HOUSE OF COMMONS

Science and Technology Committee

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

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Watch the meeting

Science and Technology Committee Members present: Greg Clark (Chair); Aaron Bell; Chris Clarkson; Katherine Fletcher; Darren Jones; Mark Logan; Carol Monaghan; Graham Stringer; Zarah Sultana.

Health and Social Care Committee Member present: Jeremy Hunt, Chair.

Questions 145-211

Witnesses

I: Dr Seon Kui (Erica) Lee, Director, Division of Risk Assessment and International Cooperation, Korea Centers for Disease Control and Prevention (KCDC), and Professor Gabriel Leung, Chair, Public Health Medicine, Hong Kong University.

II: Steve Bates, Chief Executive Officer, BioIndustry Association, and Sir Paul Nurse, Director and Chief Executive, Francis Crick Institute.

III: Kathy Hall, Director of Covid-19 testing strategy, Department of Health and Social Care, Professor John Newton, Government advisor on increasing Covid-19 testing capacity, and Professor Stephen Powis, National Medical Director, NHS England.

Written evidence from witnesses:

– [Add names of witnesses and hyperlink to submissions]

Examination of Witnesses

Witnesses: Professor Gabriel Leung, and Dr Seon Kui (Erica) Lee.

Chair: Order, order. The Committee is now in session. Before we start our questions, I send on behalf of the Science and Technology Committee our good wishes to the Prime Minister and to our colleague Tony Lloyd, both of whom are in intensive care, and to everyone who is suffering from coronavirus. I also want to express our gratitude to everyone who is looking after them and us, particularly—for this meeting—the scientists who, in this country and around the world, are working flat out to help to manage, detect, treat and prevent this terrible disease.

Through the inquiry that the Committee is conducting, we want to learn the lessons of the pandemic for UK science and research. Most of the findings will obviously be determined after the event when the pandemic has subsided, but there are two reasons for taking evidence now that will inform our proceedings today. The first is to be able to capture contemporary evidence, so that not everything is seen through the filter of hindsight. The second is that there may be lessons that can be learned now and applied to policies and institutions during the course of the management of the pandemic, to better help us. Those are the reasons for our hearing today.

We will now go to our first panel. I wonder whether our witnesses are there—I think I can see them. Professor Gabriel Leung is the chair of public health medicine at Hong Kong University. Welcome Professor Leung.

Professor Leung: Hello.

Chair: Dr Erica Lee is at the Korea Centers for Disease Control and Prevention. Welcome Dr Lee.

Dr Lee: Hello.

Q145 **Chair:** Some colleagues who have tuned in may have been expecting Professor Dr Hanefeld from the Robert Koch Institute in Germany. Unfortunately, just before the beginning of the meeting, she had an urgent personal difficulty to deal with, so will not be joining us this afternoon.

I thank colleagues for giving their time to give evidence to us in this session. I will kick off by asking both witnesses to sum up the overall testing policy of their respective countries, Korea and Hong Kong, first in the sense of looking to control the spread of the virus, and secondly on how testing helps to manage or inform the exit from initial measures.

Dr Lee: Thank you for giving me the floor. The testing was a really key measure for the early detection of cases. We used COVID-19 genetic testing—real-time PCR and dPCR—to diagnose our patients. We developed that method at the beginning of the outbreak, because we learned a lot of lessons from the MERS outbreak in 2015. Our priority in reforming our public health emergency preparedness and response system was to

strengthen testing capacity, our epidemiological investigation strategies, and risk communication and assessment. The whole of our system has been reformed.

We have activated all kinds of measures and capacities to respond during the COVID-19 outbreak. On testing, we have expanded our testing capacity in a very short period of time, for early detection. Currently, there are a total of 118 institutions available for diagnostic tests: the Korea Centers for Disease Control and Prevention, the national quarantine stations, and the Institute of Health and Environment, which are affiliated with local government. Private clients, clinical laboratories and hospitals are all included in the national laboratory network.

On average, we are performing 15,000 tests a day, and a maximum of 20,000 a day can be performed. The expansion of the testing capacity was made possible thanks to the active collaborative efforts between Government, academia and the private sector. The Korean Government quickly developed a test and disclosed it. Based on that, a company developed and produced a diagnostic reagent. Upon evaluation by Government and academic experts, the reagent was granted emergency use authorisation by the Ministry of Food and Drug Safety very quickly. Testing facilities across the nation then began using the test. To ensure the accuracy of the tests performed, COVID-19 testing centres were selected from testing facilities that had been certified for outstanding quality. They also received additional training and passed an accuracy test to qualify. The testing quality of each centre is maintained by quality assurance by Government and academic experts.

All those are the measures that we have taken, which led us to test the suspected cases first. It also led to case finding and contact tracing very rapidly. One of our strategies was to minimise and possibly block the epidemiological link from one case to another or maybe to a big cluster. We have always considered all these kinds of measures for each different scenario, and we have always considered the worst scenario in our preparation.

Our Government quickly raised the national risk level to the highest, based on our risk assessment. That was very important, because we could act before a higher risk stage. Currently, the whole Government approach is working effectively to respond quickly to each situation and circumstance.

Q146 **Chair:** Thank you, Dr Lee. My colleagues will have some follow-up questions. Professor Leung, perhaps you might set out the Hong Kong approach.

Professor Leung: Thank you, Chair. As a general principle, the experience we have had in the last three and a half months with COVID-19, not only in Hong Kong but looking around the world, is that testing on a massive scale is important at every stage of the epidemic, regardless of whether you are at the beginning, in the middle of or at the end of the first wave or, indeed, after the first wave. That applies as a general principle.

The second general principle is what kinds of tests one is talking about. A lot of us, most of the time, talk about viral shedding—that is antigen testing by PCR. What is perhaps less talked about, until very recently, is serology testing—that is to look at the antibody titers—among recovered patients, as well as to look at population immunity: looking at age-stratified population sero-surveys. Of course, they serve different purposes.

Finally, almost as an aside, some have inappropriately tried to suggest using particularly acute-phase IgM antibody titers as a diagnostic assay. I do not think that is reliable, nor do I think that is desirable, although there is a lot of commercial activity around that particular form of testing.

Having said all those as general principles, let me then describe the Hong Kong experience. Hong Kong has so far managed not to have even started a locally sustained outbreak or first wave. What we have had since the middle of January are sporadic cases, which sometimes lead to limited or self-limited secondary chains of transmission.

Most of our index cases have so far been imported cases. We have gone through three different phases of importation. First, from the middle of January to, say, the first week of February, we had imported cases mostly from mainland China. The second phase of importation was predominantly from the Diamond Princess cruise liner. Then the third and the largest phase of importation have been returnees from Europe and North America, and most of these are Hong Kongers who study abroad in Europe and North America.

We have had three phases of importations, with limited secondary spread and sometimes—quite rarely—tertiary spread, but so far we have not actually experienced a locally sustained outbreak yet. The latest real-time effective reproductive number—the Rt—for Hong Kong is actually around 0.7, so it is well below the critical threshold of 1. Hong Kong, over the last two and a half months, has seen or experienced an Rt that has been hovering just above or below 1, and we are currently on a downward trajectory after the latest round of physical distancing measures put in place two to two and a half weeks ago.

Q147 **Chair:** Thank you, Professor Leung. Can I just ask a follow-up to that? There are obviously social distancing measures and testing that are applied. Do you have any view as to the balance of those or are they inseparable, and does that change over time?

Professor Leung: To my mind, there are three sets or categories of interventions. The first are really the most upstream, and those are border restrictions or border controls. Those really try to stop importation, assuming that you do not already have a locally sustained outbreak and therefore your task is really to stop any importation. That is not necessarily so much as to completely contain it, because COVID-19 containment is not possible anywhere else in the world now. Containment policies have almost universally failed already everywhere, so it is not really to contain it. The main point of border restrictions that I am aware

of in most countries is really to stop the surge capacity of the local health system from being overwhelmed. That is why most people actually do it. That is the first kind of interventions.

The second kind of interventions are quarantine and isolation. These I call almost medieval because they do come from those times. Quarantine and isolation are actually predicated on testing and contact tracing. There is no way that you can do quarantining of contacts or isolation of infected individuals unless you test. That is the only way that you can do quarantine and isolation successfully. Of course, when you do isolation of confirmed cases, you have to do contact tracing so that you then quarantine those highest-risk individuals who have been exposed to confirmed cases for a substantial period of time at a substantial intensity. That is the second category of interventions.

Both the border restrictions and the quarantine and isolation are fairly targeted or precision public health interventions because, although they may be very taxing on the public health system, they generally involve a fraction of the total population at risk. Whereas the third category of interventions, physical distancing, involves the entire population.

Everybody, by implicit social consent, has to adhere to fairly drastic, substantial, even draconian, physical distancing measures. They obviously include things like work-from-home arrangements, flexi-work hours, school closures and, of course, restricting the opening of public places and so on. When you talk about testing, that has to be in relation to one or more of those three categories of interventions.

Q148 **Chair:** Thank you, Professor Leung. I am going to turn to our colleague, Darren Jones, but perhaps I can just ask Dr Lee about the second point about the quarantining of individuals who are tested and found to have the virus. I think I am right in saying that a similar system works in Korea, in which people who test positive are housed in centres in which they can be isolated from the rest of the population until they recover. Have I got that right?

Dr Lee: Actually, that is right. We are using isolation and quarantine measures as well and, currently, as Professor Leung said, we have those kinds of public health measures. For the containment measures, Korea did not use such strong measures for containment. We did not have a high entry ban, because we had an entry ban only from China, so our border was quite open to people.

We have gone through the same phases that Professor Leung mentioned, but our phases were a bit different. The first phase was also the imported case phase. Then the imported case-related transmission was ongoing during the first phase, until early February. Then we were really worried about a case with an epidemiologically unknown source, which was detected in the middle of February.

