doubling time suddenly became very much quicker. That was an important part of why it was important to start the lockdown.

Q392 **Chair:** The Government say that they always follow the scientific advice. Can you understand, as the person who chairs SAGE, why, if they say that they take their decisions based on the scientific advice, it is absolutely essential that SAGE's advice to the Government is published so that we can have some kind of scrutiny of Government decisions?

Sir Patrick Vallance: Throughout my career, I have been a strong advocate of transparency and openness in science as a key measure, and on the public record in a number of different forums, including when I worked for the pharmaceutical industry, I have said that it is very important. I absolutely believe in transparency and openness.

As you are aware, we published some of the papers of SAGE and will continue to publish them; some more have come out this morning. I want the team to get into a regular rhythm of publishing those papers. Those are the inputs to SAGE. It is important that other scientists can see the input to SAGE, although most of that data is available for anyone to look at anyway, because a lot of it is public domain information.

What is not a decision for me, but is an important one, is the output from SAGE to Ministers. You, of course, will be very well aware, as a previous Secretary of State, that there is information that politicians need to see, in order to make decisions, and that they need to receive in confidence, to be allowed time to make those decisions. Once they are made, it is reasonable that the science behind them is something that people can look at, but it is not my business to release the information to the public before Ministers have seen it. My job in this case is to make sure that Ministers get the advice they need in order to make decisions.

It is important also to recognise that decisions are made on all sorts of different grounds, of which science is a key input, but it is not the decision maker. SAGE does not make decisions. SAGE gives advice; it is an advisory body and Ministers of course have to make decisions.

Chair: Understood. I think in this case the difference is that the Government are very clear that they are following scientific advice; that is the basis of every decision they take. That is different from the ordinary decisions that are taken by politicians, so it is very difficult to understand or scrutinise what they are doing unless you can actually see what that advice is.

Q393 **Greg Clark:** Thank you, Sir Patrick, for appearing. I start by putting on record our gratitude to you for publishing the names of the members of SAGE. It was something that my Select Committee called for. I think it has justified this step because it reveals, as I expected, that the strength of science that we have in Britain is very well represented. Would it not be worth continuing with that policy of openness and making sure that we publish the papers that SAGE considers, in a timely way? I think the middle of March was the last time that the scientific papers were published, but you said that some have been published this morning. Will they be published more frequently in future?

Sir Patrick Vallance: Yes, I hope so. That is definitely what I would like to see happen—that we have a regular rhythm of publishing papers. We need to get them out as quickly as we can. I am sure you will appreciate that the Government Office for Science is a rather small organisation and they are working flat out and trying to get papers published and ensuring that they have been appropriately cleared. We will do that on a regular basis, and I am very keen to get the papers out as soon as we can, with quite a large number having been released this morning. I want to get into a much more regular rhythm of getting those papers out.

Q394 **Greg Clark:** How regular do you expect it to be—weekly, every time

SAGE meets?

Sir Patrick Vallance: I do not know exactly how, but it should not be a month—it should be shorter than a month—and we should try to get them out on a regular day every couple of weeks or something if we can, but I cannot commit to being absolutely sure when that will be because there are a lot of papers. Not all of the papers are ours, by which I mean that some of the papers are papers produced by academics that they wish to put into the public domain in the usual way, through scientific peer review and publication. The timing of when those go into the public domain is in their hands, not ours, but we are trying to get as many of the papers out as quickly as we can after we receive them.

Q395 **Greg Clark:** I understand. You and Professor Whitty have been very clear that SAGE gives scientific advice but that policy decisions are separate and they are for Ministers to make. But the Government have maintained, I am sure accurately, that they have followed scientific advice in policy decisions.

In terms of being able to scrutinise that, is it not important that the scientific advice that is given to Government is available for the purposes of corroborating statements that the scientific advice is being followed? It would not necessarily be before or at the same time as it is given to Ministers, to take your earlier point, but surely, shortly afterwards, a summary of the scientific advice ought to be made available, so that it is possible to discern whether the policy decisions that have been taken are indeed drawing on the scientific advice, and that there is not a danger of eliding scientific advice and policy decisions.

Sir Patrick Vallance: It is probably worth taking a step back and saying how SAGE has operated in the 11 or so years since it first started. It is a sub-committee of Cobra, and reports to Cobra, and it was set up in such a way that the minutes are published after an event has finished. That is how it has historically worked.

What is different in this situation is that we do not know when this is going to end, so the question is what the right speed is after an event to publish the minutes. That is a very important question. It is obviously one that Ministers would need to take a view on as to whether they were happy for advice that has been given to them to be in the public domain. What we are doing at the moment is publishing the input to SAGE.

It is worth reflecting that there are other times when science advice is given. If you go back before SAGE was formed, it is very difficult to know what science advice was given then, because it was often not published at all in terms of what was there. I think we are in a better position than the past, but I completely accept that, with an ongoing situation like this, it is very important that the science advice is known and open to scrutiny. I do not think the timing of that should be at the end of the whole thing; that is clearly too far away. It is up to politicians to decide

when they think they are happy to have the advice that has gone to them released into the public domain.

Q396 **Greg Clark:** Might not SAGE have a view on that? Is it entirely down to Ministers? If Ministers are praying in aid that advice, isn't there a joint interest in agreeing a timeframe for publication?

Sir Patrick Vallance: As I said at the outset, my view is that transparency is rather helpful in this situation, and the more that the science advice can be scrutinised by others, the better. I think SAGE will probably be of that view. We have not asked that specific question, but I suspect more people on SAGE would be in favour of making sure that the science advice is available, certainly not waiting till the very end of this in order to release all the information.

Q397 **Greg Clark:** I have a final question on that advice. We find in our Committee that, in measuring the impact of the coronavirus, the total number of deaths—the excess deaths, as they have been referred to—is perhaps a more relevant figure than those that can be directly attributed to the virus, in other words, indirect deaths as well. Is that your view, Sir Patrick?

Sir Patrick Vallance: There was an excellent piece written by David Spiegelhalter in *The Guardian* not long ago that summed it up very well; he got it right in terms of how one should look at this. I think that excess deaths is a sort of integrated measure, because at the end of the day it tells you the impact of the direct effect of the virus, the indirect effect on the NHS and, of course, any effects of the lockdown measures themselves, which may also have adverse health consequences. It is right that excess deaths is probably the correct measure to look at as an integrated measure, but it will take a while to see that. Different countries aggregate that information in different ways, so it is not easy to look across that at the moment.

Q398 **Greg Clark:** We know, and Professor Spiegelhalter has drawn attention to it, that some of the deaths and the impacts are going to be indirectly through the effect on the economy, and we know that a severe economic impact has its own consequences for public health. That being the case, it is surprising to me that the publication of the names of members of SAGE does not include a substantial component of eminent economic advisers. If this way of conceiving the impact is important, surely being able to assess the indirect impact of some of the measures to control the virus is important, just as the medical impact is.

Sir Patrick Vallance: Yes. It is true that it is an important area. We have looked at that, and are looking at that, with the chief statistician and others—looking at total excess deaths and trying to get a handle on that. At the moment, the economic side is integrated after the SAGE process. It comes together later in the Government process, to take that into account.

We have looked at whether we should now think about a sub-group of SAGE on economics. It is something we are considering, but I think it is important that SAGE does not become the integration of all knowledge in order to give the Government advice across every single aspect of this. At some point, the output of SAGE needs to be integrated with economic analysis from others. We have an economist on SAGE from the Treasury, and we have other people who have backgrounds in that, but we are not specifically looking at the economic impact. That is being looked at elsewhere.

What we will do is look at the mortality in different sectors, and across total mortalities, to try to get a handle on that. We have looked at whether we should have economists. We may be wrong, and we are open to advice on this, but we do not think we should try to create some mega-model of all the economics and all the disease modelling and epidemiology all together. We think that would cause spurious accuracy, but we absolutely agree that economics is an important part, and it is being looked at very hard by other groups.

Q399 **Greg Clark:** Perhaps less on a disciplinary front, if we know that measures that affect the economy affect people's health and affect deaths, that must be weighed, surely, into the advice that SAGE is giving to inform Government decisions.

