HOUSE OF COMMONS

Science and Technology Committee

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

Friday 22 May 2020

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Watch the meeting

Members present: Greg Clark (Chair); Aaron Bell; Dawn Butler; Katherine Fletcher; Andrew Griffith; Mark Logan; Carol Monaghan; Graham Stringer; Zarah Sultana.

Questions 625 - 757

Witnesses

I: Professor John Newton, Director of Health Improvement, Public Health England; and Professor Yvonne Doyle, Medical Director and Director for Health Protection, Public Health England.

II: Professor Andrew Curran, Chief Scientific Adviser, Health and Safety Executive; and Professor Catherine Noakes, Professor of Environmental Engineering for Buildings, University of Leeds.

Written evidence from witnesses:

– [Add names of witnesses and hyperlink to submissions]

Examination of witnesses

Witnesses: Professor Newton and Professor Doyle.

Q625 **Chair:** The Science and Technology Committee is taking evidence to be able to learn lessons from the handling of the coronavirus pandemic, including to be able to inform decisions that will be taken during the weeks and months ahead. We wrote to the Prime Minister on Monday this week with 10 findings and recommendations from our hearings so far. A copy of that letter is available on the Science and Technology Committee website.

Today, we have two areas of focus. The first is to hear from Public Health England about the assessments it made that led it to reject the South Korean model of testing at the beginning of the pandemic. At the Committee session of 25 March, we were promised the evidence behind that decision, but it has not been supplied, so we have had to hold this oral hearing today. The second session will consider the scientific evidence behind the risk of infection in different workplaces.

Our first witnesses are both directors of Public Health England. Professor Yvonne Doyle is medical director and director for health protection at Public Health England, and Professor John Newton is for this purpose director of health improvement at Public Health England. Thank you for joining us.

Professor Doyle, did Public Health England assess the South Korean model of mass testing that that country practised using 79 laboratories across the country?

Professor Doyle: Thank you for inviting me and John here this morning to answer your questions, I hope to your satisfaction. Before I answer that question, we owe you an apology for any miscommunication that may have occurred. That should not have occurred, and we hope we can put that right this morning and beyond.

Chair: I am grateful for that.

Professor Doyle: To answer your question, we did not reject the South Korean model. We were very interested in what was happening internationally from the word go, given that it was a novel virus. We were learning when we stood up our whole health protection system on 8 January as an enhanced incident.

There are two ways of examining how we looked at South Korea. The first is the epidemiology of the two countries; the second is the testing capacity. To cover off the first is important, because there were differences here. In South Korea, the epidemiology of the outbreak, which happened very rapidly, was obviously related to China at the time.

Q626 **Chair:** Before you go into the detail of your assessment, I want to establish the whereabouts of the evidence that was promised to us within a few days. An assessment of the South Korean model was carried out.

Professor Doyle: Indeed. As I am explaining, the epidemiology was different in the two countries.

Q627 **Chair:** We will come to the content of it, but I want to establish the existence. An assessment was carried out. When was it carried out?

Professor Doyle: There were assessments throughout this incident. As I say, we stood up on 8 January. The testing capacity and the testing profile of Public Health England's approach in the contain phase, which was between January and March, was very close to that of South Korea for quite a long time, into early March. That reflected both our approaches. There is a similar core of international approach, which is to test and contact trace, but also to contain and ensure that we are following the epidemiology so that we are responding. Our assessment of what we were doing was driven by the epidemiology. It was also driven by capacity, and if I may, at some stage I would like to talk about that.

Q628 **Chair:** We will come to the detail of that, but I am keen to establish what we have had correspondence about over the last few weeks, which is the existence of this assessment. An assessment was made. When was it made?

Professor Doyle: We were making these assessments right from the start. The first thing we had was an international cell in our epidemiology—20 cells were stood up. We also had a national cell looking at the epidemiology occurring in this country and how that changed over time. The changes and the differences between countries were very important.

Q629 **Chair:** From an early stage, you were making the assessment. When your colleague Professor Peacock, a director of Public Health England, gave evidence to the Committee, she said that the analysis "is not published at the moment, so we could make it available." When I asked when she would be able to do that, she said it would be in the next few days, "so that you are able to see it." Why has it not been provided to the Committee since the middle to end of March?

Professor Doyle: I apologise for that. This information is in the public domain. Every day, from the word go, we have had a very detailed situation report. It details what is going on in the population, which is absolutely critical for us to understand what to do and how to respond, but also the capacity and testing that is going on, and we *[Inaudible]*—

Q630 **Chair:** We have lost Professor Doyle. Perhaps Professor Newton can enlighten us. An assessment was made. We have established that from Professor Doyle. Why has it not been provided to the Committee?

Professor Newton: There is a weekly process co-ordinated by the Cabinet Office of assessing all comparator countries, which produces regular updates for all the Government Departments involved in the response. To reassure the Committee, there is a very extensive, continuous process of comparing epidemiology practice and policy in

different countries. That is a much broader response than just Public Health England. I think Professor Doyle was going to refer to the fact that—

Q631 **Chair:** The Committee will be reassured if it has the evidence that was promised to it.

Professor Newton: The specific evidence—

Q632 **Chair:** At a formal parliamentary hearing a commitment was given by a director of your organisation to provide that contemporary assessment within days. Many weeks have gone by, and it has not been provided.

Professor Newton: Indeed.

Q633 **Chair:** Can you explain why it has not been provided?

Professor Newton: I think Professor Doyle was about to say that the evidence used to make that decision was the epidemiology, which is published every week. We can certainly share with you the epidemiology used at the time, but it is already in the public domain, and also the capacity to contact trace and to test. Again, those are in the public domain, but we can point you to the specific report if that would be helpful.

Q634 **Chair:** What we are interested in is what was behind the decision by Public Health England to take a different approach. Professor Peacock said to the Committee: "We are studying"—what was done in South Korea—"but not necessarily to replicate it…we are taking a different model."

We are interested to know what assessment was made of the model that informed a decision to take a different model—the contemporary evidence and the assessment at the time. Was there an assessment made that was behind that decision?

Professor Newton: Yes, indeed. A number of agencies contributed to the review of the evolving pandemic and the response. There was a discussion with SAGE in February. I know the Committee has some concerns about how much information is available from SAGE discussions, but there was a discussion with SAGE in February that established that when community transmission was established in a country it would not be worth while to carry on with contact tracing, which is the South Korean model. When, in March, it became apparent that community transmission was occurring, and we had multiple injections and introductions from different countries in the UK, that decision was enacted. It was a decision of Government informed by all their advisers, not just Public Health England.

Q635 **Chair:** That is a very interesting point. Therefore, was the decision to follow a different approach—in the words of your colleague Professor Peacock, to take a different model—taken by Public Health England?

Professor Newton: No, it was not. With respect, Sharon Peacock is a member of SAGE, so she may have been thinking of her role in SAGE at the time, as well as her role in Public Health England.

Q636 **Chair:** SAGE took the decision to follow a different model.

Professor Newton: No. SAGE provides advice. Decisions throughout the pandemic have been made by Government advised by scientific advisers, including Public Health England but also SAGE. The epidemiology was crucial. We had an increase in the number of cases. In March, it was apparent in the advice from the modellers that within a short period we could expect as many as 1 million cases in the UK. Of course, if you have 1 million cases there is no way, however much contact tracing or testing capacity you have, you can pursue the South Korean model. At that point, it was the Government's very significant decision to move to lockdown as the most appropriate response to the epidemiology in the UK at the time.

If the epidemiology in the UK had been similar to South Korea, it would have been a relatively limited outbreak. At one point, 55% of cases in South Korea were associated with a single church, at which point it closed the border, stopped people coming in and reduced new introductions. They were then able to contain it with a test and trace strategy. If we had had that epidemiology, we would have done the same, but we didn't. We had a very different epidemiology.

Q637 **Chair:** It was never my expectation that it was not done on the basis of evidence and a judgment made, but in the interests of transparency and learning lessons it would be helpful, indeed very important, to see the evidence and the assessment that was made at the time.

You have told us that it was a decision made by Government Ministers on the advice of SAGE, who in turn were advised by Public Health England. Have I got that correct?

Professor Newton: Yes. That is true of all major decisions in the pandemic.

Q638 **Chair:** When Professor Peacock said, "We are studying what they are doing…We do not intend to run the tests in 79 laboratories; we are taking a different model," she was not speaking for Public Health England—she was speaking for Ministers.

Professor Newton: I cannot say what was in her mind at the time. Public Health England has always done everything it can to increase testing capacity in the UK and has done a great deal to support Government strategy, but the strategy for testing is a Department of Health strategy for which Public Health England has a specific role.

Public Health England provides reference microbiology. We have some lab capacity, but Public Health England does not provide microbiology facilities for the country, although we contribute a lot to them. Public

Health England's role is important, but it is one of a number of roles. Strategic co-ordination is undertaken by Government Departments, in this case the Department of Health and Social Care.

Q639 **Chair:** Did Public Health England advise SAGE not to follow the South Korean model?