That case, case No. 31, led to a big cluster that we did not expect. That cluster was related to certain religious activities and religious groups. They

were high-risk groups. We tried to conduct those kinds of measures—quarantine, isolation and testing—for all those groups.

When we had that big cluster, our Government decided to test all the members of the Shincheonji religious group in the Daegu area, because that was a special zone. Then we also collected all the information about the whole membership of the Shincheonji religious group and we just asked them to stay at home, as a quarantine. Then we monitored them. If they had symptoms we also did testing. This testing, isolation and quarantine actually had some very—I think it was kind of successful for us to control the Daegu cluster at the time.

Not only this, but we needed to have the social distancing campaign. We have done that with our public participation—our active public participation. At the time it was not that much stronger than now, but in the Daegu area, all the people had very high compliance to our public health measures, and they were willing to participate in these kinds of social distancing campaigns. We really appreciated our public.

Then, risk communication with them was another key, to make the public participate in our social distancing campaign as well as our isolation and quarantine measures, so our Government tried to really control the Daegu area by using all these kinds of measures. So that is the kind of example that I can give you.

Chair: Thank you, Dr Lee. If I am looking down, it is because I am getting messages from my colleagues who want to come in and ask some questions. I am going to start with Darren Jones and then go to Carol Monaghan, and then we will have Jeremy Hunt.

Q149 **Darren Jones:** Thank you, Chair. I am interested to learn a little more about this connection between the isolation strategy and the testing and tracing strategy. Professor Leung, you just said in your evidence that you can't undertake an isolation strategy successfully unless you have a testing and tracing strategy in place as well. You probably know that here in the UK we are in a period of isolation, but our testing is currently in the lower quartile of OECD countries, and, as far as I am aware, there is no systematic tracing strategy in place. What is the consequence for us, in terms of either the length of isolation or the effectiveness of it, if we are not having adequate testing and tracing alongside isolation?

Professor Leung: Thank you very much. When I was referring to isolation, I was actually referring to the isolation of infected individuals. I wasn't quite referring to the physical distancing measures or the so-called lockdowns, to varying degrees and intensities. By isolation I mean making sure that people who are actually infected are isolated from the rest of the population, so that they do not go on and spread it to others. As we know, a typically infectious individual who has COVID-19 generally would spread it to two, maybe three, individuals. Therefore it is important that an infected individual is removed from that mixing matrix, which is technical jargon, of course—so, generally removed from the possibility of being able to pass it on. That is what I was referring to.

Of course, then it is quite obvious why you need to have testing, because other than testing it is very difficult to then confirm or refute whether somebody is actually infected and therefore should be isolated for the duration of that illness, especially when we are still unsure how long infected individuals would shed virus and therefore presumably be able to infect others. There are conflicting reports about this duration. Perhaps it is because a positive PCR test, where you can have viral shedding, doesn't necessarily mean that you are infectious, because you can have a positive PCR test but you will not be able to grow live virus. That is what one of the reports coming out from Berlin—Christian Drosten's group, published in *Nature* last week—has shown us. I think that's really the relationship between isolation of infected cases and testing.

Q150 **Carol Monaghan:** Professor, if I could just follow up on that—more about the practicalities, rather than the actual policy. You talk about the isolation and quarantine of those who have come into contact with a positively infected individual. Those are then put into quarantine or isolation as a result of that. Are you relying on the good will of those individuals, or is there Government intervention in that?

Chair: Professor, did you hear the question?

Professor Leung: Yes, I did. I think the question was asking what we are doing in Hong Kong. Is that correct, or was it in general?

Chair: It is whether there is a degree of compulsion.

Professor Leung: In Hong Kong?

Chair: In terms of people going into quarantine. Are they compelled, or is it voluntary?

Professor Leung: In Hong Kong, because we haven't actually got overwhelming numbers perhaps yet, every single confirmed infected individual is admitted into a hospital bed. We do not do any other type of isolation: every single infected individual who is confirmed by testing goes into a hospital bed. In fact, up until very recently, almost all of them would go into a negative pressure single room. All their close contacts who are identified by contact tracing are then quarantined in an isolated facility that is separately and specially prepared for such a purpose. There is no home quarantining for close contacts of confirmed cases.

There is home quarantine for, for example, all inbound travellers into Hong Kong who, after passing a quick test at the airport—that probably comes back within four to six hours—are then required to self-quarantine at home. These are asymptomatic inbound travellers, but that is when home quarantine applies in the Hong Kong context. Now, clearly that is not applicable to very large numbers, because we simply do not have separate quarantine facilities that would cater to the peak of an outbreak. We have only been able to do this because our numbers have been remaining at a fairly low level throughout.

Q151 **Chair:** Can you tell us what the capacity of your quarantining facilities is

for patients who have tested positive and are symptomatic?

Professor Leung: At the moment, I am not sure of the exact number, but I think it is somewhere in the region of 1,000.

Q152 **Chair:** Dr Lee, can I ask you the same question that Carol put? It is the same principle there, I think: those individuals who test positive and individuals who are symptomatic do not home-quarantine, but go to a separate place. Is that right?

Dr Lee: Actually, it was the same as Hong Kong at the beginning of this outbreak. Because we had very low numbers of confirmed cases, we could accommodate all those confirmed cases in the negative pressure isolation rooms. But when we had this big cluster, we had to change our guidelines to accommodate all of this high number of confirmed cases. We decided to expand these kinds of facilities to treat the people there, because we needed to categorise all these cases by their severity.

According to the severity, we had to put some priority into the severe cases. If they have severe symptoms and they need the treatment, we transport them to either the negative pressure rooms or the tertiary hospitals designated by the Government. If the symptoms are mild, we have designated living and treatment facilities, so they can stay there in isolation and if they become severe, we transport them to the hospitals right away. If they have light symptoms or they are asymptomatic cases, we sometimes recommended that they stay home in isolation. When we had this high volume of cases, we needed to consider how to expand our capacity to isolate all these confirmed cases. So our Government changed our guidelines according to the severity level, and then we provided some facilities and treatment in hospitals and so on.

Chair: Thank you, that is helpful. So the guidelines changed during the crisis in response to capacity. I would like to bring in Jeremy Hunt, who is the Chair of the Health and Social Care Committee of the House of Commons and is joining our other members of the Committee for this hearing.

Q153 **Jeremy Hunt**: Thank you, Chair, for having me as a guest today. I have a brief question to each of the distinguished panellists, if I may. Dr Lee, could you confirm that despite the social distancing that you talked about, outside Daegu, in Seoul, Busan and so on, shops, restaurants and offices are still open? On the contract tracing side, how many people are working on that in South Korea overall? Professor Leung, you were very clear that testing is important at every stage of an epidemic, as a general principle, so what would you say to scientists in the UK who say that, on mass community testing, the ship has sailed and we are beyond that stage now?

Chair: Dr Lee, first.

Dr Lee: Thank you very much for your very important question. Actually, on the social distancing campaign, we currently just advise the public to cancel non-essential travel, events and social gatherings, and stay at

home as much as possible. Also, high-risk facilities, such as religious, indoor fitness and nightlife venues, are strongly recommended to suspend operation. The venues that remain in operation must strictly comply with the infection prevention guidelines. If they keep to those, they can open their venues, but if they do not follow these rules, we have some administrative orders to give some kind of administrative punishment to them. Recently, we had a press release announcing that we had this cluster in the Seoul area related to these nightlife venues, and the Seoul local government just decided to ban the opening of all these nightlife venues. So local government can also decide on their own measures—store bans and things like that—and they just ordered that.

On EIS officers for contact tracing and so on, currently most of our public health centre officials and local government officials are involved. At the beginning of this COVID-19 outbreak, rapid response teams were sent from the KCDC or from among the KCDC/EIS officers involved in contact tracing and epidemiological investigation. But later, when we had these big clusters, and some sporadic clusters nationwide, we decided to support the local government EIS officers and their public health officers. We also designated some EIS officers from the private side as well, so that we could have this massive epidemiological investigation. I cannot estimate the total numbers, but there might be anything from more than 500, at least, up to maybe 1,000, if we are talking about "EIS-involved" officers.

Chair: Thank you, Dr Lee. Perhaps you might just drop us a note—an email—after this with the numbers. We would be very interested in that.

Professor Leung: I would say that testing is very important at every stage of this particular epidemic, and generally for all epidemics, for the following reasons. At the stuttering beginnings of any kind of epidemic—as well as, by the way, when you come to the end of the first wave, anticipating a second wave—the prevalence of the disease, or the infection, to be more precise, in the population is expectedly low. That is why it then becomes very difficult to pick up, at any given level of test, a positive case. Therefore, given that you have a low prevalence at the time of testing, you would need to have many, many more tests in order to maintain the same sensitivity. That is why, for example, mainland China, which has just come out of the first wave and is making sure that it would be able to pick up the possible beginnings of a second wave, is ramping up all testing—at least maintaining it at the high level that they have been doing—and I suspect Dr Lee would tell you the same about South Korea. Certainly, we in Hong Kong, which is still at the stuttering beginnings of a possible first wave, are testing anywhere between 4,000 to 5,000 every day in a population of 7.5 million, so I think it gives some idea of the importance of that for low-frequency events.

At the height, or at least during the exponential growth phase of an epidemic like COVID-19, there are simply too many cases to count. My colleague Marc Lipsitch at Harvard, David Fisman in Toronto, and myself wrote a piece about 10 years ago, published in *The Lancet*—I gather the editor was on the last panel. We wrote the piece to explain what you could

do to monitor—really, to do surveillance—the trajectory of the underlying outbreak when there are too many cases to count. There are very well established epidemiological methods of sampling that one could deploy to make sure that you have a good grip on how many cases there are or at least what the relative trajectory is as you go through an epidemic. That is why I say that at every stage of an outbreak, and particularly this one, it is very important that you keep a very, very high level of testing, so that you can tell where you are in that epidemic. For this one, if everybody seems to be converging on the view that there are going to be multiple waves before an effective vaccine becomes widely and sufficiently available, you would want to be able to pick up these different waves as you move from one to another.