Sir Patrick Vallance: At the moment, we are focusing on what we need to do in terms of controlling the epidemic itself and focusing most of the advice on the effects of changes in the epidemic. It is absolutely true that then there are the counter-consequences of the lockdown that might have detrimental effects, and those are being estimated. But, as I say, I think it is a role for Government to integrate that information afterwards, not for SAGE to try to come up with a single integrated answer. We have to concentrate on the disease outbreak itself as our primary focus at the moment. That may change in due course, but that is where SAGE is focused at the moment, and others have an accountability to look at the other aspects.

Q400 **Dean Russell:** Thank you, Sir Patrick, for joining us today, and thanks to your team and to Dr Jenny as well. I have two lines of questions and I will be relatively brief: the first is on infection rates and the second is on use of masks.

From an infections perspective, how far along are we in the science of understanding when people are most infectious? For example, is it the case that when they have their symptoms in full flow people are most likely to infect somebody? Is there a point when people who are perhaps less infectious at the start and at the end are going to have slightly less impact in terms of being locked down?

Sir Patrick Vallance: We think that the most highly infectious time is a day or two before symptoms start and two or three days after symptoms start. Thereafter it tails off reasonably quickly in most people, so that by

between five and seven days afterwards people are much less infectious. The peak time for viral shedding and infectivity is around the time of the start of onset that precedes it as well, which is one of the reasons why asymptomatic transmission is potentially an important feature of this illness.

Q401 **Dean Russell:** I wanted to clarify that before I asked my next question. With regard to masks, there has been a lot of debate around whether the public should wear masks, whether they are PPE medical masks or just scarves around their mouths. I have been volunteering in Watford general hospital and I see a variation of people who come in to volunteer, some wearing masks and others not. With regard to masks and covering one's face to stop infecting other people, is that something you would say is worth doing?

I have a very specific personal question to you, which was given to me by a colleague. If you were in a supermarket that was full, with everyone still social distancing at 2 metres apart, and there were people who were perhaps coughing or not even showing that they had coronavirus, would you feel more comfortable in a queue if everybody was wearing a mask versus if everybody was not?

Sir Patrick Vallance: Let me deal with the latter point first. If people are coughing, they should be at home self-isolating; that is absolutely clear. They should not be out doing those sorts of activities. The key thing is self-isolation, and that will remain the key thing.

The situation with masks, as you can tell by the number of eminent scientists who are very strongly in favour of one position or a completely opposite position, is that the data and the evidence are not straightforward. I will tell you where SAGE got to with its evidence, which has been given to Ministers.

We think that the evidence of masks preventing the spread of infection from one person to another is marginal but positive, so there is some evidence that it can do that. It looks as if the major route of infection in this disease is probably droplet spread rather than true aerosol, but there may be some aerosol components as well. Masks may have a marginal positive effect in that situation, or face coverings of some sort might do.

To take the other situation, which is for healthcare workers, it is very clear that, in high-risk situations, with very high viral loads and potential for aerosolisation through various procedures, the role of masks is clear. The evidence is much stronger and it is absolutely clear that those people should have masks.

For most of us, the situation in outdoor environments is that the risk is really low, and the 2 metre distancing is based on a probability. The evidence, as far as you can get very firm evidence on it, is that essentially a minute at 2 metres' contact is about the same risk as six seconds at 1 metre, so that gives you some idea of why the 2 metres

becomes important. The risk at 1 metre is about 10 to 30 times higher than the risk at 2 metres, so the distancing is an important part of this.

Where masks may have a role is in situations where distancing is not possible; there may be some cases where it simply is not possible. Where there may be undue crowding—but ideally there should not be crowding—there may be times when wearing masks can therefore be beneficial to stop the spread. It is important that those coverings are worn properly, in other words that they cover the nose and mouth, and it is important that people do not handle their face a lot because there is a much, much higher risk of transmission from hand to face from touching things. The rather boring but important thing about washing hands remains absolutely critical in all of this. Face masks may have a role to decrease transmission in some of the situations that I have described.

Q402 **Dean Russell:** Can I clarify, though, because I am thinking more long term? When the lockdown is lifted, we are going to have a lot more people out, and therefore the risks of them being in close proximity are potentially higher. Even now, I go to supermarkets and people are not always following the rules. I wonder whether that might taint the decision around whether everybody should wear masks or whether potentially we should trial the use of masks in one part of the country. The tracing app that was launched yesterday—which is great—is being trialled in the Isle of Wight, for example. Is there any sense of perhaps testing, perhaps post lockdown or during the latter phases of lockdown, to have one area trialling masks to see whether it makes a difference?

Sir Patrick Vallance: This is where the evidence gets even weaker, in a sense, in terms of any positive effect. There are lots of theoretical reasons that we have laid out as to why masks might make a difference. In the trials that have been done, it is very difficult to see any significant effect. They are quite difficult trials to do to get really accurate results, not least because the mask is not the biggest component of why you get an outbreak in an area, and therefore it is unlikely—not impossible but unlikely—that you will get very clear results. I am not saying it should not be done, and there may be a good reason to do it, but I am not sure that it is a very easy thing to do.

The decisions you are talking about, though, are decisions for politicians. We have given advice on what we think the evidence is on masks, and it is then for politicians to decide what to do, and you can see people making decisions around the world based on that. Scotland has said what they are going to do based on the SAGE advice, and I think it is for Ministers to decide how they take the SAGE advice.

I come back to two points that really need to be stressed. The first is on the role of proper surgical-grade masks in healthcare settings and care-home settings. It is really important that the PPE there is in the right place. It is much less important for being outside walking around. It is a probability thing. To be as clear as I can, if somebody comes up and coughs directly in your face, of course that is a risk. Even in a short time,

if you are walking straight past somebody and you are a metre and a half apart, and you have maybe a second or two when you are close, the probability of something happening is relatively low. These are fine judgments that politicians will have to make and, of course, they have implications for all sorts of things, including how we work as a society, and that is not for SAGE to comment on.

Q403 **James Murray:** We have been told that the average R is currently around 0.6 to 0.9, which would mean that the epidemic was overall shrinking, as R is below 1, but you also explained, Sir Patrick, that R varies in different places and different contexts. You suggested that it is higher in care homes, so what is your current estimate of the level of R in care homes? Is it not the case that the average R could be below 1, meeting the Government's test, yet we would still have a situation where infections are rising in care homes?

Sir Patrick Vallance: As I said at the beginning, there are three different sources of infection that we need to think about. There is community spread, where I think the R is definitely down below 1 nearly everywhere, if not everywhere, across the UK.

The sources of infection into and out of care homes and the health service are critically important. It is very difficult to get an R value on care homes because they are spread around the country and they each have a different characteristic and a different risk, so we do not have an R. We feel that the care homes and the nosocomial spread—the spread in hospitals—are two parts of the epidemic that must be brought under control if we are to get control of the overall thing, because otherwise we get reseeding of cases into the community and seeding of cases into those vulnerable populations who desperately need to be protected. The control of infection in care homes and hospitals is, we think, critical to the overall control of the epidemic.

Q404 **James Murray:** I want to understand how that fits into the overall strategy. As we heard earlier, on 13 March you set out the Government's approach as being to try to reduce the peak, broaden the peak, not suppress it entirely, build up some kind of herd immunity and at the same time protect those who are most vulnerable to it. If that represents the Government's approach, should they not at the very least ensure that the virus is suppressed in care homes, where some of the most vulnerable people in society live, before lifting lockdown measures?

Sir Patrick Vallance: To reiterate, as I said at the beginning to Jeremy Hunt, my points about immunity were not actually about getting immunity through that route. My point has been clear from the outset that we need to suppress the peak, and keep the peak down flat below the level at which the NHS can cope, to protect the NHS and to make sure that we reduce deaths. That has been the strategy.

The care home point is absolutely right. We need to get on top of it in care homes. We have been clear about that. That is an operational

matter and it is quite important to distinguish between what SAGE can and cannot do. What SAGE does is try to distil the scientific advice into a form that then others need to operationalise and take accountability for, so I think the questions that are being asked are rightly for DHSC rather than for SAGE in terms of control of infection in care homes.