Professor Newton: No. Public Health England's role was to report to SAGE on the epidemiology. We produce weekly very detailed surveillance reports. We also do a number of serology studies. I know that one of the other concerns of the Committee is about why the ONS study was instigated late, but Public Health England was also undertaking serological surveillance and those results are now being used by Government. The Secretary of State referred to the 17% figure for London. That comes from Public Health England's serology services.[1]

Public Health England contributes reference microbiology, developing the test and rolling it out to other laboratories, and has specific functions to do with supporting testing for contact tracing and serological surveillance, but the bulk of the provision is undertaken by other laboratories and the strategy is co-ordinated by Government.

Q640 **Chair:** Indeed. That is understood. But in the assessment of the testing strategy, did the board of Public Health England ever take a paper on the testing strategy?

Professor Newton: The decision on 16 March to stand down the contact tracing and testing was a Government decision. I think that in the letter to the Prime Minister the Committee was concerned that testing was then applied only to certain categories.

Q641 **Chair:** But specifically on this, did the board of Public Health England take a paper on the testing strategy?

Professor Newton: No, I do not think it would have done; that is not how the incident has been set up. The board does not operate at the speed required to make those sorts of operational decisions.

Q642 **Chair:** We have Professor Doyle back. Thank you for reconnecting.

To continue, Professor Newton, the board does not make those decisions. Do individuals make decisions.

Professor Newton: No.

Q643 **Chair:** Who makes decisions in Public Health England?

Professor Newton: There is a very carefully constructed incident control team, with an incident structure, of which Professor Doyle is the strategic director. There is an incident director every day who makes daily decisions, and strategic decisions are made by the incident control process.

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[1] *Note by witness*: Professor Newton said 'surveys' not 'services'.

Q644 **Chair:** Professor Doyle, we are struggling to understand who made the decision, whether anyone in Public Health England made a decision on testing strategy, or whether it was just the case that individuals within Public Health England participated in SAGE and somehow that transmitted—we know not how—a view to Government Ministers. I just want to establish that within Public Health England there was no board, person or group that took a paper on testing strategy during any of this period.

Professor Doyle: Public Health England's role in this is to run the incident. I oversee the incident directors and the running of the incident. The incident deals with the situation in the population and the scientific evidence that we can provide through our guidance. That feeds into the Department of Health directly every day. It is among a number of injects to the Department for Ministers, so Ministers have the information to make the strategic decisions.

Q645 **Chair:** You are a conduit of information to Ministers; you do not make any decisions within Public Health England.

Professor Doyle: We make a decision about how to conduct the incident itself, to make sure the right people are addressing the right elements of control or contain, and provide guidance and advice according to our scientific teams.

Q646 **Chair:** Is it individuals within your organisation giving that advice, or does Public Health England come to a view as to what its advice on the testing strategy should be?

Professor Doyle: We have an incident daily team and we have a cabinet daily team as well, which is chaired by the chief exec. We are coherent in what we are saying as a group.

Q647 **Chair:** Does that group take papers, or is it entirely oral?

Professor Doyle: We have some papers. We have a very detailed daily situation report that is part of our role in overseeing the incident.

Q648 **Chair:** Who provided the committee papers that this cabinet that you have took on the testing strategy?

Professor Doyle: The other thing that Public Health England has been doing throughout is providing a variety of inputs to SAGE, mainly on modelling but also, more recently, on some of the surveys we have been asked to conduct on behalf of SAGE. Bear in mind that all of this is moving at a very fast pace with a huge amount of demand. Those papers have been provided to SAGE based on what our scientific trending shows might happen, in conjunction with what capacity we have in the field.

Q649 **Chair:** I understand that, but we are interested in looking at the view Public Health England came to on alternative models. You said there is a cabinet within Public Health England that considers this, and that cabinet takes papers. We would be obliged if you would let us have the papers

that pertain to testing strategy from the time.

Professor Doyle: We can certainly provide some of that material. It is predominantly epidemiological material and situation reports from our incident. We can certainly do that.

Q650 **Chair:** Why some of it? Why not all of the papers that went to your cabinet on the decision as to what the testing strategy should be?

Professor Doyle: Some of the papers are modelling papers that have gone to SAGE and in due course will appear in the public domain as well. We would be happy to make that available when it is in the public domain.

On the issue about who makes those decisions, they are strategic decisions. Part of our role is to provide advice on capacity and what is going on in the population, and guidance about what the scientific evidence shows it would be best to do in the circumstances we are in. We take account of that across the Cabinet Office injects that we get about international models. We also interact with SAGE itself, so we would take advice from SAGE as to what it felt at any time was the most appropriate thing to do.

Chair: There is a danger that this is all very circular; it is not clear who is providing what advice to whom, which is why I think clarity about the papers is important.

I am going to bring in some of my colleagues, as we do not have much time and we have some ground to cover.

Q651 **Graham Stringer:** Professor Doyle, I accept that you have made an apology, and it would be ungracious not to accept that apology.

Possibly you can explain to us, as we try to get to these papers, why we received two nonsensical letters from Public Health England that did not relate at all to the questions the Chair has just been asking, or what was promised to us by Professor Peacock, about the evidential basis for changing the policy in early March from contact tracing.

Can you give us some insight into how Public Health England was operating that allowed two letters that did not deal with our questions to be sent, and we still do not have the papers we were promised?

Professor Doyle: There are two reasons why, to come back to South Korea, we differ from South Korea. The first is the capacity and the role of Public Health England itself and its laboratories.

Q652 **Graham Stringer:** If I may interrupt, I was asking a question about the internal operation of Public Health England that allowed two nonsensical letters to be sent and stopped this Committee going about its business with the evidence that you have used to provide advice and information to Government.

Professor Doyle: Mr Stringer, the second letter sought to give you some information about why contact tracing needed to cease, not entirely, but to cease as mass contact tracing, in March. That was a decision come to because of the sheer scale of cases in the UK that had been introduced by multiple introductions, particularly after half-term and from European countries that we now know had large amounts of prevalence themselves.

We had multiple introductions, with many hundreds of thousands of people by March who had been exposed to the virus in this country, so contact tracing could not possibly have had the capacity to address that. With the capacity of lab testing and our contact traces, we felt the most important thing to do was to focus on where there was national concern, which was the capacity of the NHS, to accrue that testing.

We committed from January onwards, in response to Government, to provide up to 25,000 tests per day. This was unprecedented and the fastest increase in testing in recent history. That we did in Public Health England in partnership with the NHS and with Roche. The second letter worked through that as the answer to why contact tracing changed. It did not cease, but it changed. That was a joint communication, which we can also provide to you, in the public domain, from the Department of Health, the NHS and ourselves on 12 March.

Q653 **Graham Stringer:** To try another tack, the source of this inquiry was three members of the Committee asking why we were not doing as well with our testing regime as Germany. That was the burden of the questions. We were told by Professor Peacock at that time that we did not want to follow a decentralised system; we wanted a centralised, not a decentralised, system.

I did not hear Professor Newton on the *Today* programme, but I heard Paul Nurse on the *Today* programme this morning. He was saying that a lot of laboratory capacity had been turned down in March that would have meant that contact tracing would have been more effective earlier on. It seems that that was rejected. Why were the offers from the Crick Institute and laboratories in Manchester and elsewhere in the country rejected if the problem was capacity?

Professor Doyle: Mr Stringer, the Crick is involved now. We welcome all offers, but in fact—

Q654 **Graham Stringer:** Paul Nurse said that they did not hear for many weeks, when they first offered the capacity.

Professor Doyle: If you will give me just a minute to explain our role in this, we do not have centralised decision making as to which laboratories come on stream. What we do is what we did from January onwards when we got the recipe. We collaborated with Germany on that. We have a reference laboratory and a research laboratory, and only seven other laboratories. We do not have capacity to do mass testing, but we have specialist knowledge to make that available, which we did. We made the

recipe available to several NHS laboratories by mid-February, and more and more came online, which is absolutely essential for increasing capacity.

The reason why every laboratory was not able to engage in this immediately, even though the recipe was available to anybody, and we were very pleased to do that—it was shipped out from early March—was that this was a novel virus. It was treated as a dangerous pathogen and was, therefore, categorised as level 3. That meant very few laboratories initially could do that. We spotted that and made an application to the Committee on Dangerous Pathogens to reduce the level so that more laboratories could come on stream, because we knew there was going to be a capacity problem. On 1 March, the Health and Safety Executive granted that permission, and that then allowed many more laboratories to engage.

You mentioned Germany. Germany has many hundreds of laboratories. It is a different laboratory strategy. Something that preceded the epidemic in this country is that there has been a different laboratory strategy, with mass laboratory testing and mass throughput through the NHS. Public Health England is a specialist centre providing testing, as we have done, for antibodies and so on, with reference laboratories and dangerous pathogen laboratory work, but it is very modest.

Nevertheless, we paired with the NHS to step up to the plate. From having dealt with a couple of hundred tests a day, which are mainly very specialised, at the end of April we were able to offer 25,000 in conjunction with partners, including Roche. We are very pleased to collaborate, but I thought it important to put on record our actual capacity and role, and our collaboration with anyone who is in a position to accept the situation that this novel virus presents.