Chair: Thank you. Let me turn to our colleague, Zarah Sultana.

Q154 **Zarah Sultana:** Thank you, Chair. My first question is to Professor Leung: could you describe Hong Kong's enhanced laboratory surveillance programme? I am very interested in what the criteria are for qualifying individuals. And to Dr Lee: could you tell me why, in your opinion, Korea's testing programme has been more successful than the full lockdowns that we have seen elsewhere?

Professor Leung: We have had several stages of enhancement in our testing programme. I am not exactly sure which stage of enhancement you are referring to. We are, I think, on to tier 6. We started with tier 1 and progressed to tier 2, 3, A, B, 4, 5 and 6. In tier 1, at the very beginning in the latter part of January, we started to test all in-patients with pneumonia in the hospital system—our equivalent of the NHS—to make sure we picked up any pneumonia that might not have been correctly diagnosed.

So we started with testing the undiagnosed atypical pneumonias, then extended it to all in-patient pneumonia cases, then to all out-patient upper and lower respiratory cases, then to travellers, GP practices, symptomatic people and so on. So we were basically going down the clinical iceberg, progressively enlarging our catchment so that we would find the beginnings of the chains of transmission and interrupt them at source, such that they would not coalesce and be the spark for a locally sustained outbreak. That is the whole strategy of Hong Kong—progressively going down the referral chain, thereby enlarging the catchment so as to pick up with greater and greater sensitivity the beginnings of chains of transmission to hold off a locally sustained outbreak.

Q155 **Chair:** Just to follow up on that before Dr Lee answers Zarah's question, was that strategy adopted and clear from before the pandemic, or has it been designed and developed in-flight, as it were?

Professor Leung: It has been patterned after our various experiences in the 1997 bird flu outbreak, in which we had 18 cases and six people died, in the 2003 SARS outbreak and in the 2009 H1N1 flu pandemic—the so-called swine flu—which all of us shared—and we are now using it with COVID-19. It is built on a template that we have built up from experience

and adapted to this outbreak as the science has evolved over the past three and a half months.

Dr Lee: We did not use any lockdown measures during our outbreak because we mainly concentrated on early detection, which was very important. When we found case No. 31, we did very thorough contact tracing. When we found that some of the contacts had an epidemiological link to the Shincheonji religious group, we massively investigated this group and its religious activities and went for contact tracing and testing. Before all these transmissions spread, we were able to block the epidemiological link instead of locking down all the cities and so on. That was our primary measure in responding to the COVID-19 outbreak. Even now, we are using these measures as the priority because we still have sporadic clusters and transmission in some larger cities and among high-risk groups such as hospitals and long-term care facilities. If we find cases in these high-risk areas, facilities or groups, we just offer domestic testing for all their contacts, so that we minimise the threat of transmission. Acting fast in advance with this early detection was quite effective in stopping the spread.

Chair: Thank you very much.

Thank you, Dr Lee and Professor Leung, for you evidence today. Both countries—Hong Kong and Korea—have been notably successful in minimising deaths and the spread of the virus, so we look with interest at what is behind that. You have given us some important insights in your evidence. You both referred to the fact that you have learnt from the experience of previous pandemics, and had a structure of response in place, but I was interested—as I think my colleagues were—that that response has been developing and has been applied in different ways during the course of the pandemic. Obviously the implications of testing for decisions to quarantine, and then the interaction between testing, quarantining and social distancing, are going to be very important for all countries during the weeks ahead. We are very grateful for your evidence in person today, especially since it is rather later at night there than it is here, so thank you for staying up and for giving us evidence.

We are just going to take a few seconds' break while we arrange the video for the next witnesses.

Examination of Witnesses

Witnesses: Steve Bates and Sir Paul Nurse.

Q156 **Chair:** The Committee is back in session. We are very pleased to welcome Sir Paul Nurse, who joins us from the Francis Crick Institute, where he is director. He is a former president of the Royal Society and a winner of the Nobel prize in Physiology or Medicine in 2001. We are very pleased to have you with us today, Paul. We also have Steve Bates, who is the chief executive of the Bioindustry Association in this country, as well as chair of the International Council of Biotech Associations. Thank you very much indeed for joining us. My colleagues will have some questions, but let me kick off with some questions to Sir Paul.

The Government's strategy on testing, which is the subject of our evidence session today, was to start with the Public Health England laboratories and then extend that to hospitals. And then last week, on 2 April, the Health Secretary announced a five pillar plan, of which the fifth pillar was "to explore increasingly decentralised models of testing". Paul, you talked memorably on the radio about a Dunkirk-style effort. You said, "we are a lot of little boats, and the little boats can be effective. The government has put some big boats, destroyers in place. That's a bit more cumbersome to get working and we wish them all the luck to do that, but we little boats can contribute as well." I do not think of the Crick Institute as a little boat by any means, but can you say what your institution is contributing to the national effort?

Sir Paul Nurse: I lost the last part of the question because the internet is fluctuating. I apologise for that.

Chair: No problem. I will try again.

Sir Paul Nurse: Can you hear me?

Chair: We can hear you a bit intermittently, but we can hear you at the moment, so we will persevere. I was reflecting on the approach that had been taken until quite recently, which was a fairly centralised approach on Public Health England's laboratories, and then you memorably said that the little boats could make a contribution, and the Crick is one of those boats, although I would not call it little. Can you tell us what you are doing and how you are contributing to the testing?

Sir Paul Nurse: Yes, I can. Thank you for the opportunity of speaking to you. About three weeks ago, we decided at the Crick that testing would be important, particularly and critically the testing of healthcare staff—from doctors right through to those driving the ambulances. We thought that our what-would-be-moderate resources would be best equipped to help those more locally getting healthcare workers back to work. We are a research laboratory of course. We repurposed ourselves to carry out testing at a moderate scale.

You asked about the destroyers and the little ships. Obviously, it has to be right to have big facilities, but the difficulty with big facilities is getting

them to work quickly. If things had been planned a year or two ago and if resource had been put there to test them out—there are a lot of things that have to be tested—one could imagine that they would have been put in place rapidly. We did think that it would be a slower process given the complexity of it. We tried to get ours going, which we now have. Perhaps that will act as an example for others elsewhere in the country. Although we are relatively small—we may get up to 2,000 and possibly more a day in the long term—if we could get more places such as ourselves, both in the academic public sector and in the private sector, that would complement the big mega-labs that are being set up in three places in the UK. I think that that was the logic behind why we did it.

Q157 **Chair:** Did you volunteer to do it, or were you asked to do it?

Sir Paul Nurse: We volunteered to do it. Three weeks ago, I emailed a SPAD in 10 Downing Street so that they would be aware of what we were doing. I do not think that we got a reply, but we did inform them. There have been some informal discussions with the Office for Life Sciences, which did not involve me. Things have got much more useful in the last week since we made our announcement. Now we are working much more closely with the Department of Health and Social Care and, of course, all the time—I should have said this—with University College London Hospital and their diagnostic services. We have done it together, which is extremely helpful. There are lessons to be learned there. There may even be lessons for the mega-labs. It is a question not just of getting laboratory facilities in place, which is important, but of getting the workflow operating well—the workflow from hospitals through the regulatory issues. These are all very complicated and if you are to have a mega-centralised lab, you have to solve all those problems. We have solved them locally, but they will have to be solved on a national scale for the mega-labs to work, and it does take time and it does take effort.

Q158 **Chair:** Thank you, Sir Paul. A request was initially made for labs in universities and other settings to loan their testing equipment to the central labs. Was that requested of the Crick?

Sir Paul Nurse: Yes, indeed, it was. I should have mentioned that. That was done at the same time as we were deciding to do something ourselves. We lent all the machines that they requested. They only wanted a particular type of machine, presumably to make it work best in their circumstances, and we had other machines that they did not want, which we are using for our analyses now. I should say one other thing. We also asked for volunteers from our staff. We got more than 300 volunteers within 24 hours and we offered those volunteers, who might have needed some training of course but who were skilled in laboratory terms, to support in any way that might be required. We did that at that time as well.

Q159 **Chair:** One other reason for this line of inquiry is so that we can learn lessons, during this crisis, that might be applied. Obviously, we are engaging here on whether a centralised model, in which you ship your machines to a big lab at the request of the Government, or you operating

your machines with your people and expertise locally is a better model. Do you have any reflections on that? Should one combine the two, or emphasise one or the other? What do you say?

Sir Paul Nurse: I think at this moment the right course of action should have been to combine the two, because we were working against the clock. Had this all been planned before—one, two or three years ago—and the mega-labs had a clear way of operating, that might have been the most efficient way to go forward, but you have to solve a number of problems. I don't think those problems were solved and therefore just to rely on a mega-lab approach, I suspect, was not the wisest course of action, because we were all having to work so much more against the clock.

We are a bit late now, really, because in London we are getting up to the peak and we need all the facilities we can get, but I should say that we at the Crick have protocols. We can tell people where things have not worked very well, and it may be that others can get going a bit quicker than we could.

So I think the short answer is that, for now, we need both. Hopefully, the little boats won't be required once the mega-labs are going, but if we are just waiting for them to get going, and it is difficult to get them going, we definitely can help in some way.

Q160 **Chair:** You will make an important contribution, but I take what you have said: if you had been able to contribute a bit earlier, you could be contributing more during the peak as well as, we hope, afterwards. That is important to understand.

Let me ask a couple of questions of Steve Bates and then I will turn to my colleagues. This one will be just like my question to Sir Paul, Steve. What is the role of the bioindustry in making a contribution to the flotilla of little ships?