Q405 **James Murray:** But you would agree that the outbreak in care homes does need to be suppressed—

Sir Patrick Vallance: Completely. I cannot be clearer about that. It is a very important part of what needs to happen—control of the outbreak in care homes—and it is something that we have been clear about for a long time. It is an important part of this epidemic and needs to be controlled for sure, not least, of course, for the people in care homes, who are particularly vulnerable and at particularly high risk of getting an infection. The transmission from workers inside and outside remains an issue. Jenny Harries may want to comment on this as well.

Dr Harries: Yes, I would like to add to that. There is a sub-group of SAGE that is looking at some of the more scientific areas of interest in relation to care homes and the potential risks of disease transmission, but I think perhaps what James Murray was looking for was also how that translates from the scientific advice and research and into the operational area. I agree that SAGE provides the scientific advice, but we have a group of senior clinical leaders that the CMO chairs frequently, and these are the sorts of issues that are discussed frequently. I am also personally linked to a ministerial-led group overseeing work on care homes.

The particular issue of disease transmission risk in care homes is one where there have been a number of studies by Public Health England. It is quite early days, and the difficulty in trying to understand the key measures that can be taken is probably twofold: these are very small studies and just give early indications, but particularly in the elderly the presentation of symptoms is perhaps not as clearcut as in some other members of the public. We heard earlier that you can have asymptomatic transmission right at the start of your illness, but in many elderly people in residential care homes there appears to be a different sort of presentation and it can be quite difficult then to understand the problem that is there.

Clearly, if an outbreak is evident, Public Health England will always move in, do appropriate testing and provide appropriate public health advice. One of the tricky things we are dealing with is to understand the step before that, and that is now part of a very active programme of testing and scientific research. We will have more on that, but I would not like the Committee to think that there was not active scientific and clinical support for that area of work.

Chair: Thank you very much indeed. We have three more brief questions in this section before we move on to the next section when I want to ask you some questions, Dr Harries, so please do not think we are neglecting

you.

Q406 **Sarah Owen:** My question is to Sir Patrick. First, I extend my thanks to you and to your team for all the work that you are doing at this time.

As has been mentioned already, the Government defend their decision making as being led by the science. This part of my question can be answered with a simple yes or no. Has the scientific advice provided by SAGE to the Government always been unanimously agreed by the many members, especially advice given on herd immunity and when the UK went into lockdown?

Sir Patrick Vallance: Again, we give science advice and then Ministers have to make their decisions. All I can say is that the advice that we have given has been heard and has been taken by the Government. Clearly, what we do not give advice on is absolutely precise policy decisions or absolute timings on things. Those are decisions that Ministers must take on the basis of the science. The correct way of saying it is that the decisions are informed by science. They are not led by science, as you said in opening the question.

Q407 **Sarah Owen:** Forgive me; I am just trying to understand how the Government interpret the advice given by SAGE and what sort of advice is given by SAGE and the format of the advice. If, for example, there are different opinions among the members of SAGE—as you have already said, there are lots of different opinions about masks, for example, and the evidence around that—does SAGE provide one considered option to Government, or are different options and different advice laid out for the Government to take a decision?

Sir Patrick Vallance: What we don't do is just say, "There are 16 different views. Take your pick," because that is not helpful. We try to come down to what we think is a position or a range of positions—two or three options—to say, "These are the sorts of things you could consider. Here is the reason that we think they are reasonable options. Here are the uncertainties that lie around those options." Nearly everything we are talking about has quite wide uncertainty around it. That uncertainty may be one that we can put some mathematical bounds around, so we can put some confidence intervals; or it may be genuine uncertainty, in that there is not enough data to be able to make any sort of decision; or it may be a behavioural science approach where we do not have the data at the moment and we have to give an informed view. So our output is very much in the form of options, in the form of uncertainty and in the form of what could be done and what the potential consequences might be, not, "Here is the answer. Get on and do this." That is not how it works.

Q408 **Sarah Owen:** So it would be more accurate to say that the Government's decision making is being led by different scientific options, of which they have chosen one.

Sir Patrick Vallance: It is more accurate to say that the Government's decisions are based on science informing them with the best possible

option as to what the uncertainties are around the information that is provided. Then obviously Ministers need to make choices. What we are definitely not doing—I want to be clear about this—is laying out a menu of 15 options and saying, "Take your pick." We are trying to say, "The best possible consensus view on this is the following, which leads you to the following sorts of options that you might consider and the uncertainties that underlie those various pieces of advice."

Q409 **Sarah Owen:** Has SAGE ever presented the Government with just one considered option, or has it always given the different options underneath it, albeit a small range of options—provided the Government with different options and scenarios?

Sir Patrick Vallance: I am trying to think if we have ever given a single option. I doubt we have ever given a single option. We are more likely to have said, "Here are the range of things, with the potential effect sizes, and these are the choices you could make at this point."

Q410 **Dr Davies:** I have a question about the regional variation of Covid infection—three points. First, do we need to see the R value and the incidence of Covid decreasing in all parts of the UK in order to lift the public health measures? Secondly, for regions where there has been a low level of infection or we have been behind the curve, do people have anything to fear from the lifting of measures in terms of lower levels of immunity or any other factors? Finally, is there a role for a different release of health measures in different parts of the UK?

Sir Patrick Vallance: The R is, as I said, potentially a bit variable across the country, but it is not huge variation. It might be 0.6 in London and 0.7 somewhere else—that sort of level, not huge change.

The incidence will be different, and the prevalence of infection. We know that cities and densely populated places have a higher prevalence than rural places; that is definitely the case. An option that could be considered is to think about whether measures could be taken locally versus nationally; that is an option that people could go for. There are pros and cons of that. You can see in other countries that people have looked at those, and they are possible scenarios that people could look at.

There are quite big complexities in terms of transport, if you do that as well. Once you go to a regional approach, you are, effectively, saying that you are going to demarcate regions very carefully and you have to control flow between regions, but that is a possibility.

Your second question was about low levels of risk and about immunity. Again, I stress that what we do not know at the moment is immunity; what we know is antibody status. We are beginning to get some information around that, and the latest I have seen is probably from just over two weeks ago and reflects three weeks before that, because that is roughly how long it takes you to get your antibodies. It suggests

something like 10% antibody positivity in London and something much closer to 3% or 4% in other places. It may be lower still in other places. I would expect to see variation in that across the country. We will get more information as those studies go on, but I would not expect to see antibody levels much above the mid-teens; but we will see.

Q411 **Dr Davies:** Based on that, in other words, every region should perhaps be treated the same because a 10% or 15% level of antibody prevalence is still very low, isn't it?

Sir Patrick Vallance: Yes, in terms of vulnerability of the population there is nothing to suggest that you should treat different regions differently. There may be other reasons, such as local prevalence, but, as I said, that comes with complexities. In terms of vulnerability of the population, you would need to get to higher levels than that to suggest that one place had a massively different protective environment from somewhere else from the population antibody, and we do not yet know exactly how much protection the antibody status gives you.

Q412 **Laura Trott:** I want to ask a couple of questions about the role of children in spreading this disease. When the CMO gave an evidence session to us in early March, he said that closing schools was one of the lower-impact measures that we could take. All of the country will have seen the speculation in the weekend papers about reopening schools, and on the back of that I have had lots of worried emails from parents about whether they are going to be forced to send their children back in, and conversations with teachers who are very worried about the risk that they are exposing themselves to.

Can you clarify, please, Sir Patrick, what is the science behind how at risk children are, and does that vary by age? What is the role of children in spreading the disease to adults, and again how does that vary by age?

Sir Patrick Vallance: It is very clear that children are at much lower risk of clinical disease and severe disease. For severe disease, the evidence is absolutely clear that they are at very much reduced risk—not zero risk, but very, very much reduced risk. There is also reasonable evidence to suggest that they are at lower risk of getting symptomatic disease or clinically evident disease, so the effect on children is much, much lower.

The next two questions, in a way, are, do children become infected less? There, the evidence is less robust. There is some evidence that children might be less susceptible to becoming infected. For example, I have seen data from other countries suggesting that they have a lower incidence of infection itself, and that potentially you can pick that up with antibody responses and so on—so maybe, but not strong. Our view from SAGE is that it is low certainty.