Chair: You have done that. I am grateful for that clarification.

Q655 **Andrew Griffith:** Professor Newton, when you last gave us evidence you talked about the restriction on category 3 labs and said that there were not many of those without Public Health England. Who made the decision that only category 3 labs would be involved in the testing process at that time?

Professor Newton: That was a Health and Safety Executive decision, informed by the advisory committee Professor Doyle mentioned.

Q656 **Andrew Griffith:** What assessment has Public Health England made of that decision with hindsight?

Professor Newton: I think at the time it was right to consider the virus to be at level 3. In fact, as the knowledge developed, the recommendation is level 2 now, but with some special considerations to do with training of staff.

Mr Stringer makes a very good point about other laboratories. All requests from other laboratories were passed to the Department of Health at the time. They set three tests for any laboratory that wanted to take part. On the basis of that, some laboratories were invited to contribute, but others were not able to, because the third test was whether they could provide an end-to-end clinical service associated with the NHS, and most laboratories were not in a position to do that.

Q657 **Andrew Griffith:** When Professor Matthew Freeman, head of the world-class Oxford University Dunn School of Pathology, said at the end of March that despite many offers and approaches to Public Health England he had heard nothing back—I echo the comments made by Graham in respect of the Crick Institute—do you think in hindsight that was a failing?

Professor Newton: All those requests were passed on to the Department of Health, which set up a specific office to deal with all of those requests, so that is what happened. I cannot comment on whether the William Dunn school received the responses it was expecting from the Department.

Q658 **Andrew Griffith:** Professor Doyle, this Committee is about science. Science is a process of discovery and learning, including learning from our mistakes. I do not think that today the Committee is getting any sense that with hindsight you would have done anything different. That seems improbable.

Professor Doyle: I am sure there are many things that we would learn to have done differently. A lessons learned group, set up at my request, will go through much of this, but as to what we could have done in terms of laboratories, we have seven laboratories and two specialist services. There is not much more we could have done ourselves on capacity.

We do not have a role in the quality assurance of laboratories. This may be frustrating because it sounds like everybody has a responsibility in this, but that is the case in a very complex incident. People operate with different roles. There is a national policy on laboratories. We do not quality-assure laboratories. We collaborate and, as I have explained, we will do what we can, but we are basically a specialist service.

Maybe in retrospect, we need to look at the configuration of laboratory capacity nationally. It would not be Public Health England's demand for that. It needs to be agreed with the Department of Health and the NHS, which is a crucial player, because most of the laboratory service in the country comes through that, but we will certainly want to reflect on it.

Q659 **Chair:** Although you do not have other laboratories in your control, you can express a view, can you not, and probably quite an authoritative view, if you think your capacity is insufficient to cope with the expected demand?

Professor Doyle: Absolutely. We were very clear from the beginning that what we could do was augment very quickly to a particular level that would support the NHS in the national policy, which was very clear that we needed to protect the NHS to have the right capacity for patient treatment, but we also needed to be able to deal with complex outbreaks. We certainly have provided that advice throughout, from January onwards, both to SAGE—

Q660 **Chair:** Did you advise that there should be an expansion, making use of labs beyond your control?

Professor Doyle: We certainly raised the point as the epidemiology changed, bearing in mind that we really had our first cluster at the end of February. There was quite a long time when we were containing. That was a very active role for Public Health England. If the epidemic was going to continue to increase, we did not know to what extent that might happen, and what pattern it might follow. We had a fair idea that it might be a European pattern, because of the injects from various countries through travel, and the dense nature of our population, and we would certainly need more capacity. That was the basis of the decision on 12 March, first, to contain capacity for where it was most needed and, secondly, to increase that capacity greatly with the five-pillar strategy that was prepared throughout March.

Chair: We would be very grateful for a copy of the advice you gave on the limits of your own capacity and your advice that it should be expanded beyond that.

Q661 **Dawn Butler:** I have a number of questions and I will try to ask them in a way that may get quick, concise answers. In regard to capacity, I understand that you had only a certain number of labs that were category 3, and in order to increase that capacity PHE changed the category to 2, which therefore increased the capacity. Is that correct?

Professor Doyle: We made an application on behalf of the country to the Committee on Dangerous Pathogens to do that. It was their call as to whether they felt it was appropriate. They then requested the Health and Safety Executive to examine the request, and it agreed that it was appropriate on 1 March.

Q662 **Dawn Butler:** That decision was made by PHE. You gave that information in regard to improving capacity. When was the decision made to pursue a centralised approach to testing?

Professor Doyle: The approach to testing was very much driven by a number of factors. The first was the capacity at the time, which was estimated to be up to 25,000. It has exceeded that now. There was another factor that played into some of this—

Q663 **Dawn Butler:** I understand. I have a limited time to ask my questions. When was the decision made to centralise? Was it made in February, March or April—just a round time?

Professor Doyle: There was no decision made to centralise. In a sense, the configuration when we entered this epidemic in January was a decision that had been made some time before on the configuration of the Health Protection Agency and the laboratory system in England as a whole. It was an NHS and Public Health England specialist mass testing decision.

Q664 **Dawn Butler:** Are we currently following a centralised approach—yes or no?

Professor Doyle: No. We are not following a centralised approach, but we are following an approach that needs to increase capacity.

Q665 **Dawn Butler:** Are we following a centralised approach with the app, for instance? Is there a centralised or a decentralised approach?

Professor Doyle: Sorry—with the app?

Q666 **Dawn Butler:** Is it a centralised approach or a decentralised approach?

Professor Doyle: I cannot really hear you. Is that the app for contact tracing in the Isle of Wight? There has been a specification for this. Invites have come back to NHSX, which is the organisation that assesses technical capabilities. To some extent, that needs to be centralised. We need to understand whether these applications work.

Q667 **Dawn Butler:** It is a centralised approach. Professor Newton, do you agree that there is a centralised approach happening in the UK at the moment in terms of both testing and the app? Is it a centralised approach or a decentralised approach?

Professor Newton: The testing strategy is decentralised. There are a number of arms. We have the labs in the NHS and Public Health England working together. We have another group of laboratories set up, the Lighthouse labs; they are assisted by other labs in Cambridge, Birmingham and elsewhere. The Department of Health sets standards. You cannot have just any lab with a machine contributing; they have to be able to produce an end-to-end testing service. It is a combination of centralised strategy and decentralised provision.

Q668 **Dawn Butler:** Now it is a combination of both. Is that because the category of lab changed from 3 to 2, which means it is now a combination of a centralised and a decentralised approach?

Professor Newton: Yes. We could not have pursued the current strategy if all the labs had had to be level 3. No, we could not have done that.

Q669 **Graham Stringer:** I will try to roll two questions into one. First, the Government claim to have been making 100,000 tests a day. It seems that they are counting when envelopes are put in the post to people to carry out the tests themselves. Does Public Health England advise on what the definition of a test is, because clearly posting a test is not a

test?

When tests are made, we now have more capacity. In Greater Manchester, we are using Manchester airport and the Etihad stadium. The leader of Manchester City Council today made a statement that people are being tested but they cannot get useful information back about where difficulties may arise and where most people are being infected with the disease. I would be grateful for an answer to the first point about definitions and the second point about the effectiveness of follow-up.

Professor Newton: The programme increased the number of tests according to its plan, which was an exponential increase. The way tests were counted was discussed with officials in the Department of Health. We were advised by officials in the Department of Health on an appropriate method of counting the tests, and that was what we did.

Q670 **Chair:** They advised you? You did not advise them.

Professor Newton: They advised us. Absolutely, yes.

Q671 **Graham Stringer:** Do you think it is appropriate to count posted letters as opposed to real tests?

Professor Newton: The important thing is that they are only counted once. The basis on which we were advised the decision had been made was that the tests should be counted at the point when the programme had control of what happened, and that was the point at which the tests were sent out and made available for testing.

The key thing is that a very large number of tests are now being conducted. Whichever way you count them, it is a large number of tests; it is a huge increase. The highest we have had is 177,000 a day, which is way in excess of the 100,000 target. The programme has been trying to provide the testing capability needed to protect the country against the pandemic. That has been our focus, not trying to hit particular arbitrary numbers. I can reassure the Committee on that.

Q672 **Chair:** What percentage of home testing kits have been returned?

Professor Newton: Certainly more than half, and we would like to get that amount up. A lot of the ones that were counted as they left were not home testing; they were the satellite tests sent out to care homes. We have now tested a quarter of a million staff and residents in care homes, so a very large proportion of the satellite tests were returned.

Q673 **Chair:** What is the current return rate for posted tests?

Professor Newton: I am afraid I do not have that figure, but I am sure it can be provided by the programme.

Q674 **Chair:** Will you write to the Committee straight after this meeting with it?

Professor Newton: Yes, indeed. Of course.

Chair: I am very grateful.