Steve Bates: We have seen the Government effort at national level on this go into hyper-speed in the last week, and we have really spent our time organising the good will of the sector, both those who are traditionally involved in the diagnostics industry and those who want to come alongside and help in that national effort. We have already seen, in the last few days, big changes. There was the announcement this morning from AstraZeneca and GSK that they are working with the University of Cambridge on a new testing lab. We have already seen many companies as well as universities give up the particular type of kit that is the backbone of the new national centres. And we have works today to make sure that there is detailed understanding of the standards by which, if you want to bring a little ship alongside the national effort, you need to be able to dock, and how you may do that through an understanding of standards.

The other thing that is happening is that there is innovation within the processes in Public Health England, within companies and within NHS labs as to how they run this test. And we are making sure that that best

practice, that innovation, is spread rapidly so that people can work at pace in a very difficult situation.

Q161 **Chair:** Thank you, Steve. I don't think people would have seen, but you were nodding when Sir Paul was saying that if you had started a bit earlier, you could have made a contribution earlier. I think you were indicating that what Sir Paul said about the research sector applies also to the industry sector. Am I interpreting your body language correctly?

Steve Bates: The industry has always supported the diagnostics infrastructure in the NHS—for a number of years—and to the extent to which the NHS has sought to buy these things from the private sector, the private sector has been supportive of the infrastructure that has been built in the country. There are some excellent companies doing that, whether it be Thermo Fisher, Roche, Randox or others. They have always been part of the scene.

What we have seen is a willingness to support. Really, in a sense, it's the Thermo Fisher backbone and the Randox backbone that are making the difference in the national hubs. They were commissioned relatively recently. In the last week we have seen a real ramping up again of the desire to engage everybody, and only in the last couple of days really specific details and plans as to what people need in terms of antigen testing. We are talking here about swab testing for people who have the virus. I can talk separately about the antibody test; you may want to come to that later.

Q162 **Chair:** Thank you. What is your assessment of a concern that has been raised, not least by the Government, about an alleged shortage of the reagents that are necessary to significantly increase the manufacture of test kits? Is that something that your members are experiencing?

Steve Bates: I think it is a bit like the toilet rolls. In one sense, if there is not something where you need it in the place that you need it, you believe that there is a shortage, but in fact there is plenty of supply of some of this, or it is able to be made by other people, so I think it is a logistical challenge. Some of these are things that need to be in the right format. They are packaged in particular kits to go into particular machines. There are pinch points, and that is understandable as volumes are increasing very rapidly. Supply chains are adapting to that, but there are pinch points. I do not think that there is a fundamental problem with the capacity to make a reagent in the long term.

Q163 **Chair:** You are talking about within this country? It could be contained within this country? We have got supplies and, if it all slots together, you can produce the necessary test kits without a problem once the links have been made within this country over the next few weeks.

Steve Bates: The things that go in the machines can have up to 70 parts in them. Some of those are plastics, some are consumables and disposables, and some are reagents. I am not pledging that everything can be done easily within the UK supply chain, but the UK does have reagent manufacturing and some of the plastics manufacturing. Most of

this has been built in the global supply chain, and we are confident that global suppliers will be able to supply what they have promised, but this is a thing that everywhere in the world wants immediately.

Q164 **Chair:** It is no good having something with 70 parts if the last two are missing. You need to have them all there. To be confident that the tests will work, what is your assessment of getting all of the components in place, either through availability, or, a bit like the ventilator challenge, getting people who previously did not make these components, whether chemicals, or, in the case of swabs, physical components, in place? Can they be repurposed?

Steve Bates: I have discovered in the last week just how innovative the people who run labs, public and private, can be, as Paul's team at the Crick have shown. Where there's a will there's a way. Some of these may be able to be more easily adapted with different steps, different processes or different kits. It will probably be easier on some machines than others, and probably there will be a rate limiting steps on some that are bigger than others. It depends on the specifics. I know that there is a very detailed request from the DH. Priority areas have been signalled very clearly to the market and to the private sector in the last day or so.

Q165 **Chair:** Is there a relevant lesson to be learnt for the future management of this pandemic? We are keen to learn lessons that can be usefully applied. To anticipate production that is needed later in the crisis, it is best to get ahead of it. Obviously, vaccine production comes to mind. From what you and Paul have said, more test kits available now would have been useful. Should we be making sure that, in anticipation of the need, we have, for example, vaccine manufacturing facilities?

Steve Bates: If I can pay testament to some of the work that you yourself have been involved in in recent years, as part of the UK's life sciences industrial strategy investments have been made by the UK state that will be very helpful in building a vaccine manufacturing capability. These are around the country. They link to the private sector as well. A great consortium of BIA members have made proposals that have been adopted by Sir Patrick Vallance and the UK Government, which anticipate exactly this: the need to manufacture.

Q166 **Chair:** In time for use during this crisis?

Steve Bates: We hope so, if candidates emerge for vaccines from either the Jenner in terms of the adenovirus, or perhaps the more novel approach of the mRNA approach. We believe that we have linked and co-ordinated the UK's capability in this, for which there is some—I would not say it is everything to do everything at scale—capacity, and that has been linked and is being invested in and being organised and ready to go should a vaccine candidate become available.

Chair: Thank you, Steve.

Q167 **Aaron Bell:** I want to ask both the witnesses, if I may. *The Times* reported that the newly appointed Government adviser on testing,

Professor John Newton, thought that "companies who are offering their capacity" for testing "might not be as helpful at the moment." It seems you both fundamentally disagree with that. Is it that it is not necessarily a question of capacity but, to speak to what Mr Bates said, one of the agility and innovation that those companies can offer?

Secondly, to both of you, to what extent do you think that the whole UK was sufficiently prepared for the level of testing that is now required, and are there any lessons we need to learn from that?

Steve Bates: I found that the NHS and PHE have been very, very welcoming of opportunities for companies to support them. There is a question about how easy it is to dock into processes, because it is not just bringing your laboratory on board; you have to ensure that you have samples coming in and that the data can go out the other side. You have got to mesh in, if you like, when you arrive, and that is easier for companies that are close to industrial or NHS processes than it is perhaps for those that have some machines and are working on research. So, we are linking back together, and I think that that may be the thinking.

On your point about what is needed, it is clear that in the last week we have understood that the challenge of antibody testing—the tests that may be able to detect antibodies—is a knottier scientific problem than we first thought. Professor Sir John Bell has helpfully outlined some of those challenges in a blog and there are scientific papers on it, which enable everybody who can work in this research space to work on it. That will be the thing that we will need to be able to scale. However, we don't have the capacity yet, because we don't have the answer yet.

Aaron Bell: Sir Paul, the same question to you.

Sir Paul Nurse: First, we at the Crick are doing testing, but we have also repurposed a number—

Aaron Bell: I think we are losing Sir Paul again.

Chair: Can you hear us, Sir Paul? We have a problem with the sound. We will try to come back to you if we can, for you to answer Aaron's question. May I turn to Carol Monaghan?

Q168 **Carol Monaghan:** Thank you, Chair. My question was for Steve anyway. You talked about the difficulties in accessing patient samples, and I have had companies getting in touch and raising that particular issue. What can Government do to make these infected samples more available to companies that are working to produce diagnostic tests? How can we support that?

Sir Paul Nurse: It is critical for NHS staff, because you don't want staff on the wards picking up patients if they are COVID-positive. We have to test careworkers; I think that has really got to get out there very, very fast.

There are a lot of rules, a lot of regulations, a lot of practices. You have to cut your way through them; it is difficult to do. I think that what we can

learn locally will be helpful for the bigger laboratories, because they will have to solve the same problems. They—the rules and regulations—will be different in different places, and you have to get through them. You can get through them, but I must say it is a lot of effort and my colleagues at the Crick have had to do an enormous amount of work to get samples in.

The practices that are suitable for peacetime are not always quite the practices that are suitable for wartime, and we are in war at this moment. I know that I keep turning to military metaphors, but it does seem useful to through this stuff.

Steve Bates: Chair, if I can answer Carol's question, there are two points. First of all, we should be under no illusion about the centrality of Scottish life science firms and capability for the UK effort; they are fundamental and some really big sites that are vital for the whole of the UK are based in Scotland.

As for giving companies access to samples, I think there are two questions here. One is where people are trying to do research to get something to work that is perhaps not yet ready for industrialisation but they are seeking access to the data. Obviously, this is a new disease and they need access, perhaps to blood. I think that the UK clinical trials network has built a fantastic network. That is another piece of infrastructure built very effectively over the last 10 years through a life science industrial strategy. So the Nightingale hospitals do have a clinical trial infrastructure. The adaptive trial out of the University of Oxford and the PHE approach to surveillance screening, and some of the data that will come out of it, will enable companies to share some great science coming from the UK.

I know that most companies will want the individual bloods as quickly as possible for their own particular projects. That is a challenge in a very fast-moving environment, but I know that where this could be linked into clinical trial work, there is a desire to do it, and perhaps there could also be local facilities where people work on that.

Chair: Thank you very much. Darren Jones is next, and then Jeremy Hunt.

Q169 **Darren Jones:** Thank you, Chair. I am interested in some of the points you have made about the lack of agreed strategy at the beginning of this pandemic between a centralised and decentralised approach to testing. I am conscious that in the health service, we do stress-testing to look at how many ventilators we need and what capacity we have for these types of scenario. Could you tell the Committee whether we do similar stress-testing from a testing perspective, and if so, whether there were recommendations before this arrived about which approach we ought to take?

Sir Paul Nurse: I am not familiar with this, I have to admit, being in a research laboratory. I suspect we were not prepared enough. I think there was an NHS test of how we would respond to a pandemic about three years ago. I am not familiar with it, but I am told that there were issues

as a consequence of that. You will have to ask the experts about where we were on that; I cannot provide an answer. Certainly tests were carried out on the system some time ago, and maybe there were lessons that should have been learned, but you will need to ask somebody else to get a response.

Steve Bates: I am sorry, but I do not know.

Chair: All right. I will turn to Jeremy and then Zarah.