Then on transmissibility, are they sources of transmission? The evidence is that they are unlikely to be higher than adults as a source of transmission and may be lower. Young children particularly may be a lower risk of transmission, but again the evidence is not compelling, and

you would have to say it is low confidence in terms of that. Overall, children are fine; they have less of a problem, but some of course get a problem. Maybe—maybe—they get infected a bit less, and maybe, perhaps, they reduce transmission, but we are not clear about that at the moment.

If you put all that together and add one other thing, which is what is the role of children not because of their infection or transmissibility but their ability to contact across households, you see that very young children are not such a big cause for transmission because they do not have household-to-household connection in quite the same way as older children do. I suspect that is what underlies the decisions in lots of European countries to go for primary and younger-age children first; they are less likely to cause onward transmission, not for reasons of biology but for reasons of contact and patterns of links between households. Older children, of course, are more likely to do that.

Q413 **Laura Trott:** Is there more research work going on as to what the transmissibility is? As you rightly point out, there are huge areas of uncertainty, as with so much of this virus. Obviously, reopening schools when there is uncertainty around this is in many ways risky. What work is going on to firm up the science in this area?

Sir Patrick Vallance: Very early on—I think in January, although I cannot remember exactly, or maybe early February—we got the funding agencies across the UK together to get some rapid-response funding in place to be able to answer questions, and the academic community, of course, has been applying for those grants and doing lots of work around that. There is work that will be going on in the academic community across the world to try to answer those sorts of questions. I saw some data that the Dutch health agencies shared with me recently about that as well, so there is a lot of work going on.

Any measure of lifting social distancing inevitably must come with a risk. The reason the measures were put in place was to reduce the risk, so the moment you remove them, of course you stand a chance of increasing risk. The very important thing, going forward, is to have very good surveillance systems to be able to pick up risk early. Nothing is going to be risk-free. Everything, as we go back to less social distancing, will carry a risk of there being an outbreak somewhere, or a few more cases, or, in the worst-case scenario, R going above 1. We need a very effective surveillance system to pick that up, which needs to be run nationally, but needs to have local granularity, to be able to pick things up in and around regions that make sense.

Q414 **Chair:** I want to move on to the second condition the Government have laid and bring in Dr Jenny Harries, who has been sitting very patiently for nearly an hour.

The second condition is that there needs to be a sustained fall in death rates. At 9.30 this morning, the ONS published the latest all-cause

mortality statistics that showed that for the week ending 24 April the number of excess deaths was 11,500 higher than the five-year average for that week, which was slightly lower than the previous week but none the less significantly higher than you would normally get.

Dr Harries, it is obviously too early to say which countries are doing best or worst on death rates, but the charts that you show us at the Downing Street briefings do have a pattern. The pattern is that the UK is in a cluster with Italy, France and Spain but that Germany and South Korea, among others, seem to be doing a lot better than other countries when it comes to death rates. What is your early analysis of why that might be the case?

Dr Harries: The really important message on deaths, apart from the sadness that of course comes with them, is the fact that we will have to wait quite some time, I think until the end of this pandemic, to do robust comparisons. Even then, it will be extremely difficult. One of the reasons for that, which I know has been repeated often for media questioning and in other environments, is that different countries collect their data in very different ways. You highlighted that the UK has moved to a different pattern; on 29 April, we moved from publishing just the hospital death data, which is a very early and very robust way of giving an indication of the change in death rate, to publishing deaths in all environments where we know there has been a confirmed case of Covid.

We now have a number of different ways of reporting deaths, and that can appear quite confusing to the public. The important thing is that sitting behind that is an endeavour, first, to be very transparent about what the position is; secondly, to be clear that we are counting and actively looking in areas where we have particular concern, which, for example, includes the care sector; and, thirdly, using all sorts of available information to try to coherently put the pattern together, because along with the surveillance programmes, which Patrick has spoken about, we will perhaps find new clues as to how we can better control the environment and make environments safer for people, particularly as we come through lockdown.

To go to your main point, which I think was about international comparisons, it is extremely difficult to compare countries at the moment. We need to look not just at the numbers, but at some sort of rate. The obvious one would be an age-standardised death rate per million population. Those are not numbers that are routinely reported, so it is really quite difficult to do direct comparisons.

It behoves us to look at that information, to check and to continue talking to public health and science colleagues in all the different countries, particularly where there are significant differences, to ensure that we understand as best we can. If I remember rightly, when the CMO came before the Health and Social Care Committee last time he highlighted a conversation he had had with his German counterpart, trying to understand the differences in approach and outcomes in the two different

countries. Those remain unclear in some cases. It is very important that we look at death data, but we need to be very careful about how we interpret it.

Q415 **Chair:** I understand that caution, but this is a crisis where we are trying to learn as much as we can as quickly as we can. On 26 March, you said that community testing was not an appropriate intervention for the UK. Both South Korea and Germany, the two countries that on the charts shown in Downing Street appear to have had much lower death rates, carried on their community testing. Sir Patrick has just told us that it is absolutely essential to know exactly where the virus is if we are going to track it. Do you still think it was right to stop community testing on 12 March, rather than ramping it up rapidly, which we ultimately decided to do in April?

Dr Harries: Perhaps to clarify the statement—apologies if I did not do that at the time—12 March was the period when we moved from the containment phase to "delay". Up to the point of containment, along with many other countries, we had tried vigorously, with very active contact tracing, which is normal public health process, to contain cases and to contact-trace each individual contact.

Once you get very sustained community transmission, you are likely to see a rise in clinical cases and you have more difficulty trying to contain the virus. At that point, there is an element that says the most important thing is to manage clinical risk and to ensure that patients are managed safely and get the best care. My comments at the time were that we were focusing our testing and tracing on those individuals. At the time, we would have been doing outbreak control, for example, in care homes or in other high-risk environments such as prisons, so that contact tracing would have continued.

Q416 **Chair:** My question was very specific: do you still think it was not appropriate to test in the community? That is what they did in South Korea and Germany, and they seem to have had much lower death rates than us. We could have chosen in the early part of March to ramp up our testing, as we actually did a month later, but we did not; we stopped testing in the community and therefore we stopped knowing where the virus actually was. You were very clear that it would not have been appropriate to test in the community; you used the phrase, "It is not an appropriate intervention," and I want to check whether you still think that.

Dr Harries: I think the issue is what capacity we have to undertake testing and where that should be prioritised. In the unlikely event that a country has unending capacity to test, I think we would continue. However, there is an issue around capacity, and it is not just the testing. I think that, unfortunately, some of the conversations have ended with perhaps just thinking about the testing, but it is the action that goes with it.

In the examples that you have given, there would be a large component not just of doing the test, because that perhaps in itself does not lead to a change in outcome, but of associated actions. In Germany there was, I think, follow-on contact tracing, but there were also a large number of very different population groups, such as a number of young people coming back to Germany, so the population comparison is different. In South Korea, they had very focused outbreaks, which in fact would have been followed through in the same way in the UK because they were identifiable local hot areas, if you like, rather than sustained community transmission right across the country.

To answer your question, if we had had unlimited capacity and ongoing support beyond that, we perhaps would choose a slightly different approach, but with the resources that we had—I mean that in a broad sense because many of the specialists and expertise that you need to carry out additional contact tracing will also be supporting the other changes that have been very successful, such as ramping up NHS capacity, so there are clinicians working on the interface between public health and the NHS—it is appropriate that that capacity was maximised to save lives, as well as considering the spread of disease.

Q417 **Chair:** I am sorry to press you on this, but South Korea had the virus worse than us; they are closer to China and they had a super-spreader in a religious cult. Germany is closer to Italy and they got the virus before us, but they carried on community testing. The other thing about your comment just now about testing is that, when you were asked at one of the Downing Street press conferences about the WHO advice to test, test, test, you said that the clue for the WHO is in its title—it is a world health organisation—very much suggesting that the advice to test, test, test did not apply to high-income countries with developed healthcare systems. I want to understand whether you still have that view.