Q675 **Zarah Sultana:** I would like to go back to April, when the Government spent £60 million on tests from two companies in China, despite the technology of the kits being unproven. Professor Newton later admitted that none of the 3.5 million antibody tests ordered were fit for widespread use. A spokesperson from the Department of Health and Social Care said that wherever tests did not work orders would be cancelled and costs recovered wherever possible. Have those costs been recovered, and what update is there on the tests that were not fit for use?

Professor Newton: I can ask the Department to give you an account of the cost. I am not able to tell you that straightaway, but I am sure the Department will be able to provide that information.

In terms of the tests themselves, it is the nature of the pandemic that the best decision was made at the time based on incomplete information. The decision to order the test was based on the information provided by the manufacturers. When we did our own tests, we found that the performance was less good. They were not without use, but they were not good enough. We made the decision that there were likely to be better tests available in the near future, and indeed that is now what has happened, so we now have better tests.

The tests that were ordered are still of value for surveillance. They are being used in some of the surveillance studies that are now taking place. They are being further evaluated and used for population level studies, but they are not adequate for individual decisions.

Q676 **Zarah Sultana:** I want to ask a question about the aim of carrying out 200,000 tests a day by the end of May. Are 200,000 people being tested each day?

Professor Newton: The target mentioned for testing has always been the number of tests, not people. In fact, it is perfectly normal practice for an individual to have more than one test in the management of their infection. It is the number of tests, not the number of people. Importantly, the 200,000 target the Prime Minister mentioned included antibody tests, as well as PCR tests for the presence of the virus.

Q677 **Aaron Bell:** Could I turn to the third and fourth pillars of the strategy—the antibody testing and the surveillance testing? Yesterday, the Health Secretary announced quite a lot of new information, so perhaps we can go through that briefly. On the antibody tests, is it correct that you have approved two?

Professor Newton: Yes, that is right.

Q678 **Aaron Bell:** What is the accuracy and specificity of those tests?

Professor Newton: It is extremely high. In the testing, it was 100% specificity and very high sensitivity. From memory, I believe it was 98% or 99% specificity. They are very high-performing tests.

Q679 **Aaron Bell:** What is now the intended timescale for using those tests? How will they be rolled out, and how are people going to access them?

Professor Newton: This is a matter for the NHS, which will roll them out for NHS staff in the first instance. I believe further details are being finalised and will be available shortly.

The role of antibody tests at this stage is relatively limited. They are markers of previous infection. We do not yet know whether they can be used for risk assessment because we do not yet know the level of immunity provided by a positive antibody test, or how long that immunity will last. At the moment, they are used to try to learn more about how the pandemic has spread among the population, in particular among health and social care staff.

Q680 **Aaron Bell:** It has been reported that there are now tests available on the high street. I think Superdrug has been selling one for £69. Does Public Health England have any view on that? Is there any way that the results from such tests could be integrated into our system, if they are believed to be of value?

Professor Newton: It is an important point. The public need to be aware that those tests are not the same as the test we have evaluated, approved and recommended for use. The laboratory-based tests have a much higher standard of accuracy. We would not recommend at the moment that people rely on the tests that are now becoming widely available. My advice would be to wait until we have better tests, which will be available in similar form relatively soon, although they are still under evaluation at the moment.

Q681 **Aaron Bell:** Turning to pillar 4, there is a high-accuracy antibody test, which I think you told us had been used since 4 April to collect 800 samples. Is that the same as the surveillance testing that has been going on, or is that a different test?

Professor Newton: There are two parts to the programme. The surveillance testing is a programme for collecting samples from a structured representative group. We now have over 10,000 samples available through Public Health England programmes. Those samples are stored, so you can use any test that is available at the time to assess them. Initially, we used the Euroimmun assay, which was available, but in future we can use the more accurate antibody tests on the same samples.

Q682 **Aaron Bell:** The Government stated that they hoped to conduct 5,000 of those high-accuracy tests by the end of April. Are you aware whether that target was met?

Professor Newton: I think Public Health England has delivered at least on that. The reports are published regularly from pillar 4. Public Health England has been supporting that programme, and it has gone very well.

Q683 **Aaron Bell:** On the infection survey pilot, data from that was made available by the Health Secretary yesterday, which suggested that about 61,000 people a week were still being infected in England. Has Public Health England made any assessments of what that means for the R value, and has that been done at regional level?

Professor Newton: The Office for National Statistics survey you refer to is still a pilot. The numbers are still very small and the confidence intervals are very wide. We should have a little note of caution about that. All those results are reviewed regularly. We have a group that meets twice a week—the so-called data debrief group—where we look at all the incoming data. Those are discussed with our modellers, SAGE, colleagues in the universities and the Wellcome Trust and so on. All the data are available and being actively monitored.

Q684 **Aaron Bell:** The ONS report said there was no evidence of statistically significant difference between people in patient-facing roles in health or social care and those who were not. Is that a surprise to Public Health England?

Professor Newton: It was certainly of interest, but given the very small numbers involved, it is not really a surprise that it has changed. We just need to wait and see.

The serology studies are more reliable because more individuals are involved, but it takes a little while for serology to become positive, so we will find out a lot more. That is one of the reasons for using the first newly available antibody tests on health and social care staff, because we will get very reliable information, including in different parts of the country, about how many health and social care staff have been infected, and whether that is symptomatic or not. That is really important information, and it will be available from those studies and tests.

Q685 **Aaron Bell:** The infection survey will continue.

Professor Newton: The infection survey will continue and will ramp up, and it requires very substantial testing capacity. One of the successes of our building up the PCR testing capacity is that we can drive those surveys.

Q686 **Mark Logan:** Given how integral testing is to effective contact tracing, should the Government's five-pillar plan be updated explicitly to include a contact tracing component?

Professor Newton: Indeed. We have always been evolving the plan, and the strategy looking forward is now very much to support the test and trace programme; the group is now very closely integrated in the single programme. It is also to cover infection control, where testing is equally important in care homes, as I am sure the Committee is aware, and in the NHS, and elsewhere in any other setting, and for the surveys and research. The focus of the strategy has evolved as the requirement has changed.

Q687 **Mark Logan:** Do you believe that currently the daily testing numbers are sufficient for contact tracing to be effective in the UK?

Professor Newton: Yes, indeed. The numbers required are much smaller for test and trace. At the moment, we are getting about 2,500 new positive tests a day, which is a very small proportion of the testing capability. More important is being able to get those tests out to the right people quickly and get the results back quickly, so the focus has now become on speeding up the process and getting the data back.

By the way, Chair, I did not answer Mr Stringer's question about the data. We are actively working on getting data reports out. We have a working group with the Local Government Association to make sure that local government gets exactly the data it requires. It will be getting those data very soon.

Q688 **Mark Logan:** Looking at the Isle of Wight experience, what insights have we gained and what lessons have we learned from that contact tracing pilot?

Professor Newton: It has been a very successful pilot, and we are extremely grateful to the people and the authorities in the Isle of Wight for their support of it. A key observation is the importance of integrating the different elements, the public health contact tracing and the work of the app. The numbers of contacts identified were relatively limited, which shows that, in the context of social distancing, contact tracing is very manageable. It is worth pointing out that the whole test and trace programme sits alongside social distancing. As we move out of lockdown, we will need to continue social distancing and all the things we have learned about the importance of hygiene, as well as having the test and trace programme alongside. Those three things together will allow us to control the spread of the virus as we move into the next phase.

Q689 **Mark Logan:** When do you expect the full roll-out of the app to take place? In a worst-case scenario, if the app was not a success and we were not able to use it, do you agree with some views in the media that the app is just the icing on the cake?

Professor Newton: What we have is an integrated programme, but, as I am sure the Committee is aware, the international model of contact tracing does not rely on proximity apps. Nevertheless, there are countries that use proximity apps successfully. The Prime Minister has said that we will have a world-class test and trace programme, which will include high quality and effective public health contact tracing, supported by a telephone advice service from contact tracers and by an app. As you say, the international model is the public health contact tracing; the app is to some extent an extra.

Q690 **Chair:** The app was supposed to be ready in the middle of May. It is now the 22nd and it is not. Then it was going to be 1 June. I think you said on the radio this morning that it will not be ready by 1 June. Is that right?

Professor Newton: With respect, it is ready and is being used in the Isle of Wight at the moment. The judgment is that it can be improved based on that experience. Judgments are being made within the programme as to when it is best to introduce it.

Q691 **Chair:** Do you have a view as to when it is likely to be deployed nationally?

Professor Newton: It is not my personal responsibility, so I am probably not the right person to give you a view on that.

Q692 **Chair:** Referring to what my colleague Mark Logan said about the role of the app in the suite of contact tracing methods, in evidence to the Committee, Professor Christophe Fraser from the University of Oxford said it was extremely important because, to quote him, manual efforts would be "unlikely to be quick enough" to inform those who were infected, whereas obviously an app is instantaneous. Do you agree with him?

Professor Newton: I have a lot of respect for his opinion. There is a trade-off between speed, content and impact, so to speak. Public health contact tracing works on the basis of a confirmed test, followed by contact from a person giving you personal advice. That has a very significant impact.