Q170 **Jeremy Hunt:** Thank you, Chair. I have a quick question for both Paul and Steve. To do 100,000 tests a day by the end of this month, which is three weeks and two days away, is a very important statement of ambition. But given what we know now about the difficulty of antibody tests and the fact that they are unlikely to work by then, do you think that it is an important stretch target or something we could actually achieve in that short period of time?

Steve Bates: I think industry is going as fast as it can. I believe that the supplemental work of the smaller ships coming alongside PHE and the NHS will help with that. We had a good update today from the central labs, and if they can get volunteer communities to help them with second shifts and go through the night, everybody will do everything they can to give the UK the capacity that has been set out as the target.

Sir Paul Nurse: We all have to work together to achieve what has to be achieved; 100,000 is a stretch, though.

Q171 **Zarah Sultana:** This question is for both Steve and Sir Paul. Thank you for talking to us about the benefits of an approach that brings together mega-labs and smaller labs. Are there any risks to the more open, decentralised approach—for example, testing at work or in the home—announced in the Government's five pillar plan for testing?

Steve Bates: I do not think there are any particular risks for individuals in terms of the way that a test would be taken. We have seen the procedures that are used in IKEA car parks, and I believe that they are properly overseen by the NHS, to make sure that the staff conducting those tests are doing it properly. If, through a research programme, we got to something similar to a DNA swab that you could take at home, to show whether you had had the virus, that would be ideal. We are, I am afraid, some distance from that, but such a test would be unchallenging in the way that DNA swabbing is used by police. That is the holy grail at the moment, not a realistic prospect in the immediate weeks.

Sir Paul Nurse: We are setting up the Crick drive-in and walk-in facilities, to diversify our help to the national health service. We are also experimenting with different ways of making these tests. Some look promising, and if they are working, I think we will be able to make a contribution there too. I have a feeling that we are going to get through this largely by lots of different efforts coming together and looking for best practice. It is perhaps not the way large organisations normally operate, because they have to have appropriate processes in place and so on,

which is only proper, but in this particular situation it is probably going to require a somewhat looser organisation—an organisation that listens to what everybody is doing and maybe accommodates different approaches, rather than a monolithic approach. That is probably going to be the best way forward.

Q172 **Chair:** You are a very distinguished biologist, Sir Paul, and you seem to be advancing an approach that is rather adaptive and rather more biological than mechanical. Do you think that is the right approach—that we should allow different approaches to develop during the course of the crisis?

Sir Paul Nurse: I am absolutely sure that the mega-lab approach is the right one in the long run. To get running properly, they may need to call upon our experiences, and at this moment the smaller labs are definitely required until they can get up and going. I do not know if I would call it a mechanical or a biological approach, but we are certainly—

Chair: We have lost your sound. We lost you right at the end there, but I think we got the gist of what you were saying.

I should say to you, Sir Paul, and to you, Steve, that we are very grateful for the contribution of the industry and of the scientific labs across the country to this flotilla of small ships, as well as for the contribution of the big labs. In half an hour of evidence you have given us some very important insights. If we can get ahead and anticipate some of the work that is needed and some of the installations that are needed, that is evidently a good thing, and you evidenced that.

We had an interesting insight into the decentralised versus centralised approach, and we took some comfort from what Steve Bates said about the capacity for us to lay our hands on the necessary reagents and the other contributions that we will need to have the quantum of tests that is required.

Thank you very much indeed for taking time out to give evidence today. We will pause for a few seconds while we arrange the communications for the next witnesses.

Examination of Witnesses

Witnesses: Kathy Hall, Professor John Newton and Professor Stephen Powis.

Q173 **Chair:** Order. The Committee is back in session. We are very pleased to have with us by video link Professor John Newton, who is the Director of Health Improvement at Public Health England, but for the purpose of today's hearing is present in his capacity as Government adviser on increasing the COVID-19 testing capacity, to which role he was appointed on 2 April.

We also have Kathy Hall, who is director of COVID-19 testing strategy at the Department of Health and Social Care, and we have Professor Stephen Powis, who is National Medical Director of NHS England and also professor of renal medicine at University College London. Thank you very much indeed for joining us today.

Before I bring in my colleagues, perhaps I could start with Professor Newton. Your role is new—it is less than a week old. Can you describe your new role to the Committee, please?

Professor Newton: Thank you very much, Chairman. It is great to have this opportunity to address the Committee and to discuss these important issues.

You asked me to describe my role. I thought Sir Paul Nurse put it very well in the previous session: this global pandemic is an extraordinary event and there has been an extraordinary response in this country to try to increase testing capacity, and it is a very diverse response. My role is to take an overview of that response and to understand the different elements of it and how they work together to deliver the testing capacity required for the country to respond to the pandemic, and to advise the Government—particularly the Secretary of State—on the progress with that programme.

Q174 **Chair:** That programme is the five pillar plan for testing that was announced last week.

Professor Newton: That is right, yes. The Secretary of State helpfully described the work, and many of those streams of work have, of course, been under way for many weeks, as you will have heard from some of the other witnesses. It is more a question of describing what has been achieved so far and setting out, as you have mentioned, a testing target for future achievement.

Now the target is testing, but I think it is appropriate. As a number of your Members have pointed out, especially Mr Hunt, testing is a very important contribution to the country's response. We are determined to make sure that the country has the testing capacity that it needs.

Q175 **Chair:** Thank you. Let us go into a bit more detail on the targets. The target as of 11 March was to get to 10,000 tests per day. On 18 March, it increased to 25,000 tests per day by the end of April. On 3 April, it was

increased to 100,000 tests per day. Who came up with the number? Who is responsible for alighting on a particular number?

Professor Newton: The Secretary of State clearly set out his target of 100,000 on 2 April, but in the background there is of course, as you would imagine, a lot of scientific work going on, including modelling, to give us an idea of what the requirement is.

It might be worth pausing for a moment to think about what the requirement is—why do we need testing? Testing is important for the clinical management of patients in the NHS, but also for the management of anyone receiving services, to make sure that people know what PPE to use, and to ensure that staff get back to work if they are symptomatic but test negative.

There is also a role for scientific epidemiological surveillance. The priority right now is to manage patients and get staff back to work, and then—soon, hopefully—to roll out to testing other key workers. It is that requirement that is driving the targets that are being set for the programme at the moment.

Q176 **Chair:** On the 100,000 target, no one on the Committee and no one watching doubts the importance of testing, and if you have seen our previous evidence you will have seen that everyone agrees with that. But this 100,000 number by the end of April has been adopted as a target. Has SAGE, the Scientific Advisory Group for Emergencies, considered the target? Is it their target? Have they endorsed it?

Professor Newton: I think specifically, no, it is not a SAGE target; it is the Secretary of State's target. I think he has taken advice from the programme and from colleagues, but there is modelling, which is—

Q177 **Chair:** Has he taken advice on the target from SAGE?

Professor Newton: I am afraid you would have to ask the Secretary of State himself exactly where he got his advice from—I do not know whether Kathy Hall might know—but the modelling that underpins this sort of target has certainly been made available to SAGE, so there is plenty of consistency between the various sources of advice. Of course, one of the issues that we are all dealing with in respect of coronavirus is the fact that it is an unpredictable pandemic. There are very few certainties in this. We think it is a reasonable estimate of the likely requirement.

Q178 **Chair:** Does Public Health England have a view on the target? Is it something that Public Health England has adopted?

Professor Newton: Fairly soon, Kathy Hall might want to talk a little bit more about the different pillars of the strategy. Public Health England contributes to the first pillar, the NHS-led component, which is on track to deliver 25,000 tests a day. Public Health England is, in fact, delivering more tests every day now than was set as a target. Public Health England is also contributing to pillar 4, which is the serological testing for epidemiological surveillance. That is being done at the at the level of around 3,500 tests a week.

Q179 **Chair:** I will come to Kathy on that in a second. On the 100,000-per-day target, given your role as the person leading the effort to achieve this target, I am keen to understand the rationale for it. Is 100,000 per day desirable in and of itself, or is it what is achievable in your estimation?

Professor Newton: It is a balance between the two. It is important to set a feasible target. Again, it is worth going back to the requirement and the pandemic. We have a very solid programme to increase capacity in NHS laboratories, which is essentially providing a linear upgrade in the capacity, but the pandemic is operating exponentially.

In order to get exponential growth, we need a different model, which is where what I call the mega-labs come in. This separate channel, which delivers three very large laboratories and which can be scaled up much more rapidly, provides the exponential increase in capacity. We are at the stage now where those labs have been through their set-up and testing phases and are starting to roll out testing, so we are about to see their capacity increase exponentially.

Q180 **Chair:** If the target has been set reasonably, with a view as to what is achievable, do you have a view as to the desirable level of testing that we should aim for?

Professor Newton: It would be great to have infinite access to testing, but at the moment, of course, the response to the pandemic is social distancing and various measures that are in place, and if we had an infinite amount of testing, even now, that would not change.

As I said before, testing has a particular role at the moment to do with managing patients, getting staff back to work and so on, and we are in fact delivering the testing required for the NHS—Professor Powis might like to comment on that. We are already testing a good number of NHS staff as well; I believe that 20,000 NHS staff have now been tested. Testing capacity now is not what we would like, but it is by no means inconsiderable, in terms of what we need. However, we anticipate that the need will increase dramatically, and we therefore want to get as much testing in place as possible.

Q181 **Chair:** I understand, but am I correct in interpreting that 100,000 per day by the end of April is a reflection of what is attainable, but that there is a desire or volition to go higher than that?

Professor Newton: That number is a big number, and even if you compare it with what other countries are doing at the moment, it remains a big number. Our thinking is based on delivering testing—to allow for the management of patients, but also to test key workers and to test, for example, people in care homes and a whole range of other people, including some members of the public who might wish to be tested just for their own knowledge. That is the sort of requirement that we have in mind when we think about delivering that scale of testing.

Q182 **Chair:** I see; but at that rate it would take, I think, a year to test half the population, would it not?