Dr Harries: I would like to clarify my position on that. I do think the test, test, test mantra from the WHO was very much at a time when a number of countries were not testing at all. It was entirely appropriate to encourage the whole world to test because unless you were testing you would not know whether you had any cases, so the comments that I made were very much to try to reflect that.

That does not mean that I think more developed countries with more developed health systems should not be testing. Indeed, we continued to do so. But there is a balance point with the resources you have available, and I use that word in its broadest sense, as this is very much about specialists to follow through with testing. You need to prioritise that. At the time we did that, we had to balance our resources across testing and other areas.

On the issue about countries, we refer to Germany a lot, but it is interesting that on the testing alone, I think—I am happy to be corrected—the number of tests carried out in Germany is broadly the same as the number of tests carried out in Italy, so testing per se does

not have a direct causative link. So it is the follow-on activity from that. What we are identifying here is contact tracing, and there is a resource component to that and a prioritisation component that needs to be considered.

Q418 **Chair:** Did you advise the Government on 12 March, when we stopped community testing and contact tracing, that you did not want to do that, that you understood why it had to be focused on hospitals but that really we should be increasing our testing capacity as soon as we could, so that we could carry on testing in the community? Was that your advice?

Dr Harries: As a preface, I would not have given that advice personally, but I think it was recognised in the plan for moving from containment to delay and mitigation that, as we moved into the delay phase, the prioritisation of approach would not necessarily be testing in all cases in the community but focusing on it where it could have the most effect.

We have always recognised that there should be active testing within an appropriate framework, and, of course, there is a very large programme of testing available now. It goes back to the earlier conversations with Sir Patrick. Different elements of testing are for different interventions, and that is important. Some are for surveillance, which is absolutely critical; we have just been talking about understanding transmission. Some are for actual clinical management, and some are for ensuring that staff can go back to work, for example.

We have always had a very active approach to increasing testing, and we recognise, and have always recognised, that there may be a point when the prevalence of disease is lower, as we are coming to now—I am sure everybody is aware of the Isle of Wight test. When the prevalence of the disease is under control, the element of testing and contact tracing becomes a very significant part again.

Q419 **Taiwo Owatemi:** I have two questions. One is on migrants and the other is on certification of deaths—death certificates.

The hostile environment has meant that migrants feel uncomfortable using public health services, including the NHS. In Professor Whitty's last statement at this Committee in March, he stated that migrants being treated for coronavirus would not have to pay, nor would it be an impediment to their treatment. Have the rules been relaxed and is cost still a barrier for those communities?

Dr Harries: The direct translation into policy of that is perhaps not something that the CMO or I would be directly involved with, but it was a point that was actively considered. As far as I am aware, it is still the case, and it was absolutely recognised that both for supporting the individuals themselves and for managing disease risk in the country—the whole-population risk—those were really important elements, and we did not want any barriers in place that would prevent people seeking treatment and actively getting tested. As far as I am aware, all those measures are still in place.

Q420 **Taiwo Owatemi:** A constituent of mine sadly passed away in a care home. His death was recorded as suspected Covid-19, but he was never tested. How do we ensure that the appropriate cause of death is recorded on a death certificate and, if Covid-19 is suspected, that there is a sufficient number of test kits made available to coroners?

Dr Harries: I will take that in two different parts. On the actual act of certification, if, for example—very sadly in your case—a resident in a care home had passed away, and it was clear that they had symptoms of coronavirus, or it was clinically suspected, the doctor writing the death certificate will include that. It might be, for example, that an individual had a primary cause of death that might be something unrelated. They would put the primary cause of death, but there is still an opportunity in the way the death certificate is written to say that Covid-19 was a suspected cause. It does not have to be proven. It has to be clinically considered to be a likely element contributing.

Going back to my earlier points about death recording, it is exactly for that that we are looking at data in different ways. The ONS data picks up individuals who have not necessarily had a confirmed laboratory test. It gives us a much better understanding of where people perhaps have not been tested. That may be for a number of reasons. One is the testing capacity and capability, and, of course, all care homes and residents now are provided with testing. I know that can be quite difficult in practical terms—as a number have reported—getting the testing to them, and a number of mobile units have been brought in. If there is an outbreak in a care home, Public Health England will advise locally and a mobile unit can now be brought in to support testing of residents, and the staff, which is also important.

The other thing we need to be mindful of in this disease is that, for residents in care homes, it is their home. They are near the end of their life and sometimes they may not wish to have additional interventions. That is another important element that we need to consider.

Q421 **Taiwo Owatemi:** I understand that, but, as you can imagine, the uncertainty on the death certificate can mean that many families are left in distress as they are unsure of the actual cause of the death of their family member. What support is being given in a situation where family members do want that clarification, and are test kits being provided to coroners to ensure that, in those situations, the deceased can be tested to confirm what their cause of death is?

Dr Harries: I am sorry, I misunderstood that. Are you talking about doing a test after death?

Taiwo Owatemi: Yes.

Dr Harries: In that case, if a family is concerned for a resident when they are alive, obviously there are additional testing facilities available. There is advice for coroners, and that is very much something for the

family to discuss individually. There is not provision particularly, but we have additional capacity, so I think if a family is particularly concerned there would be no reason why they should not have that local discussion. There may be practical reasons why it could potentially be more difficult, just in terms of ensuring that a result was valid, but that would be for individual discussion.

Q422 **Amy Callaghan:** It is my understanding that, to know whether we have sustained and consistent falls in the daily numbers of deaths, we need credible data. How credible is the data now on the number of tests being conducted, the number of cases of Covid-19 and the number of deaths from Covid-19?

Dr Harries: We have always been very clear that, in testing, the number of cases will not represent the totality of infections across the UK. That has always been very clear. Where measurements are made, we try to provide those that are most robust as an indicator but obviously highlighting any areas where there are caveats in translating that through.

Most of the early data, as I highlighted with the death data, is from hospital infection rates, because it is much clearer what those are. In terms of infection across the country, as Sir Patrick pointed out, our real, much stronger information will come particularly from ONS surveillance data where families are recruited based on a representative sample of the population, including on geographies as well. Short of testing absolutely everybody across the country at one point in time, which would not be practical, that should give a very good scientific estimate of infection rates across the country.

The death rate goes back to the points I was making earlier. The ONS has published quite detailed guidance, which I advise anybody to look at—more data, as we noted, has come out this morning—and that gives quite a robust picture. There is always room for improvement, and one of the caveats with this data is the practicalities about differences between registered deaths and the date of death. It can look quite complex, but in fact the data we have now is trying, in a very transparent way, to show the deaths as best we can, including the excess deaths that we think potentially are taking place at this time. I think our data now, particularly on deaths, is good. When we have the ONS surveillance data coming back, it will give a very good indication of prevalence across the country as well.

Q423 **Amy Callaghan:** To pick up on another point that was part of the initial question, how credible specifically is the data now in terms of the number of tests being carried out each day?

Dr Harries: In terms of the numbers carried out each day, tests are only counted once. I know there has been some concern about how that counting is being done, but John Newton, who is leading the collation of that work, highlighted in one of his interviews that a test is counted

either when it goes out or when it comes back in, and we have a number of different testing pillars. There may be a lag in the time between when the test was taken and when it is reported, but it will only be reported once. From that perspective, they should be entirely reliable.

Q424 **Sarah Owen:** I want to ask about why we are seeing disproportionate deaths in BAME communities. Does the panel agree that this is likely to be about more than just biology, and that structural and socio-economic inequalities are a major part of it? If so, how will that be addressed in any lockdown exit plan?

Dr Harries: It is a really important point and, increasingly, as we get different datasets coming through—there is a publication shortly from the obstetric surveillance unit, for example—there are potentially some signals. I am going to call them signals at the moment because one of the problems we have is that when academics, different research groups, have looked at the data they have, taking out elements of underlying disease prevalence—we know that chronic cardiac disease, for example, is a key contributor to poor outcomes from Covid, and the same applies to diabetes—and taking out the risk element from those conditions, which are frequently more prevalent in some black and minority ethnic groups, it gets to be a very complex picture. When, as you have just highlighted, you then add the complexity of perhaps cultural differences in the way people live, or perhaps the fact that different groups are more likely to be living in socioeconomically deprived areas in some instances, it is a really complex picture. What we are seeing are signals in some areas; but not all datasets, when looked at in detail, are demonstrating specific black and minority ethnic disparities.