The app relies on an automated message telling you that you may have been in contact with somebody who may have coronavirus and, therefore, the assessment is that it would have less impact. The combination of the two is the ideal. They do very different things. As the professor from Oxford pointed out, the benefit of the app is its automation and speed, but it lacks a certain precision and, therefore, impact.

Q693 **Dawn Butler:** The approach to the app is exactly the approach they have taken to testing and it just will not work. It needs to be a decentralised app, not a centralised app, but that is for another day.

Professor Newton, you said that the timeframe for the test to come back is either 48 or 24 hours. Is that the timeframe from the moment the test is taken or the moment the test gets to the lab?

Professor Newton: At the moment, we are measuring the time from when the test is taken to when the result is given to the individual. We have made it very clear that we need to start moving to measuring from when the person has symptoms, but as a proxy we are going to use when the person requests a test. We have instructed our colleagues in NHSX and NHS England to engineer that process so we can start measuring it. We need to measure both.

Q694 **Dawn Butler:** Some people have had their tests back in 24 hours.

Professor Newton: Many people have their test back in 24 hours.

Q695 **Chair:** Let us turn finally and briefly to questions on some of the guidance informed by Public Health England. Professor Doyle, what is the basis for the 2-metre distancing advice?

Professor Doyle: This is advice that we take internationally. We have looked at a range of international evidence on it as well. The WHO advises 2 metres for 15 minutes. We have taken a precautionary approach and said 2 metres, full stop, particularly indoors, and the 15-minute measure is useful on that. That is where we are at the moment.

We are still learning about the virus and how it transmits itself, so on a precautionary basis 2 metres appears to be correct. Other countries use slightly less than that, but until we know more, particularly about where the virus may transmit environmentally, 2 metres is important.

Q696 **Chair:** Looking at international practice, my understanding is that other countries are recommending a shorter distance. I am certainly open to being corrected, but my understanding is that the WHO was recommending 1 metre. Certainly, Hong Kong, Singapore, France and China are advising 1 metre; Australia, Germany and Netherlands advise 1.5 metres; South Korea, which we have been talking about a lot, has the equivalent of 1.4 metres. Looking at the international comparisons, we are an outlier; we are at an extreme end of the recommended distance. Why have we chosen to be at that end?

Professor Doyle: It is a learning experience internationally. We are aware of the international differences. I am sure it will be the subject of continued investigation as to whether 2 metres is necessary or whether it can be reduced further. The important thing about the 2 metres is that in close contact 2 metres, certainly for a prolonged period of time indoors, would seem to be a precautionary measure at the moment, but your inference is quite right—can we review and learn from that? I am sure that is right, and we will.

Q697 **Chair:** The Government's plan, "Our plan to rebuild", says that is not a rule and the science is complex. Is Public Health England feeding into an active consideration as to what is the appropriate distance?

Professor Doyle: Yes, we are. Through our chemicals, radiation and environmental team, we are collaborating with others who feed into SAGE about the duration of the virus on certain products and surfaces. We are also learning from the information that SAGE has commissioned from expert environmental engineers elsewhere in the country. It is a very big collaboration. We need to learn more, particularly about surfaces and the environment. We know it is likely that the risk to the population is less outdoors, and that is one of the reasons why people are now encouraged to take more exercise, but we continue to learn.

Q698 **Chair:** Do you accept that it has big implications when we contemplate releasing lockdown measures for a lot of workplaces and businesses? They may be able to trade at 1 metre or 1.5 metres in a way they cannot

at 2, so it is a pivotal decision—the question as to what is the recommendation.

Professor Doyle: It is an important decision, and we are fully aware of that. On one side, we are aware of the requirements of the economy and business; on the other side, we are aware of the concerns and anxieties of the population. This is a trade-off; it is a balance, but you are quite right that the science should inform the measures as we go forward.

Q699 **Carol Monaghan:** We have heard the Secretary of State for Health talking about systems of certification for those who have been shown to have antibodies—survivors and those who are not aware they have had it—to allow them to get back to normality. You have just said that the science must inform decision making. Can you tell us about the science that led to that statement made yesterday? Is there new evidence available to show that the presence of antibodies gives some sort of immunity?

Professor Newton: This is a good opportunity to clarify that. The answer is no. The science is still uncertain on the role of antibody testing. What we have announced is a new study—the SIREN study—which will look at that issue, recruiting 10,000 healthcare workers to try to assess the level of immunity that might be provided.

It will take time. Frustratingly, it will take some time, possibly a number of months, before we know whether antibodies protect people against reinfection, because the numbers of infections are now going down relatively rapidly. The Secretary of State's point about certification is that there is an assumption that at some point we will know that, and if and when that time comes Government are looking into a programme of certification, but no decision has been made to introduce that because, exactly as you say, the science at the moment would not support it.

Q700 **Carol Monaghan:** Professor Doyle, on 6 May you warned against prematurely opening schools, because adequately setting them up would take a lot of organisation. We are now talking about opening up schools on 1 June, which is 10 days away. Are you confident that schools will be in a position to reopen at that point?

Professor Doyle: A lot of work has gone on over recent weeks about the reopening of schools. We have been feeding into the Department for Education what the measures are and what good practice would look like in schools. As you know, the children who are being invited back to school will be young children and year 6. It is very much on a phased basis.

Ultimately, it will be for schools to decide whether they are ready for this and it will be whether parents have confidence to send their children back. On one side, we have the very clear view on public health that it is good for children to be in school, and the science informing us that the risks to children, as demonstrated in this epidemic, seem to be much lower; they seem to have lower numbers of infections than adults. On the

other side, there are the practicalities of how a school would organise distancing and hygiene, and ensure that they are clear about who should be in school. We have provided advice for all of that.

It will be a trade-off. It will be a balance. It is quite right to say that it is debated, discussed and actively inputted every day. It is a difficult decision. We know that it has been difficult across Europe. We have taken advice from other countries, particularly the Netherlands recently, about how it is to happen. Every country finds it difficult.

Q701 **Carol Monaghan:** The question was: are you confident that schools will be in a position to do this? It is a yes or no. Are you confident?

Professor Doyle: I am confident that some schools may already feel they are ready to open, and others may not. That is why I say it will be a decision for individual schools as to whether or not they are in that position. What we can provide them with is guidance and advice as to how risk can be most reduced if they open.

Q702 **Andrew Griffith:** Have either of you or Public Health England been asked by the Government to advise on the imposition of a 14-day quarantine period?

Professor Doyle: Yes. Initially, we had a very active port health team, which operated up to the time that travel stopped. We have been providing advice to Government and SAGE about what happens when the ports may open again. Indeed, our chief exec has been in touch with the chief exec of Heathrow about a trial of temperature checking.

Quarantine for 14 days is an international standard at the moment; many countries are doing it, and Government have taken advice from a range of advisers on this. By the way, the idea of isolating for 14 days is not new; that was what we operated during the first phase when anybody was unwell; they were advised to self-isolate, so we are familiar with that process.

Q703 **Andrew Griffith:** Presumably, you would be willing to publish that advice in due course. Are you familiar with the European Union Aviation Safety Agency guidelines, in particular its recommendation that aviation is safe if medical face masks are worn from the moment you enter the airport to when you disembark from the aircraft, and the fact that high-efficiency particulate air filters "have demonstrated good performance with particles the size of the SARS…virus"?

Professor Doyle: I think that information is being looked at. I do not think we have made a decision or a recommendation on that. That is all I can say about it at the moment. I am aware of it, but I do not think we have provided formal advice on that.

Q704 **Aaron Bell:** Professor Doyle, following what you said to the Chair about the 2-metre distance, it is obviously the case that maybe 1 metre would be riskier, but 3 metres would be safer still. I am concerned to read in

yesterday's *Times* that SAGE has apparently advised Ministers that the 2-metre distance should stay on the grounds that blurring it could be confusing. That does not seem to be particularly scientific.

We need a measure that we can have some faith in. Because this measure is so crucial to the potential economic hopes of so many firms around the country, can you reassure me that you are looking at what the measure should be in future, and you are not going to stick with 2 metres just because that is what we have had so far?

Professor Doyle: We will learn all the time. Some of the work that will need to be commissioned is about how we can understand the survival of the virus in various circumstances, and that will inform that decision.

Chair: We are very grateful to you for giving evidence today. To refer to the point Professor Doyle has just made, it is important to learn lessons as we go. There will be things that are done right and things that are done wrong, probably both, and decisions will be made in the weeks and months ahead that can be influenced by what we have discovered so far. That is why it is important that we are able to review the basis of some of the earlier decisions to inform future decisions.

Transparency is very important; it is the reason we had to invite you back today. Reflecting on the earlier discussion, I have to say there is still a degree of opacity about the basis on which the decisions were made to pursue our testing strategy, including, in the light of what you said, who is making those decisions. We would be very grateful if you would supply as soon as possible the board or cabinet papers you referred to, and some of the other information we have requested.