Professor Newton: That would not be the objective. This testing capacity is to detect the presence of the virus, which is only required for people who are symptomatic. The number of people who would benefit from testing is much less than that.

Q183 **Chair:** Finally, before I turn to my colleagues, on the 100,000-per-day plan by the end of April—that is when it is to be achieved by—when in the plan will all NHS workers be tested?

Professor Newton: Again, perhaps Professor Powis may like to comment on that. As I say, we have already tested 20,000. The requirement for NHS workers is to test people who are symptomatic and who are off work. If they test negative, they may be able to go back to work. I think that is probably a question for Professor Powis.

Q184 **Chair:** Professor Powis, when might all NHS workers expect to be tested under the plan that has now been adopted?

Professor Powis: I think it is really important to be clear about which NHS workers we are testing. We are not testing all NHS workers. There would be no merit, on the scientific evidence, in simply testing all NHS workers. We are focusing on those workers who are absent from work, either because a member of their family is unwell and has symptoms, and therefore they are in 14 days of home quarantine as per Government instructions, or they are symptomatic themselves and are therefore self-isolating for seven days.

We have been focusing on those in household quarantine for 14 days. Just to be clear—it is then the member of the household who is symptomatic who is tested; it is not the NHS staff member, because they are clearly in quarantine because somebody else is symptomatic. We have been focusing on that group initially, because that is exactly the group that our trusts and our trusts' chief executives have asked us to focus on first.

We are now in a place where we can expand to focus on those who are symptomatic. We would not necessarily always want those individuals who are symptomatic to come back to work; even if they had an illness that was not COVID-19, clearly, we do not want people who are unwell and sick to come back. But there may be some people with mild symptoms, such as a cough that could be a cold and not COVID-19, who under normal circumstances could come back, and therefore we are extending to that group.

However, I must make it clear that it is not all NHS staff; it is the NHS staff who are absent because either they or, more importantly, a member of the family has symptoms consistent with COVID-19.

Q185 **Chair:** I understand. So, as part of the plan, when can that group of NHS workers expect to be able to be tested?

Professor Powis: The group that I have just spoken about is the group that we are focusing on at the moment and, as you have heard, within the NHS testing laboratory—distinct from the drive-throughs that you have seen set up—we have now tested more than 12,000 members of staff.

That is ramping up all the time and very shortly we will be in a position where anybody who is absent from an NHS organisation can be tested if they are symptomatic or in household quarantine. We intend to extend that, with our colleagues at the HSC who are managing the second pillar, the drive-in testing, which we will come on to, to expand it to other areas of health and social care as soon as we can.

Q186 **Chair:** For those workers that you mentioned, it sounds as if you are saying that, well before the end of April, they will be able to be tested.

Professor Powis: Yes. We have written to chief executives of NHS trusts—we started with the NHS trusts—and asked them to prepare lists, because obviously it is those organisations that know who is off on any day. They are actively working to identify those individuals who they wish to test or prioritise for testing, but as capacity ramps up, the intention is that everybody who is absent who wishes to be tested, or whose organisation wishes them to be tested, can be tested.

Q187 **Chair:** Thank you. Back to Professor Newton: consistent with the 100,000-per-day plan, when would you expect all care workers who are showing symptoms to be able to be tested, to assure themselves and the people they care for that they are not in danger of infecting them?

Professor Newton: As you would imagine, there is a lot of work going on across Government to ensure that the right people get tested at the right priority. It is not my responsibility to set those priorities, but I can assure you that very careful thought is being given to that to ensure that people are tested in the order that the local systems would like. In fact, we are working closely with local resilience forums to ensure that the available testing is made available to give the most benefit locally at the time.

Q188 **Chair:** If you get 100,000 by the end of this month, do you expect all care workers, or a proportion of care workers, to be able to be tested under that programme?

Professor Newton: I cannot give you an answer to that, but we will make as much capacity available as possible through the testing programme, which is what we have been tasked to do. That will be deployed according to a combination of central Government priorities and, importantly, local priorities to ensure that those tests are delivered to the people who need them most. I don't know whether Kathy would like to add any more about the work to allocate priorities to the testing programme.

Kathy Hall: As Professor Newton said, we are continually looking at how many workers are off with coronavirus and what capacity we therefore need. That is something that has to be looked at all the time. The 100,000 gives us scope. As the Secretary of State said, that will mean that every NHS worker who needs it will have a test by the end of the month. As soon as possible, that will go out to careworkers and 100,000 should give us the capacity to extend that to a range of key workers as well, subject to ministerial decisions on how we prioritise that, but also subject to local need. We are very keen to make sure that it is local systems that will get

to decide where the pressures are and which key workers in their systems most need tests.

Q189 **Chair:** Is there a plan? We understand that there is a target, and 100,000 a day is very important and a significant increase. That may be a number that is set reasonably, given the capacity, but is there a plan for when that should be rolled out to what types of workers, starting with the NHS? Is there a plan for when you expect careworkers or essential workers to be able to be tested?

Kathy Hall: When we set out the strategy, we said that patients are obviously the top priority, then frontline NHS staff, careworkers and other key workers. As we ramp up capacity, we will be able to make testing more available. We are working with NHS colleagues in the first place to make sure that we are working with local systems to get the NHS staff who need testing—those who are in most need, depending on the local system—to the tests. In some cases, they may even tell us that they think it is social care workers or others who are most in need of the test there. Then we are working across Government with other public sector agencies in order to decide how best to then roll it out to other key workers. That work is ongoing all the time. We are in conversation with the Prison Service and so on to design that in as capacity ramps up.

Q190 **Chair:** When you get to 100,000 by the end of the month, do you expect prison workers, for example, to be able to be tested by then?

Kathy Hall: Obviously, we rely on advice about how the disease is progressing, but also on staff absences and so on in order to look at that closely. My understanding is that as we ramp capacity up, we will be able to extend that out to key workers beyond the NHS—into care and into other key sectors.

Q191 **Chair:** I think it would be useful if you or Professor Newton could write with some details of the plan to achieve it, the ways of prioritising and when people in those groups might expect to be tested. Just one more before I hand over to Chris Clarkson, my colleague. Within the 100,000, what proportion of those tests are antigen tests and what proportion are antibody tests?

Professor Newton: That is a helpful clarification to make. Although the target that the Secretary of State set was not specific to different types of tests, it is clear that we do not expect to be doing antibody tests by the end of April. In fact, the requirement is for the swab tests that detect the presence of the virus. We are planning to do 25,000 tests a day in the NHS-led stream, which is supported by Roche and by Public Health England. The rest will come largely from the mega-labs, which will also be doing these PCR tests to detect the virus. Also, as you heard from Sir Paul Nurse, there are additional laboratories that are coming in alongside the main laboratories to provide additional capacity. We heard about some of that work again on the radio this morning on the "Today" programme, with the partnership at Cambridge with AstraZeneca. There are other groups providing input as well. The short answer to your question is that we expect nearly all the tests for the virus to be PCR tests.

Q192 **Chair:** The AstraZeneca-Cambridge initiative is very welcome, as is the Crick Institute, but that is a very important clarification. You are not now expecting any antibody tests to be available in significant number by the end of April.

Professor Newton: We are not relying on antibody tests to make up that target. There are, of course, antibody tests available now, so the antibody tests are being used to perform the epidemiological surveillance. Those are undertaken by Public Health England at the moment, although a number of NHS labs are also building capacity to undertake the so-called ELISA antibody tests. Those will be laboratory-based antibody tests, and they are beginning to come on stream in relatively modest numbers.

Q193 **Chair:** So the 100,000 is all antigen tests, detecting whether people currently have the virus.

Professor Newton: That is correct; it is a test for the virus.

Chair: Thank you.

Q194 **Chris Clarkson:** This is a question for Professor Newton. Just under a week ago, we moved to the five-pillar plan. I want to get an impression of why this particular model was chosen and when we first started looking at this as an option.

Professor Newton: I think the model of having these different streams reflects both the requirement and the distribution of resources to help. From the outset it has been recognised that it is important to build up capacity, and it was also apparent that that capacity was going to lie in a number of different places. The reason for having multiple workstreams is to capitalise on the resources and on the skill, talent and enormous amount of support that has been offered to the programme.

The addition of the fifth programme is a way to increase the innovation in the system, because—as I am sure you will have heard—the earlier programmes, which had been running for a number of weeks already at the time of the announcement, rely on industrial increase in volume of the existing well-tried technology. The trouble with that is it puts pressure on global supply chains for the same reagents and consumables, but there are a number of companies that are developing truly innovative approaches to achieving the same testing, which do not rely on the same consumables. If we could do that, we would be unbounded by the global competition. There is real excitement about some of these novel approaches but, because it is innovative, it is high risk and we are therefore not relying on it. The things we rely on are industrial upscaling of existing technology. Has that answered your question?

Chris Clarkson: Yes.

Q195 **Katherine Fletcher:** First, and I think most importantly, thank you to all three of you. I am sure that, by coming and speaking to us at this incredibly busy time, we are actually sticking half an hour on your working day, which I can imagine is not short anyway. I appreciate it very much, and I appreciate everything that you are doing for the

country at the moment.

My question is on the tack and strategy. I understand that this is fast moving and that the word "unprecedented" gets used too often, but this situation genuinely is. The last set of evidence we just heard almost suggested that there had been a slight tweak or change in testing strategy. I wonder whether the failure of the pre-ordered antibody tests has had anything to do with the ramping up of antigen tests. Understandably, antigen tests need that big box in the lab, whereas antibody tests are in theory much more accessible to consumers. Has that change in knowledge influenced a change in strategy?

Professor Newton: First, thank you very much for those comments, which are extremely welcome. An enormous number of people have been working incredibly hard to achieve the testing that we have got. Having said that, it is very important—I would say this is an extremely valuable use of our time—to have scrutiny. It is also important to get your advice and to explain in public what we are doing.