For example, there is a Covid dataset—CovidSim—which is based on the hospital admissions, and I think that is where the signals were first picked up. That has been looked at in some detail and has not been able currently, I think, to detect a significant difference, but different signals are coming from different datasets. I think the answer to this will come from the Public Health England work that is looking not only at the characteristics, the variables, that may be of importance alongside ethnicity—the disease conditions as well—but is absolutely recognising that people live in their own communities, so the socioeconomic element is also being considered. The Public Health England team working on that recognises how important it is to link with the minority groups while the work is ongoing, because people understanding the process and what it might mean for their community, whatever comes out at the other end, is equally important.

Q425 **Laura Trott:** Dr Harries, you were very clear in your earlier answer to the Chair that infection numbers need to come down before contact tracing will work effectively. We have talked about the R level extensively, but what is the number of new cases that we need to reach in order for contact tracing to work?

Dr Harries: I think I was referring to when we previously had very high R rates, at the start of the epidemic in the UK. I think it is reasonable to say that I do not think we are putting a precise number on the number of infections, but, as Sir Patrick noted earlier, we need to be clear that we can consistently keep the R value down. One of the reasons for testing the test, track and trace app on the Isle of Wight at the moment is that it is clear that if we can maintain the R level down, it could be a useful adjunct to allowing a degree of lift in some of the measures while still managing to keep the infection under control.

The short answer is that if the R value is down and can stay there, and we have tested methods that will work in practice, we have an opportunity to be moving in that direction reasonably soon.

Q426 **Laura Trott:** There must be a range in the number of cases that you expect to be able to deal with. Professor Van-Tam last week at one of the press conferences said that the current infection rate, which was around 4,000 new cases, was too high. Is there not at least a range of infection—numbers of cases—that you think a contact-tracing programme can deal with, if you think at the moment the level is too high?

Dr Harries: There have been some numbers looking at that, but we need to understand how the app, for example, works and then you almost have to translate the number backwards. You can look at it in terms of how many contacts an average person might have, and those are the sorts of things that will need testing from the app work. The number of people you need to use to contact-trace effectively then relates backwards to the number of cases. It does not all start from the number of cases; it works slightly the other way as well, which is what the capacity is to manage contact tracing effectively and ensure that we keep the R number down.

There are numbers that can contribute to that. If you look at the number of individuals related to each symptomatic case, you can work out how many symptomatic cases you can manage within your contact-tracing system. We need a little more information from the work that is ongoing now to test out the theory and practice.

Q427 **Laura Trott:** As I understand it, we are looking to recruit 18,000 contact tracers by mid-May. Is there an estimate of the number of cases that you believe that those 18,000 can deal with?

Dr Harries: I do not have it to hand, I am afraid—apologies for that—but there have been some calculations behind that. It includes the numbers of individuals who are related to each case, as I pointed out. I am very happy to provide any information separately, but I do not have the number to hand, I am afraid.

Q428 **Laura Trott:** That would be very helpful; thank you.

Previously, you have been clear that we had to stop contact tracing at the early stages of the pandemic because community transmission was in

place. We are now looking to restart contact tracing at a point in the future when the R rate is down below 1 and we feel the infection numbers are manageable. What is different this time that will stop the number of cases increasing exponentially again, that did not happen last time?

Dr Harries: We are at a different point on the epidemic curve. When we moved from "containment" to "delay", the trigger point was the recognition of sustained community transmission. That means that each case may have a first, second, third or fourth transmission—a generation—and when you have sustained community transmission, you find cases of third and fourth generation where you cannot identify the early phase of the chain. It means that you have cases seeded right across the population, and, as we have heard from Sir Patrick, the R rate at that time was 3.

What the public have done, by managing social distancing measures with very strong compliance, is to push that rate down and remove a lot of the transmission in the population. As we come out of it, we should be able to control and identify many of the cases as they come up. It gives us a degree of control to lift carefully, but as many scientific colleagues have mentioned—Sir Patrick, and the CMO previously—it has to be a very steady and slow approach, with very careful observation of what happens. I would not like to give the impression that this will resolve everything. We have to be extremely careful and we have to watch, as we are doing these things, to see how much change we have and how many cases arise.

Q429 **Chair:** Thank you. We are going to move on now to the third of the five conditions, which is that any lifting of the lockdown should not risk a second peak of the virus. Sir Patrick, why was the third condition changed? Originally, it was that we must not risk a second peak, and then that was changed to say that we must not risk a second peak that could overwhelm the NHS. That is quite a small but significant change, and a strange one, given that the fourth condition is itself that the NHS should always be able to cope. Could you tell us why that condition was changed?

Sir Patrick Vallance: I am not sure that I can tell you why that condition was changed in that way. I can tell you that the second peak, though, is something that is very real, that you need to watch out for, and you can see it in other countries. If you go back to the stated position of the Government from early on, which was to make sure the NHS was not overwhelmed, it seems to me that it is consistent with that.

Clearly, what you would like to do, from a pure science perspective, having got this under control, is to have the testing, tracking and tracing take more of the heavy lifting than the social distancing measures, if you can get this down to levels where you can operate that effectively. That is what you would really like to do, to try to keep the whole thing down through that, allowing you to remove some of the social distancing levels.

What, in any event, is important is not to get into a position where you get the R above 1 and get a second peak. It is a political choice where you choose to set that level and where on the spectrum you choose to put your line.

Q430 **Chair:** It is very clear from the trial on the Isle of Wight that has been announced today that testing, tracking and tracing is going to be our new way of trying to keep the virus under control and keep the R level below 1. On 28 January, when SAGE was preparing the options that you said it prepares for Government, I understand that you decided not to model what the death rates would be with a track and tracing model because you decided we did not have adequate testing capacity, so Ministers were not given the track and trace option as a potential option going forward. Given that in the end there was a heroic effort and we actually ramped up our testing to German levels in just four weeks, I wonder why we did not model at that meeting in January what would have happened to death rates if we had gone for testing, tracking and tracing right at the outset.

Sir Patrick Vallance: I don't know that that is correct; I cannot remember off the top of my head. Right from the first meeting, and at multiple meetings throughout January and February, we absolutely raised the point of testing capacity and the importance of testing. It was in the very first meeting, on the 22nd I think, that we raised it, and pretty much at every meeting thereafter we discussed testing and tracking. I am sorry, I cannot remember exactly which modelling was done at which stage. On the 28th, which was very early on, I suspect we were looking at overall modelling based on Wuhan data at that point and trying to see what could be predicted from that.

Q431 **Dr Evans:** My first set of questions is to Sir Patrick. I would like to broaden it all the way back. On 3 March, the initial plan was put in place—there is a document on the Government website—for "contain," "delay," "research" and "mitigate." Is that still the overarching plan, or is there something new as we try to move to a second phase?

Sir Patrick Vallance: To some extent, this answers Jeremy Hunt's point as well. At the early stages, it absolutely was about trying to contain all the cases that came into the country and trying to isolate them. Again, I am not sure what modelling we did at that stage, but that was definitely the plan—to try to keep as many cases as possible isolated and track their contacts. That was based around geographical imports from China as the way to think about it. What became clear, or has become clear in retrospect, as you can see from some of the genomic data, is that we had a massive influx of cases, not from China but from all sorts of other places, partly because of the huge connectivity of the UK.

One of the things we did model very early was the number of outbreaks that we were beginning to see depending on transport connections to China. You could see the initial outbreak, but once it went beyond that to being a pandemic you didn't know where it was going to come from, and

we got a very large number of cases coming in right the way across the country from multiple European sources somewhere around late February and detected in early March.

The plan now, as we said, is absolutely to get this under control with the social distancing measures, get the levels of new cases down to a manageable number and try to take more of the heavy lifting with testing and tracking of contacts, therefore allowing some release of social distancing measures, but to do it in a way that is part of a system that can pick up early outbreaks. As I said earlier, it is going to have to be a nationwide system but with enough regional and local granularity to pick up small fires springing up around the place.