One of the lessons the Committee has reflected on in taking evidence from many witnesses, both in this country and around the world, is that anticipating need and getting ahead of it is crucial to being in a good position. We were concerned that, when it came to the initial phase of testing, it was late in the day. It was almost a nail-biting run to the deadline and the target that the Secretary of State has set. Equally, with the contact-tracing app, we need it and want it, but there seems to be a rush to get it ready in time. Prevalence testing in the community is very important to understand the spread of the pandemic, but it was requested of the ONS only on 17 April.

It is important for us all to be able to look forward and see what is coming, so that we have less of an essay-crisis approach to nail-biting finishes on some of these important decisions. That is why we are interested in documenting some of these early decisions so that we can make good decisions in future. We are very grateful to you for coming back to give evidence to us today. Thank you very much.

Examination of witnesses

Witnesses: Professor Noakes and Professor Curran.

Q705 **Chair:** We are going to consider in this panel some questions about the risk of infection, especially in different workplaces. We are very pleased to have two expert witnesses: Professor Andrew Curran, who is the chief scientific adviser and director of research at the Health and Safety Executive, who participates in SAGE, in the environmental working group that feeds into SAGE, and Professor Cath Noakes, who is professor of environmental engineering for buildings at the University of Leeds. She is also a participant in SAGE and is also on the environmental working group. Thank you very much indeed for giving evidence to us today.

Professor Noakes, can you give the Committee a short primer on what we know now of how Covid-19 is transmitted?

Professor Noakes: We believe that it is transmitted through respiratory droplets as its primary route. That is quite a complicated process, and it can involve three different transmission routes. There is a transmission route of direct person-to-person transmission where, if you are face to face with somebody within 1 to 2 metres, potentially you can have droplets containing virus land on your eyes or nasal membranes, or you can inhale them directly and they can impact on your respiratory tract, which could cause an infection.

There is a second route by which some of the droplets, particularly the bigger ones, will land on a surface, and then that surface potentially is contaminated; somebody could touch the surface and then touch their nose or eyes and get an infection transmission that way. Of course, surfaces can also be contaminated through the fact that somebody's hand is contaminated, and they have touched surfaces and left it behind, and people can subsequently touch those surfaces. The third possible route is an aerosol route whereby, if you are further than 2 metres away, potentially you could inhale the very small particles that remain airborne for longer periods of time and get infected that way.

The current thinking is that the close range, 1 to 2 metres, presents the biggest risk. Certainly, most of the evidence we have seen seems to suggest that people are being infected in enclosed indoor environments and at close range. It is hard to put evidence for surface transmission, but it is very likely that that is a transmission route, because it is believed to be a significant transmission route for many respiratory diseases.

The aerosol route is likely to be a smaller component; it may be a risk under certain circumstances in hospitals, where there are aerosol-generating procedures. There is a little bit of emerging evidence that would suggest that it might be a risk in very poorly ventilated environments, where the particles can stay in air for longer and people can breathe them in.

It is very important to add that, with all diseases, to get infected you need to be exposed to a sufficient dose—a sufficient amount of virus. We do not yet know what that is for this disease, and it will probably be some time before we find out. We do not even know what it is for many other

diseases, so it is very hard to find out for this one. Therefore, some of the recommendations around risk come down to how long you spend with somebody. You are more likely to get infected if you are in a close-contact environment with somebody who is infected, for a longer period of time.

Q706 **Chair:** The biggest risk is close proximity over a sustained period in an indoor, poorly ventilated setting.

Professor Noakes: That is what the evidence shows so far—people in close proximity in indoor spaces.

Q707 **Chair:** In terms of exposure, can you give us some calibrations as to what is significant and what is less significant?

Professor Noakes: In terms of how much virus?

Q708 **Chair:** I was thinking in terms of experience. Is it if you work with someone for eight hours, or is half an hour enough?

Professor Noakes: To be honest, it is very hard to say at the moment. From many outbreaks internationally that we have investigated so far, there is some evidence that, in environments such as parties, conferences, churches and that sort of thing, people are infected in those spaces within two hours. It will very much depend on the nature of the infectious person.

There is a huge unknown as well, in that we do not know very much about respiratory droplets. We know that they are produced when people breathe, talk, cough and sneeze, and we suspect that a cough provides a much higher viral load than simply talking. We also think that some people produce a much higher viral load than others, but we do not yet know at which stage of the disease. It is quite likely, from the evidence that is emerging, that people are producing a higher viral load at the early stages of the disease, possibly before they show significant symptoms. You can see that there are an awful lot of unknowns.

Q709 **Chair:** And it is very good to have an expert guide. How important is the open air? Do we have any insight into that? You said that poorly ventilated buildings were dangerous. Are we confident that open-air environments are significantly less dangerous?

Professor Noakes: We believe that they are significantly less dangerous. That comes from two things. If you are still 1 or 2 metres away from somebody, you can still get face-to-face transmission, but, further away, the outdoor environment disperses aerosols very quickly, so the chances of you being able to inhale enough in an outdoor environment are very small.

Q710 **Chair:** In studying the statistics, do you know how many people are known or suspected to have caught the virus outdoors?

Professor Noakes: There is not a great deal of evidence. There is a study from China, which I think is still a pre-print paper, in which they looked at 7,000 transmission cases and identified 300 or so indoor ones from which they could show that there was significant transmission happening. They found only one case that was an outdoor case, and that was where two people were having a conversation. It did not say how far apart they were, but having a conversation would suggest that they were reasonably close to each other.

There is some very anecdotal evidence, mainly from newspaper reports, from Singapore, that on building sites there has been some transmission. But, again, it is very hard to say whether that was outdoors or actually in shared toilet facilities or shared food facilities.

Q711 **Chair:** To return to the question that we had for Public Health England on the basis of the 2-metre rule, most other countries have taken a decision to have a shorter distance as a guideline. What is your assessment of that?

Professor Noakes: My assessment is that it is complicated. The reason for 2 metres is related to an understanding of how respiratory droplets behave in the air, and that is a complex flow process. There are studies that use very controlled laboratory settings, which show that the risk decreases with distance and that between 1.5 and 2 metres the risk drops off quite significantly. Those are very controlled laboratory settings with a computer model or a mannequin.

There are also some studies that have looked at what happens to the particles when somebody coughs and how they behave in the air. They can be shown to be really complex, and they move in a cloud, which means that they can go further. There is evidence that things can actually go further than 2 metres. There is also a certain amount of epidemiological evidence from things like transmission on aircraft, which suggests that most transmission of many respiratory diseases happens within a couple of seat rows, which, again, is a space of around 1.5 to 2 metres.

We recommended 2 metres, based on the fact that that is where the evidence is sitting at the moment. Having said that, it is very complex, and as we learn more we may be able to adjust it. We have already stated that, if people are back to back or to the side, the risk is lower. One of the papers we produced stated that we believed that, if you are about 1 metre to the side or back, you are breathing what is in the air in the room rather than the plume coming out of somebody's mouth.

Q712 **Chair:** One of the benefits of experience in this country and others across the world is that you see what works and what does not, and you can calibrate better. From what you have said, would it be reasonable to say that the variables or key factors are distance, ventilation and length of exposure?

Professor Noakes: Yes. Ventilation does not really interfere with the 1 to 2-metre space; it interferes with the rest of the room.

Q713 **Chair:** I see. The length of exposure is clearly—

Professor Noakes: Yes, the length of exposure matters. If you walk past somebody in the street and you are within a metre of them, the risks are very small, because you are very unlikely to be able to be exposed to sufficient virus.

Q714 **Chair:** In terms of recalibrating it, obviously, there is virtue to simplicity, if everyone has 2 metres in their minds, but a reflection of the science might be more nuanced and informed by the evidence. I dare say that that is a decision as to how people would be able to follow messages and guidance that is specific to variables like the distance that people are apart.

Professor Noakes: It is also important to remember that people are not static. When people are very static, 2 metres is one thing, but 2 metres allows for some flexibility, because people will move. If you put two people a metre apart and they turn to face each other and lean in, they are going to be half a metre apart.

Chair: Thank you. I am very grateful for that.

Q715 **Carol Monaghan:** Professor Curran, it has been reported that the Health and Safety Executive has paused its inspection of workplaces because of the risk that it poses to its own staff. First, is that true? If so, how can we expect employees to work in conditions that are too risky for the Health and Safety Executive?

Professor Curran: I can confirm that the stories are not true. HSE has been undertaking inspections. Obviously, when lockdown was first introduced, our inspections of non-hazardous installations paused while we recalibrated ourselves to enable us to undertake the appropriate risk assessments for our own staff to go out. Our staff are now going out to workplaces, responding to concerns and advice raised through the normal channels, and are taking enforcement action both in relation to Covid-19 and in the general purpose of their duties—looking for issues that may lead to breaches of the Health and Safety at Work etc. Act. Our inspectors are on the ground as we speak today.

Q716 **Carol Monaghan:** Thank you for that. I have been contacted by a number of businesses within my constituency, and businesses where my constituents are employed. They want to do the right thing for their employees, but they are not sure. The Government's own guidelines say that employers should assess whether the activity can safely go ahead. First, what criteria should they use to carry out that assessment and, secondly, if the employee is clinically vulnerable, what should be considered an acceptable level of risk?