In response to your question, I don't think that is the case. The drive to increase the tests for the virus is driven by the requirement. We were obviously optimistic that a number of companies have been offering us quick antibody tests, and we were hoping that they would be fit for purpose. Of course, the reality was that when we got them to test—they all work to some extent, but they are just not good enough to rely on. Because the requirement for those tests is a little bit down the line, the judgment was made that it is worth taking the time to develop a better antibody test before rolling it out. That is what the current plan is.

Katherine Fletcher: Professor Powis?

Professor Powis: On the question of antibody tests?

Katherine Fletcher: No—if you had anything to add to Professor Newton's point about it not really being a change of strategy due to the slight disappointment with the antibody test results.

Professor Powis: Maybe it is important that I set out how the NHS works in respect of testing. Of course, it is not our responsibility to set the overall strategy; that is the responsibility of the Chief Medical Officer and colleagues. I would like to pay tribute to my colleagues in the NHS—and, actually, Public Health England—because in the last few months they have rolled out a test for a virus that a few months ago we did not know existed. In the NHS strategy we have always aimed to make sure that we can roll out capacity as quickly as possible; you have seen that in our bed capacity, and similarly in testing capacity. We now have the swab test—the antigen test—in 65 NHS labs and PHE labs, so that is a substantial number of labs. As I have said before, that has meant that we have managed to scale up to over 10,000 a day, as we have promised, and we are on track to deliver that 25,000 in NHS laboratories by the end of April.

As I said, patients are our foremost concern, so quite rightly, as the Secretary of State also said, the initial capacity—we also always need

capacity reserved for patient tests, which are an important part not only of diagnosis but of tracking the epidemic. But the second part of the strategy was to allow staff to access tests so that those who were absent because of symptoms, or because of somebody in their household, could come back. In the first few days after that was announced by Sir Simon Stevens, we set a limit for that of 15% of capacity, because we wanted to protect patient tests, but within a couple of days we had the capacity to extend that, and we have been extending that, as you have heard, to all staff as we have gone through the last week or so. Our intention is to keep expanding it up to 25,000, working in partnership with colleagues at DH. You have heard already of that strategy.

It is important to say that there are some things that we are keen to do but for which we are not responsible. We are keen to work with the private sector. We do not—contrary to some comments—want to block private labs. We want to work with private labs. It is the Department of Health and Social Care's responsibility to talk to private labs; it has always done so, and we are very keen, so we have not blocked any relationships with private sector or third parties. We value the work of universities and others in providing additional support. But as I said, the overall strategy is one that needs to be developed through Government and scientific advice, and the NHS's role then is to deliver that, whether antigen testing or—when it is available—serology testing.

Chair: Thank you. Let me turn to Aaron Bell and then Jeremy Hunt.

Q196 **Aaron Bell:** Thank you, Chair. This question is for all three witnesses. Rather than looking at the 100,000 target for the end of the month, I want to look at the number we are at now. Clearly the 100,000 is partly a reflection of the expected growth in the requirement but it is also a reflection on us not being entirely happy with where we are. Professor Newton, you said earlier that 14,000 is not what we would like. I appreciate that there is almost unlimited demand if you were to offer the test to the public at large, but from a clinical and strategic perspective, how many would we like to be doing right now?

Professor Newton: That is a difficult question to answer. Given the priorities that we have set, which are, at the moment, to support the distancing measures and keep the NHS safe, the absolute requirement right now is not that much greater than the availability we have now; all the patients who need testing are being tested. As Professor Powis pointed out, we are not far off offering tests to all NHS staff who need them. Of course, we will never complete that. It is a Forth Bridge issue, because there will constantly be new staff coming up who need testing, so that is a continuous process.

The real priority, as the Committee has already picked up, is to get the tests out to other core services. Right now, we would love to be testing care home staff, and care workers who are going out to see people and who are delivering care at home, if only because it would help us to use the PPE we have got more effectively. I am also very aware that, for

example, the police have suspects in custody and need to know whether they are positive, if they have symptoms.

We could use double that capacity without any difficulty. Beyond that, given that most people are, thank goodness, following Government advice and staying at home, it is, as you pointed out, in the future that we will need this capacity. Right now, we are not that far off—although, as I said, we would love to have more capacity right now.

Aaron Bell: Thank you. Professor Powis?

Professor Powis: It is pretty much as John has said. Our aim is to ensure that we have the capacity required to test patients; that is always the first priority. As you have heard, we are optimistic that we are beginning to see a flattening of the number of admissions, but we need to maintain that capacity for patients. The second priority for the NHS is to ensure that our staff are tested. Beyond that, it is a question of strategy, as set out by the Government, the Department of Health and Social Care and PHE, as to the additional groups or individuals who need to be tested.

I should have said, but you have probably noticed, that I am here in Downing Street; hence the flags behind me. I am grateful to the Downing Street staff for setting up this remote facility. I am here because I am doing the press conference at 5 o'clock, so I will need to leave at about 4.30 pm, unfortunately.

Chair: We will not detain you beyond that, don't worry. We are very grateful for the effort you are making to present this evidence. Kathy Hall, perhaps you will address Aaron's question.

Kathy Hall: The Secretary of State said at the press conference on the testing strategy that we want to be able to offer a test to anyone who needs one—patients first, then NHS staff and then other critical workers—so we want to have as many tests as it takes to do that. That is why the Secretary of State set the 100,000 challenge for the end of the month across all the pillars. We then keep going beyond that, as we learn more about the disease and see how it affects sectors, so we are able to go beyond, into the population.

Q197 **Chair:** To clarify, when we get to the 100,000, how far does that go into groups beyond the NHS and emergency workers, such as care workers? I assume that you must have some assessment of how many people out there might benefit from the test. What kind of incursion into that group can be made by the 100,000?

Kathy Hall: The modelling is being done iteratively, and it keeps changing as we learn more, see more about absence rates and understand that, so it is hard to be definitive. The latest advice I have heard is that it would allow us to get a significant way into critical workers who are symptomatic but well to work.

Chair: Thank you. May I turn to Jeremy Hunt?

Q198 **Jeremy Hunt:** I am delighted that Professor Newton is helping with this very important programme of testing, but my question is to Kathy Hall. Kathy, you were one of the most outstanding civil servants I worked with when I was Health Secretary, so I am delighted that you are involved in this. If it were just you and me sitting across the table from each other, as we used to in the old days, with no one else listening, and I asked you, "Kathy, what are the biggest challenges to stop us getting us this massively important result of 100,000 tests a day?", what would you tell me?

Chair: Go ahead—we will close our ears.

Kathy Hall: Thank you, and it is very nice to be briefing you again. I think we set the challenges out in the strategy. We tried to be really transparent about them. There is the challenge of supplies, which you have talked about a fair amount, and which we have been working really hard on—getting the right sort of supplies of kit such as swabs and reagents.

There is a big logistical challenge. How do we make sure, with those supplies coming in, that they are in the right place, so that we have the right equipment for the right machines? How do we make sure that we get people who might have the virus tested? How do we get the swabs from the tests to the lab, and the results back out again? There is a big logistical challenge there.

There is a big challenge around the quality and accuracy of the tests. This has particularly come to the fore with the antibody test. Those are the three big challenges, and everyone is working really hard all the time, with contributions from across all Government, the NHS and—as you heard from some of your witnesses—industry, research and universities, to overcome them. Those would be my big three.

Q199 **Jeremy Hunt:** What is your confidence level, Kathy, that we will get to that 100,000 tests per day?

Kathy Hall: I think what the Secretary of State said was that it is a big challenge to go from where we are now to 100,000 tests a day by the end of the month, but we have got a really good plan and the support of everybody doing it, so we feel confident, though that is not to underplay the challenges and risks that we have to overcome.

Chair: Thank you. Let me turn to Darren Jones.

Q200 **Darren Jones:** I am interested in this question of the balance between demand and supply of testing across different parts of the country. We know, for example, that London and the midlands have a particular density, but in the west country, where I am, that is not so much the case. I have two questions related to that management point. First, I understand that there should have been some national modelling about where we predict the spikes to happen across different parts of the country at different times. Has that been published yet? If not, why not?

My second question is around the importance of tracing. There is a lot of debate going on around mobile apps, reporting of symptoms and location

tracing. How important is the tracing part of the strategy to the prioritisation of the delivery of tests across different parts of the country?

Professor Newton: First, in terms of the modelling, we are building this testing service to be responsive to whatever patterns we find. The key is to have a distributed service, so that we have 44 NHS laboratories and eight Public Health England locations throughout the UK available to do testing. Built into that is a process of mutual aid, so that if there is a surge in demand in one area, other laboratories can play in and take some of that demand. That is quite difficult to achieve, particularly given all these closed platforms, if I can use the jargon, for the machines. They are a little bit like coffee machines; you have to have the right cartridges to go into them, and you cannot put someone else's cartridge in. There is a bit of challenge in mutual aid because of that, but nevertheless there is a lot of work going on to increase the use of open systems that can support each other. Flexibility is important in the NHS for that reason.

The service that we are delivering with industrial partners on the mega-labs is a highly flexible function. We are working with the Army to deliver logistics that allow that to be supported and to provide, essentially, pop-up services wherever they are needed, both in the locality and in the country. There is a lot of flexibility built into the process. Models are good, but my models rely on assumptions, and they respond as things change. I think we would be unwise not to build in a lot of flexibility, however good the modelling is.

Chair: Thank you. Darren, I think you had a second question—we can't hear you, Darren.

Q201 **Darren Jones:** Sorry. Someone needed to unmute me there, I think. My question was about the importance of the tracing aspect around testing.

Professor Newton: That is a very interesting issue. There is a lot of work ongoing on this. Our colleagues in NHSX are working extensively on developing digital support, because clearly, in the current context, with the widespread use of smartphones, this is a potentially huge tool, so that is actively being considered. The digital technology will help us just in the delivery of the service, but when we come to a slightly different phase of the pandemic, the plan is to have digital support that will allow our epidemiologists and the disease response function to work using testing and supported by these digital tools.