Q432 **Dr Evans:** Is that four-stage plan still the overarching plan? Is it rinse and repeat and put it back out, or is there a new staged plan for later on if there was to be a second peak?

Sir Patrick Vallance: We are definitely in "mitigate" now and coming down. If there was a second peak, you would have to go very hard on "contain" for as long as you possibly could to try to get it under control, but you would need to introduce the "mitigate" measures and the "delay" measures quickly. The idea is to try to avoid a second peak as far as we possibly can.

Q433 **Dr Evans:** Hopefully, we will never get there, but it is useful to prepare for that. As the parameters have changed, and we now have 100,000-capacity testing, partial staff immunity and public immunity, but also things like the possibility of lockdown fatigue, how would it change the modelling if there were to be a second wave? God forbid we ever get there, but it would be remiss not to think about what might happen at that point. Does it mean we would use the same planning, or does it significantly change because we are in a different position and have moved on from eight weeks ago?

Sir Patrick Vallance: It would change in terms of the ability at scale to do some of the things that you could not do at scale at the beginning.

Q434 **Dr Evans:** Perfect. To feed into that second model, what sort of conversations are we having about the international data, and the way that internationally they are releasing their lockdown? Austria is opening hotels on the 29th and some of the schools have gone back. Germany has had problems. Could you talk us through how you are gauging that data and how that feeds into Government policy?

Sir Patrick Vallance: There is a lot of work going on in a group set up to scan continuously all international comparisons, to see what they are doing and what effect it is having. There is also a group at the Royal Society that has been set up to do that, which is going to feed information to us. We have regular conversations—just last week, I was speaking to the Dutch science advisers about how they are thinking about it and why they are taking certain decisions that they are taking. I have had discussions with the Italians, the US and all sorts of countries around

the world—Singapore and so on—and I am on a regular call with international science advisers from 20 or more countries, trying to understand what people are seeing and what effects they are having.

Again, this speaks to the uncertainty of the science. It is important to reflect on the fact that there is not a set of absolute science outcomes such that you can say, "There is the answer without any doubt." You have only to look at two very scientifically advanced and sophisticated countries—Germany and Holland—to see that they are taking quite different approaches to how they are thinking even about schools, in terms of the years going back. These are judgments that get based on the scientific information. They are not scientific certainties that allow you to make an absolute decision.

Q435 **Dr Evans:** I have one final question for both you and Dr Harries. You are both clinicians and, as clinicians, it is built into you to be reflective learners. I know from my side and in my appraisals that you are told to look back at what you have done. In terms of the four-stage plan that you had—"contain," "delay," "research" and "mitigate"—on reflection, is there anything you would have changed or done differently and, if so, carrying it forward if there is a second outbreak, could you explain that? The same question is for Dr Harries afterwards.

Sir Patrick Vallance: I am sure there are lots of things where, looking back, you think, "What if we had done that differently?" That is normal and, as you say, it is absolutely standard in clinical practice to think about where you may have made different choices at different times. I would be amazed if, when we look back, we do not think, "Yes, we could have done something differently there."

In terms of what we see now, I think probably in the early phases—I have said this before—if we had managed to ramp up testing capacity quicker, it would have been beneficial. For all sorts of reasons, that did not happen. It is clear that you need lots of testing for this but, to echo what Jenny Harries said, it is completely wrong to think of testing as the answer; it is just part of the system that you need to get right. The entire system needs to work properly, and you need to have the link to contact tracing, isolation and so on.

There is going to be plenty of time to look back and say what worked, what did not work and which things we need to do differently. Going forward, we are now, as an international scientific community, extremely well connected on this and we are learning from each other. What we will see are natural experiments taking place as people choose slightly different options. We will be able to monitor carefully what effect those slightly different options have, but with one quite important caveat: there are quite important differences between societies, which means that effects will be different in different places.

I do not think it is chance that two huge, cosmopolitan, well-connected cities, with multiple imports from all over the world—New York and

London—got very hard-hit. These are cities that have certain features in common that are different from some other places. We should not view the thing that works in Iceland as necessarily going to work well in London or in the rest of the UK. There are certain things that you might want to operationalise in certain parts of the UK. You might be able to look at things a little bit differently as you go forward because of the differences in density of population and other factors that could be important.

Q436 **Dr Evans:** Could I could put the same question to Dr Harries? In the context of the initial plan, could you give your reflections, and your reflections going forward, if we were to enter a second wave?

Dr Harries: The plan as it stood was sensible and logical, and, as Sir Patrick said, we will have to look back to see and compare. It was based on good, traditional public health practice.

One of the things that I am reflecting on, as I suspect most of the world will, is that we are in a very different world now with our digital capacities. We are focusing on the app here, but of course we are not the only country, and one thing that perhaps we have not yet done is link up, or think through, digital progression and opportunity in some of our preparedness planning. In addition to the points that Patrick has made, there may well be some opportunities to think through how we can be prepared at an earlier stage.

We have learned from previous incidents and have probably done very well on things like the speed at which we put out rapid research proposals, work on vaccines and treatments, research protocols and things. When I look back on my experience in Ebola with the international work, that seems to have gone much more coherently and rapidly. But perhaps we have not factored in what opportunities there are for digital use, and that would be good for our planning going forward.

Q437 **Dr Evans:** To pull in what Sir Patrick said and what you have just said, we are talking about interconnectivity—New York and London. We are still getting flights in, and I understand why that is the case, but, in hindsight, should we have cut out more flights? What about future pandemics? Would travel be something where we need to consider a more robust approach?

Dr Harries: Interestingly, of course, we are bound by, or signed up, to the International Health Regulations. There are pros and cons, which are not necessarily always obvious, in managing the influx and outflux of passengers and goods. Of course, if you shut travel routes in, you also shut routes for various products that may be essential not just for our population but all around the world.

At the moment, most people who are coming back are coming back home to the UK, and they will of course immediately fall under social distancing regulations anyway. Where we identified high-risk areas, as in Wuhan for

example, people in the "containment" phase came back in and underwent very strict quarantine.

It is an international discussion that we need to consider. It cannot just be a single-sided position. Sir Patrick's point about understanding, through the genomics work, that the seeding of cases across the UK was likely to be through Europe, which was not the focus, means that it would be a very fruitful area to consider—you are right—but considered in the totality of the risks as well as the benefits.

Sir Patrick Vallance: In terms of travel, what was very clear, as I think you can see now in retrospect, was that the idea that you could control this by stopping travel from one place doesn't work, unless it is, of course, your only source of import.

We have now in the UK sequenced 13,600 viral genomes, and when you look at the cases you can see that we got imports from all over the place. Quite early on, the advice that SAGE gave was that, if you are going to do something on travel, you need to be extremely draconian and stop all travel from all sorts of countries; it is not really worth trying to stop it from one place, because you will not make it happen. The answer is not, unless the country chose to do that, to go for stopping travel anywhere, but to do what Jenny has just said, which is to make sure that, as people come back, you have appropriate systems to isolate, to test and to make sure that they are following the same rules as the rest of the country.

Q438 **Paul Bristow:** My question has been answered slightly, but I want to qualify it. Do you feel that there is a risk of a second peak of infection in the UK when we see people—British nationals and dual nationals—coming from other parts of the world that perhaps have not had their peak of the pandemic? I am thinking of parts of Africa, Pakistan, India and Bangladesh. Dual nationals in those parts of the world will want to come home, and if their countries have not been through their peak, is there a risk of a second peak in this country as they come back to the UK?

Sir Patrick Vallance: We did a calculation a few weeks ago on the likely impact of imported cases in terms of the total number of cases in the UK at that point. I cannot remember exactly when it was but let us say three weeks or so ago. At that point, when you took all the travel and all the numbers coming in, something under 0.5% of all the cases would have come in through imports.

Clearly, that equation reverses when you get down to very low numbers in your own country and you have higher numbers elsewhere, and that is when you need to be vigilant on how you think about isolation and testing of cases coming in, but this is a pandemic, which means it is everywhere. Therefore, cases can come from anywhere in the world and it is not going to be easy to say that there are some places that you have to be absolutely sure you do not get people in from; you have to be vigilant across the board and vigilant on cases in the UK.