Professor Curran: Public Health England has produced a range of guidance that aims to help people to make some of these decisions. Our approach would be very simple, in that we would look for people to undertake a full and comprehensive risk assessment in the context of Covid-19. In doing so, they should consider all the elements of their job, because we know that jobs do not consist of one kind of activity all day, and they should think, as Cath said, about the three possible key areas: transmission through the air, through people and through surfaces. In each of those circumstances, they should think about what effective controls might be used to manage the risk of transmission or contracting the disease.

That might be a range of measures; it might be saying that actually we do not need to do that particular work activity, so you can eliminate the risk completely. You could substitute and change the way you do things. You could put in some engineering controls and some barriers, or you could change some administration of the activities—for example, by putting lines on the floor, or changing rotas and shift patterns and all those kinds of things.

I encourage people to do that in a very participative way, so that everybody involved in doing the job is involved in redesigning the job to make it Covid-safe. That is basically the underpinning principle of the risk assessment process. In doing so, they will identify some issues that they might have to think about, which is where the Public Health England guidance may be helpful in providing potential solutions.

Q717 **Carol Monaghan:** Professor, can I push you a bit on that? The majority of employers want to do the right thing for their employees, but there are some unscrupulous employers who are less willing to put in place what is required. There is a phrase about an acceptable level of risk. What is an acceptable level of risk, and is there a way in which we can calculate it, or employers or employees can calculate it?

Professor Curran: The first thing to say is that the risk will never be zero. Indeed, the risk is never zero for many work activities. Thinking through what is an acceptable level of risk is a bit like what we do with the standard processes used for risk assessment, which is getting the risk as low as reasonably practicable, given what we know and understand about the controls available. It is not going to be possible to give a number on that; as Cath said, we have so many unknowns in our understanding of this virus that we cannot yet quantify what the risk looks like. If organisations can identify through the three routes that I described—air, people and surface contamination—things that work for them, they can mitigate, monitor and modify so that their process is continuously learning as the evidence evolves.

I could not give you a number now or a definition of what acceptable risk is; that has to be discussed in the context of employers and employees together, to work out whether the combination of controls that they propose is sufficient to enable them to be confident that they can work in

an acceptable way, understanding what the risks are in their particular workplace.

Q718 **Dawn Butler:** Thank you both for a very informative session. Can I ask a couple of quick questions? In a workplace where there is no ventilation and a constant flow of different people coming and going, what extra measures should take place for it to be safe?

Professor Noakes: First, I would never recommend having a workplace with no ventilation. Essentially, that is a really bad idea, full stop. It contravenes all the guidance, building regulations and so on. The risk of transmission in well-ventilated spaces is quite likely to be small. There is no evidence so far of transmission in well-ventilated spaces that is believed to be through an aerosol route.

That workplace should be looking very seriously at its ventilation; it should not be unventilated. If it is unventilated, the first measure is to install proper ventilation in the space, and, if that cannot be done, to look at whether certain technologies such as air-cleaning devices could be installed. They are not certain, by any means; there is a lot of laboratory evidence for them, but less evidence for how they might work in practice. If you have to have people working in the space, you might then end up with significant PPE, to enable them to work safely in that space. That might be the only route.

Professor Curran: I agree with everything Cath says. We encourage people to use the hierarchy of control to go through the various options. We certainly would not be looking at this stage for workplaces that do not currently use PPE to jump to PPE as the solution to the exposure question. We believe that there are other much more effective mechanisms to do that before you have to resort to PPE. The challenge with PPE, of course, is that you have to have access to it, it has to fit properly, you have to wear it properly and you have to maintain it, along with all the other things. The hierarchy of control provides people with a range of other options before that route is used.

Q719 **Aaron Bell:** Professor Noakes, you spoke earlier about alternative measures such as being back to back, and so on, and suggested that they would be quite effective. Is there any scientific evidence about how effective they are? You said earlier that it was difficult, but do we have some data?

Professor Noakes: There is a little bit of scientific evidence, but it tends to come from very controlled studies where people either do a computer model or set up mannequins in a chamber, for example, and then aerosolise particles as a surrogate. Most of those studies show that back to back is significantly lower risk. The risk at that point would be from the fine aerosol particles that remain in the air, which we have already said, if the room is well ventilated, are likely to pose a much smaller risk of infection.

As Professor Curran said, you cannot eliminate risk completely, but you can significantly reduce it. What would have to be considered is, if you set something up where people are back to back or at different angles to each other, whether they will remain in that position, because you have to take into account human behaviour.

We have talked about screens. Interestingly, there is very little scientific evidence for the use of screens and barriers to prevent disease transmission. There is a little bit, but very small amounts; most of the work on screens and barriers comes from industry safety, for exposure to chemicals and things in an industry context, rather than respiratory droplets.

Q720 **Aaron Bell:** To follow on from what you said and what Professor Curran said about taking a proper approach to considering all the methods of transmission and so on, it seems as if the 2-metre rule is quite a gross oversimplification, because of the way things are different outside and inside. It depends on the ventilation, and so on.

I appreciate that people like the simplicity of the rule, but at what point can we get to a level where we move beyond it and start to do genuine risk assessments, rather than trying to arrange people in 2-metre grids, as we see in certain set-ups, and so on? Is a realistic medium-term goal to get away from a strict distance metre and start to treat it on a case-by-case basis?

Professor Noakes: Yes, I believe so. What we lack with this disease at the moment is an understanding of the viral load that people need to be exposed to, to get infected. That evidence is hard to come by, and it will not necessarily be something that will happen quickly. Once there is some understanding of that, it is possible at least to do some initial preliminary calculations to say how risky things might be under different circumstances.

We have known about influenza for well over 100 years, but we have sampled influenza from the exhaled breath of people only in the last 10 years. It is a hard thing to do; we do not actually know fully how influenza transmits in the environment. We need to bear in mind that we have very little evidence for most other diseases that we have had for a long time, so we are unlikely to get that evidence quickly for this disease, but we will try.

Q721 **Aaron Bell:** Professor Curran, do you have any thoughts about the 2-metre distance, and the future of that?

Professor Curran: Yes, as Cath says, it is a complex issue, but, as we learn more, we will be able to do things slightly differently. At the moment, if I could categorise workplaces into two different kinds, places that do not interact with the public probably have more control over their work environment and can manage the interactions between people. As Cath said, it is about managing the duration of any interaction below 2

metres to an agreed amount of time, or arranging people so that they are facing different directions.

That is much more difficult in roles that are outward facing and have contact with the general public. One of the things that would be very helpful is to have better public understanding of the risks, and the relative risks, in the contexts of our daily lives. Moving forward, being able to explain to the public what they can do to take control of their environment, so that they minimise the risk they pose to others and that others pose to them, would be one way of thinking about how we can move to a slightly different position. If you have to control people through direction, and that is the only method you are going to use, you need that simple 2-metre rule.

Q722 **Aaron Bell:** You mentioned that PPE should not be the first port of call for any workplace. What other methods would you potentially recommend? Is there value in workplace screening, such as temperature checks? Is there value in simple things like gloves, or not exactly homemade PPE but people taking sensible precautions with things like a scarf? What are your thoughts about alternative provisions?

Professor Curran: I am sorry to repeat myself, but I go back to the hierarchy of control, because that gives you a framework to have a conversation. A lot of this is about having the conversation with the people who are doing the work. Already in HSE, we have seen some good examples where organisations have had those conversations and have managed to change the way they do activities so that the risk is significantly reduced.

I have great faith in people's ability to understand how they do their job and what they can do to reduce the risk. The ability of the UK population to do that kind of thinking is sometimes underestimated. If you resort to PPE, you have sort of given up, when actually this is a challenge that workplaces should be taking on and thinking about. The appetite for people to do it properly and carefully, with the knowledge of the people in the organisation, should not be underestimated. For me, that is the most important thing. Just saying "Put a mask on" is not going to help you at all; having a good conversation will really help you.

Q723 **Mark Logan:** In Bolton, for example, we have had lots of inquiries from restaurants and pubs around the lockdown initiative, as I am sure is the case for other Members. What advice would you give to business owners to say that the measures have been taken with scientific advice in mind?

Professor Curran: The hospitality sector is one where there are interactions with the public, as I mentioned earlier, so it is much more difficult to manage easily. Therefore, there needs to be considerable thought as to how the public interact with those spaces, and how people managing those kinds of facilities use the best available knowledge to minimise risk. Until we have perhaps a little more evidence, it will be

quite difficult for that risk to be reduced significantly enough for those businesses to operate in a way that is profitable.

Clearly, it needs significant thought to enable those businesses to operate, and for the people going to them to be safe themselves and for people working in those environments also to be safe. The risk assessment process will take you so far, but given the interactions with members of the public, the social distancing issue will probably be the most complicated to address. Cath may have more thoughts on how that might be managed, but when you are dealing with members of the public who do not always act in the way you expect or want them to act, that can be the barrier to some of the measures you would be able to put in place in a workplace where there were no members of the public. That is going to be the challenge, and that is where the scientific evidence has to work to understand what mitigation measures can help in those kinds of situations.