The digital tools are, of course, imperfect. They will give you some indication of whether you have been close to somebody who has tested positive, but it will not be definitive. They will require support from what you might call more traditional public health measures, but they are undoubtedly going to be a very important component.

Q202 **Zarah Sultana:** My question is to Professor Powis. World-leading disease data analysts at the IHME in Seattle published a report on Tuesday that takes into account the UK Government's response so far, and predicts that the UK will be worst-hit country in Europe, with 66,000 deaths by COVID-19 by August, and a peak of nearly 3,000 deaths a day in 10

days' time. What are your thoughts on their findings? What measures need to be taken to avoid such steep numbers?

Professor Powis: I guess that is a little outside the remit of the testing discussion, and it is work that I have not looked at myself. I guess the comment from the NHS would be that the overall modelling and strategy around the potential numbers of deaths and cases in the UK is being reviewed constantly by SAGE, so it is their remit. It doesn't sound to me as if its modelling is coming up with the same predictions as the modelling that you have just described, although I haven't had a chance to review that.

I have been on record saying that we will do well to be below 20,000 deaths during this epidemic, but it's also true to say that there is evidence—again, as I and others have said publicly—that we are beginning to see a plateau in this first wave. Clearly, we need to develop a strategy that is ongoing in the months to come, but the numbers in the report you mentioned don't sound consistent with the current numbers that SAGE is working through.

Q203 **Chair:** Thank you, Professor Powis. Mark Logan was next, but he seems to have dropped off the screen. I don't know whether he can hear us—no.

In that case, let me ask a question that goes back to the antibody tests. When the Committee last took evidence, Professor Sharon Peacock of Public Health England was able to tell the Committee that the antibody tests that had been bought were going to be tested, and she thought that they would be available for deployment within days. That was a couple of weeks ago. Clearly it is very disappointing that that has not been possible, and I infer from the answers that you have given, and from those that others have given, that the reliability of those tests has not been adequate.

I wonder whether Professor Newton, Professor Powis or Kathy Hall can give us any sense of what is next on this? Have we tested all of the tests that Sharon Peacock was referring to then? Do we need some new ones to be supplied? Or is there some hope that the ones that have been contracted for will turn out to be useful?

Professor Newton: Yes, all of the tests that have been made available have been tested, and none of them performed well enough. In particular, they didn't have sufficient sensitivity, which is the ability to correctly identify people who have been infected. We set a clear target for a test to achieve and, frankly, none of them were close.

That doesn't mean to say that they don't have any value, but it was considered that they were not good enough, and it is possible to improve on that. So there is an active partnership going on with industry in this country and abroad, and with our academics, to improve on the underlying molecules that make up the tests.

The specificity and the sensitivity of the test are determined by the scientific design of the components. If we could get that right—and our scientists are really quite confident that they can—then the manufacturers

could scale up the production of that test and make it available really quite quickly.

We are reasonably optimistic that we could produce a test that meets the standard by the time it is needed, at very high volumes, but because it is innovation we cannot be absolutely certain of that, but we are reasonably optimistic.

Q204 **Chair:** Regarding the tests that were bought, were they bought on a provisional basis? I assume they haven't been paid for; they were bought on the contingency that if they worked, the payment would be settled. Is that right?

Professor Newton: I think Kathy Hall could give you the best answer on that.

Q205 **Chair:** Kathy, what were the terms on which the tests were bought?

Kathy Hall: We ordered the tests on the basis of the minimum volumes needed to get the samples so that we could test them. We will now work with companies to cancel the orders and get our money back where possible. We will update the Committee on the results of that once conversations are concluded.

Q206 **Chair:** So when Sharon Peacock told the Committee that 3 million tests at that stage had been ordered, were they ordered on the basis that they would work? Was the money paid for them before they were tested? Was that the only way that it was possible to get them in that quantity?

Kathy Hall: Our overall strategy was to secure the tests in order to get them validated and ensure we could do that. That meant ordering minimum volumes in order to secure them. We wanted to ensure that we had the opportunity to do that, and that was the strategy we took.

Q207 **Chair:** Where were they ordered from?

Kathy Hall: Do you mean which companies?

Chair: I mean the parts of the world.

Kathy Hall: They were ordered from different parts of the world, and from a range of different suppliers.

Q208 **Chair:** Are these tests being deployed in practice successfully in other countries? We have heard reports that in Spain, for example, there was a similar disappointment when tests were applied but were not reliable enough. It is no good proceeding with them if that is the case. Is anywhere in the world doing antibody testing at scale, so that we can have confidence in that and replicate that approach?

Kathy Hall: Our understanding is that no country has yet validated an antibody test for use at scale.

Q209 **Chair:** Have you been able, either within the Department, or Professors Newton or Powis, to give an estimation of what the timeline might be to

get to the development of an antibody test that is sensitive enough to be safely deployed?

Professor Newton: As I said, it is innovation. It is impossible to be certain, but this morning the chief exec of AstraZeneca said that that company was confident that it would have a test available in May, which I found very encouraging. We have to wait and see, but the people who are doing it are talking about those sorts of timescales. Traditionally, of course it will take a lot longer. I know that in the past if we produced antibody tests for something like measles, we would expect that to take at least six months.

I do not want to get too technical, but the coronavirus is not very good at producing antibodies for the test. It is a particularly difficult type of virus to study in this way, compared with some others. We are in a zone of innovation, but it is remarkable that so many extraordinarily competent and well-resourced organisations are looking at this, and we may come up with something relatively quickly, which would be incredibly helpful.

Q210 **Chair:** Thank you. Touching on some other themes from the evidence that the Committee has been taking over the last couple of sessions, one thing we are keen to do is to learn lessons that are relevant for the conduct of policy and practice in the remainder of this pandemic. It is obvious that with something as fast moving as this, not everything is going to be perfect first time, and it is important to be confident enough to learn lessons. Testing is obviously an important area here. When Sir Patrick Vallance gave evidence to this Committee a couple of weeks ago, he said candidly, "I wish we had more tests available today. It would have been great to have got ahead of this more than we have been able to", and I think that is the spirit in which one should approach this.

One of the dimensions of this, which we have heard in evidence today, is about an approach of relying on the central institutions of the state—Public Health England labs and NHS labs—versus what Sir Paul Nurse described as the "little ships", and having lots of people who have not previously been part of the effort coming forward. That might have got us to a position where we could have more tests in production and being deployed at the moment.

Is that a reflection that you all agree with? Does it have implications for the balance between a centralised approach and a decentralised approach for questions of vaccine production and administration—for example, decisions about how, when we come to it, we can change social distancing policies, perhaps not always in a centralised way? Is that something that has been reflected upon?

Professor Newton: It is an incredibly important question. No doubt there will be lots of opportunity to reflect later, but my impression, coming to this relatively fresh, is that the reason the UK was not able to respond in the same way Germany did, for example, was due to a whole lot of factors that were in place long before the coronavirus outbreak. My impression is that the need to increase capacity for testing was recognised from the outset and a huge amount of effort went into it. In fact, Public Health

England published the so-called recipe for the test back in January, so any laboratory was able to perform the assay based on the Public Health England recipe from the word go, pretty much.

What is often not appreciated is that, to begin with, testing for coronavirus was designated as something that could be carried out only in a category 3 safe laboratory because of the infectious nature of the disease. There are not that many category 3 laboratories outside Public Health England and a relatively small number of universities, and they actually have quite small capacity. It was only at the beginning of March that the relevant authorities—that was not Public Health England, by the way—re-categorised the virus down to category 2, and that of course opened up the possibility of a whole lot more laboratories undertaking testing. In fact, that change occurred at the request of Public Health England.

There were a number of factors that meant the provision of testing in this country ramped up a little slowly, and that has left us in the position we are in now, but the thing that has impressed me is quite how much work has been done and how much effort has been put in to address that situation. We are now at the point where capacity is about to increase very substantially.

Yes, there are lessons to be learned, and it would be great if the Committee would like to help us think about how we could ensure that, in the future, the UK has the levers to pull in response to these sorts of events. At the moment we are somewhat behind a few other countries, but we are catching up fast.

Q211 **Chair:** That is exactly our purpose and our intention, both during the crisis and of course beyond it, so that we are proofed against other crises. May I ask finally—we know that Professor Powis has to go upstairs to the press conference—about the fact that we were not able to have the degree of testing capacity that some other countries had? We have taken evidence from some of those countries this morning, and everyone, including Sir Patrick Vallance, has said it would have been desirable had we had more testing capacity. Was that significant in requiring the overall strategy for handling the pandemic to move beyond contain? If we had had adequate testing capacity, could we have stayed within the contain phase rather than having the very much tighter social distancing and lockdown measures that we have had?

Professor Newton: As an epidemiologist, it is always difficult to be certain, but essentially no. The fact is that there was community transmission of the virus that was clearly quite widespread, with a number of people presenting with no obvious source for their infection. Once you have widespread community transmission, however much testing you have got, you are going to have to do something different. I think the decision to move to the restrictions we have now—the social distancing—would have been made anyway, regardless of how much testing we have. It does mean that the time now that we have to increase capacity for testing is not time wasted, and we are making every effort to ensure that the testing that is required later on is available.

Chair: We are very grateful for your evidence today. As my colleague Katherine said earlier, we are very conscious that you are working incredibly hard under great pressure and very strongly in the public interest. We want to help by bringing to light evidence from other countries that may command attention. I have written to Public Health England following our previous evidence session to ask what consideration was made, in setting the testing strategy, of the experience of other countries. It is not until the end of the week—Friday—that we are expecting that back, but it would be very helpful, for exactly the purpose you described, for us to have that so that we can reflect on it and hopefully make some recommendations that might be useful.

Thank you very much indeed. Perhaps you could convey to your colleagues our gratitude for their continuing hard work and success over the weeks ahead. Thank you very much to all witnesses and members of the Committee.