Chair: In our final 10 minutes, we are going to look at the remaining two conditions that the Government have set for lifting the lockdown. The first is that the NHS should be able to cope. The second is that we have an adequate supply of tests and PPE. I am going to bring in Dean, who has a question on the NHS.

Q439 **Dean Russell:** I will be very brief as I know time is tight. When we talked about the NHS coping, previously we talked about ventilators and capacity in the hospitals themselves. We have the Nightingales now, and that has been a great success, but I want to double-check whether, when we talk about coping, we are also taking into account the NHS staff—our most precious resource. My concern is that they have been working day and night for quite a while, they are exhausted, a lot of people are off and a lot of people will be suffering from anxiety and all sorts in the coming weeks and months. When we talk about the capacity to cope, are we taking into account our brave NHS staff?

Sir Patrick Vallance: This is probably one for Jenny, but I think the answer is yes.

Dr Harries: Yes. Without avoiding the question at all, obviously the bulk of this work will sit within NHS England and their HR components, but Patrick and I, like many of our science and clinical colleagues, have friends and even family on the frontline, and absolutely understand that it is a very traumatic time. Sometimes, medics themselves are quite surprised at how much it has affected them.

There are clear support programmes going in, not just through the NHS itself but, equally importantly, from colleagues; some of the specialist organisations, for example, for intensive care—there are peer support elements through that group. The Government have looked at a number of areas and that signals value to staff, in that they are coming back in huge numbers. We have had something like 27,000 nurses and more than 10,000 professionals come back on to the frontline to give support. That is a huge opportunity and there is huge gratitude from the nation that they have put themselves forward. It has meant, of course, that, with the public support for the social distancing measures and managing the flow-through with that additional capacity, hopefully, some of the really difficult stress will have been relieved, but clearly not removed.

Your point is important. NHS England recognises that there is a considerable way to go after this. Often you get on with your job until it stops, and the impact afterwards is quite significant. It is not an area that I am directly involved with, but I am aware that there is recognition both of the impact now and of the likely longer-term consideration that needs to be given to support to staff.

Q440 **Rosie Cooper:** My question has two parts. First, when can we look forward to test results returning within 24 hours? Secondly, as infection rates rage in the north-west, can Dr Harries give us more of a clue as to why the Liverpool-Atlético Madrid match was allowed to go ahead? If

Atlético Madrid were not allowed to play at home, why did our Government not protect our citizens? Were we just sacrifices to herd immunity, and who was responsible—who is responsible for making those decisions?

Dr Harries: The first point was about test returns. The time period for the test returns coming back is decreasing all the time. The actual test itself will vary in how it is taken; if a test is sent out and is sent back, that will be a different testing capacity from a patient having a test in a hospital. I cannot give you a single figure because it will vary by type of test and the way the test is being delivered and returned, but I am aware that testing times are coming down all the time, and that obviously reflects the capacity.

Going back to the digital point, whereas previously, in an old-fashioned way, we may have considered how we would get the test result to the patient, for many of these tests now the transit time for the actual result is very quick. It is very difficult to give a single answer because of the different testing streams.

On your second point, I think we partially covered it earlier with some of Sir Patrick's comments. It is difficult taking a single event and then translating that through to perhaps a causal link to cases in an area. There is a whole science behind gatherings, which is one element of that. The other one was a point that Sir Patrick picked up earlier about the timing of interventions.

Perhaps what has not come out from this conversation is the different series of interventions. People seem to think there was a lockdown moment, whereas in fact a series of interventions based on science were recommended. But, as Sir Patrick said, the genomics suggest that a large number of cases had seeded already from Europe quite early on. I cannot give you a specific answer, but it is not possible to say whether or not that particular issue linked to the seeded cases. It is quite likely that there were already cases here through European regions, when in fact I think the focus of attention was perhaps more towards China and some of the south-east Asian countries.

Chair: Rosie, do you want a quick follow-up? Then I am going to have to wrap up, I am afraid.

Q441 **Rosie Cooper:** The point has been missed. It was clearly shown that Atlético Madrid were not allowed to play at home. Why were they allowed to play here? I am not going on to the causal links, just that simple question: it was not safe there, so why was it safe here?

Dr Harries: I am not trying to avoid the question, obviously. As Sir Patrick highlighted, the advice around gatherings and the scientific advice behind that will have been provided through SAGE's work to politicians, but the individual decision about whether a match would go ahead or not is not one that the CMO or SAGE would take.

Q442 **James Murray:** This is a quick question about the testing numbers. We have seen a lot recently about the target of 100,000, but we never saw a justification for the number of 100,000 and the strategy associated with it. Can you tell us, very quickly if possible, how many daily tests approximately might be needed for an effective community testing and contact-tracing strategy?

Dr Harries: I think this goes back to the point I was making earlier, and I have offered to come back with some numbers separately, as I do not have them with me. The 100,000 was in some ways an ambition, to stretch our testing capacity, which I think we have acknowledged overall is a positive thing. There were some calculations about the number of tests we would need, for example, for all the clinical care patients who were in hospitals, which was our priority, and then our key workers—our health and care workers at the start—and other key workers. It is also recognised that part of the testing linked back to our understanding of the prevalence of disease in the country, so I think it was a broad ambition. It was not my 100,000 tests, so I think you would have to ask political colleagues that particular one, but it certainly moved us forward.

Q443 **James Murray:** Dr Harries, I am not asking you to justify the 100,000; I am asking you how many you think would be needed for an effective community testing and contact-tracing programme to be established. Just roughly, what kind of number are we talking about?

Dr Harries: I cannot give that answer at the moment—it was the same point that I think Laura Trott asked about earlier—because it relates to the prevalence of disease and then the capacity of contact tracers you have to continue the contact tracing, and that in itself relates to the proportion of people who are using digital means as opposed to population means.

They are all linked and we know that, on average, depending on local circumstances in populations, we would estimate somewhere around 20 to 30 contacts per case, but it depends on how the app is used and people's actions when some of the cases start lifting. It is very much, "Tread very carefully and see." The 100,000 puts us in a very good place to start looking at that process, but the work on the Isle of Wight will start to signal some of those parameters and that will give us some of the numbers that we need for this conversation.

Q444 **Dr Davies:** How far are we from the widespread availability of antibody tests that are both sensitive and specific, whether ELISA or lateral flow, and how important is it that we have those in place?

Sir Patrick Vallance: For accurate ELISAs, I think we are there; you can see that they are already being used. They are laboratory-based tests. I think lateral flow is more difficult. I would not like to put a time on that.

The question, of course, is what you want to use them for. Using those sorts of tests for surveillance studies may be okay because you do not need very, very high sensitivity and specificity. You would like high

specificity but you do not need such high sensitivity. If we are to get to the state where we can say, "You've got antibodies and, therefore, you are protected," we need highly accurate tests to be able to do that, and at the moment that looks like ELISAs. No doubt there will be simpler ways to do it in the future, but as of now it is an ELISA test.

Q445 **Chair:** Before we wrap up, I have a very final brief question to Sir Patrick, if I might, to push you a bit about the likelihood of a second wave. If we properly implement the test, track and trace programme that we are planning to do, and if the public comply with the social distancing recommendations made by the Government, could you give us some sense—let me ask you as if I was asking for legal advice—on a percentage scale of 0% to 100%, whether it is 70% or 80% that we are going to have a second wave—in other words, it is pretty inevitable; or is it 20% to 30% that, if we do the test, track and trace and follow the social distancing guidelines, we should have a reasonable chance of avoiding a second wave? Could you give us some sense of that?

Sir Patrick Vallance: I think if we do test, track and tracing well, and we keep the social distancing measures at the right level, we should be able to avoid a second wave. I am on the more optimistic side that you can, provided you do that. I want to add one caveat, which is that winter is going to be extremely difficult when you also have flu circulating and all the other respiratory infections that can get confused with this. That is the one caveat.

Chair: Thank you for ending on an optimistic note and thank you for your time this morning. Thank you, too, Dr Harries, for your time. Thanks to your teams and thanks to my colleagues on the Committee.