Professor Noakes: It is a very difficult environment to deal with. You can do as many environmental controls as you can, making sure that your pub is well ventilated, cleaning your surfaces frequently and making sure that you have good hygiene measures for your staff, but ultimately you cannot necessarily control the public. That is where, above all the environmental measures that we are talking about, we need an effective test, trace and isolate system. We need the amount of virus to come down within the population. If you get to a level where there is a very low level of virus circulating in the population, you have a very effective tracing system in place and nobody is infected in your workplace, there is no risk. But we are not yet at a level where we can be confident that that is the case.

Q724 **Zarah Sultana:** According to data looked at by the Office for National Statistics, taxi drivers, shop workers, chefs and security guards are among those most likely to die from Covid-19. The figures show that, if you have a low-paid job and you are working through the crisis, you are more likely to die. Are there any early indications of the reasons for that?

Professor Curran: The ONS statistics are really important. They give us some early indications of potential areas of concern. I would put in a note of caution, in that they are a relatively small sample size. When you are dealing with small numbers of people in particular job categories, there can be a level of uncertainty around what that is telling you. Perhaps some more analysis is required on matching and socioeconomic status, and all those kinds of things.

Having said that, any indication of increased risk in particular occupations is important for us to consider. Certainly, we are monitoring those kinds of things through our concerns and advice line at HSE. We encourage people to report any RIDDOR events so that we can use that dataset to help advise us on where incidents might be occurring, either of dangerous occurrences or of occupational disease caused by Covid-19 and, sadly, deaths caused by Covid. Collecting enough data to enable us to get better

granularity on those issues is important, and we are working with the Office for National Statistics to ensure that we include the right questions in the surveys that are being used so that we get increased granularity on occupation.

I have one other quick point on that, which goes back to a point that I was making earlier. A job does not necessarily tell you everything about somebody's role. It is surprising that all healthcare workers, for example, were not flagged up in that survey. That might be, for example, because doctors are not just looking after Covid patients but doing other things as well. They might be community doctors, and they might be doing all kinds of things where they are not exposed to Covid. That is why I urge a little bit of caution about reading too much into them at this stage. With additional information and data, we should be able to get more granularity and, therefore, focus our efforts on the occupations that are most at risk.

Q725 **Zarah Sultana:** On the point about healthcare workers who have not experienced above average mortality rates from Covid-19, do you not think it is the levels of protective personal equipment that they are wearing that causes that statistic in that particular profession, rather than their working in other aspects of healthcare?

Professor Curran: That could be one reason, and there could be many other reasons. The data provides us with opportunities to identify some additional research questions that would be able properly to answer those questions with certainty. It is directional, in relation to research questions, but does not necessarily give us all the information that we need to be certain. We need to make sure that we are not confusing correlation and causation in early data. We need to make sure that we put the uncertainty around it and that the research is targeted to answer the direct questions left unanswered by that data at the moment.

Q726 **Zarah Sultana:** Public Health England has said that, if schools followed the Government's guidance, the risk of transmission would be lowered. Have you evaluated that risk?

Professor Curran: From an HSE perspective, we have worked with BEIS and other Departments to advise on the approaches that I have talked about already—the risk assessment and hierarchy of control approaches. Schools have remained open in many places to teach the children of particular groups of workers, so we can learn from that experience and use it to inform the risk assessment process. If the risk assessments are done with all the people involved, and the issues are properly explored and different ways of working are considered, that gives the best opportunity for schools to reopen in a safe and healthy way.

Q727 **Carol Monaghan:** As we begin to see people use public transport again, there is a question of risk there. Professor Curran, how do we think that the risk on public transport compares with risk in actual workplaces?

Professor Curran: It is very difficult to put numbers on that, as I said earlier. The relative risk of different activities is quite difficult to calculate, given our uncertainty about the virus, how it moves, what people's viral load is and what role asymptomatic people might have in spreading the virus. We have had lots of conversations with transport representatives and, through our sub-group of SAGE, we have worked quite extensively with many of the organisations involved. We have been through a process to try to understand where the risks may be greatest and then have a dialogue about how we might help them to work through those issues.

I sound like a broken record, so apologies, but that process of dialogue, communication and understanding of what works and does not work in the specific detail of each work activity is the best way to do it. There will still be a residual risk, which will have to be managed. Clearly, one way to manage that is to reduce the number of people using public transport, and, to some extent, that is happening at the moment because the numbers are significantly down on what they were prior to lockdown. There is a lot of thinking to be done, but there are specific measures that could be used to reduce the risk, and those are the kinds of things we are talking to transport organisations about at the moment.

Q728 **Carol Monaghan:** Quite a lot of us are worried and concerned when we see pictures of people on busy tubes or buses. I appreciate that numbers are significantly down, but they are significantly down in many cases on an overcrowded system. Even significantly down means people crammed into tubes, trains and buses. Are you concerned about that?

Professor Curran: Absolutely, in relation to how that affects the risk not just to members of the public but to the workers involved in those situations. As I said earlier, things can be done to reduce that risk, not least of which in this case is the education of the public in how to manage their own environment.

Everybody needs to take responsibility for how they interact with others and think carefully about making sure that advice is followed about washing hands before they leave the house and making sure that they socially distance as much as possible in those circumstances. If that is not possible, they might want to consider wearing a face covering of some kind. If people follow all that practical advice, it is the best way, and the best evidenced way we have at the moment, to reduce the risk.

Q729 **Carol Monaghan:** Professor Curran, with respect, people are not following that, when we see the pictures. Is there a responsibility on transport providers to limit the number of people using public transport, putting in place specific social distancing measures in transport arrangements?

Professor Curran: As I said earlier, the hierarchy of control would suggest that, if the risk is above a reasonably practicable level, you need to go back around the loop. Elimination is one of the ways of doing that

and, in that case, you would need to eliminate the numbers of people on the tube who were causing the problem. You may have to introduce restrictions, but that would be a matter for London Underground or the bus or train operators to consider as part of their risk control strategies.

Q730 **Carol Monaghan:** Okay, so would you think that would be worth doing? Would it be your recommendation that that should be put in place?

Professor Curran: My recommendation would be that, if they go through the proper risk assessment process and there is still residual risk, they would need to consider other options to manage the numbers of people or, indeed, the use of public transport, but they should do that through the standard risk assessment process.

Q731 **Graham Stringer:** Professor Curran, isn't it likely that what would be eliminated is public transport, if you increased social distancing? Whether it is private bus companies, the tube or trains, to be commercially viable, or to not require huge amounts of subsidy, you have to have very crowded trains, tubes and buses. Have you given any thought to how you could make a crowded tube, bus or train safe?

Professor Curran: In all of the issues we are dealing with, there are difficult decisions and choices to be made. I totally understand that. The difficulty we all have is that we know so little about the virus. That makes it very difficult to put in place the standard control measures that you would use to manage those kinds of situations. Therefore, it becomes a balancing act between the requirement to maintain public services, and public transport in particular, and the risk that may increase as more people use that service. Those are very difficult questions to answer.

From an HSE perspective—I can only speak from HSE's side of the fence—we are trying as much as possible to support industry in making the right decisions. We are working very hard with other Government Departments to ensure that we are pragmatic and practical in our approaches to providing the guidance. Using the best available scientific evidence, we are feeding in what we believe is the most balanced approach to the regulatory environment that we think is best for the UK.

Q732 **Graham Stringer:** Is it possible to make a crowded tube, bus or train safe?

Professor Curran: As things stand at the moment, it would be quite difficult if tube trains were running at normal capacity to guarantee that a tube train was safe. There are so many unknown factors that it would be difficult. As we learn more about the virus, and, as Cath said, as the infection rate and the prevalence drops, there are probably different tools in the toolbox to use. But at the moment it would be very difficult for tube trains to run at full capacity, given our understanding of the current situation.

Q733 **Graham Stringer:** I have no idea what the answer to this question is, but is this the first time in the HSE's existence that you have been asked

to give advice on infectious diseases? If so, are there any implications for future advice you might have to give on the flu season, or other diseases?

Professor Curran: HSE has quite a number of specialist microbiology inspectors, for example, who have advised previously on things like Legionnaires' disease, so there are legionella inspections. We do inspections of high-containment facilities to make sure that they are operating safely, so we have quite a lot of experience in advising employers and employees about safe systems of work in those kinds of environments.

It is fair to say that, in relation to a pandemic situation, this is very unusual for HSE. Clearly, we are doing a lot of thinking about how that affects our approach to enforcement and inspection, and the advice we give others. We are using that specialist microbiological experience and knowledge to help to go through those conversations, which I think will enable us to deliver an appropriate regulatory approach to the different world that we are all starting to become accustomed to.

Q734 **Andrew Griffith:** To broaden this into aviation, with your expertise, do you have any thoughts on the safety protocol for air travel that was issued yesterday by the European Union Aviation Safety Agency and the European Centre for Disease Prevention and Control? They thought that aviation could be made safe with the wearing of medical masks in the terminal and on the aircraft. They also noted the efficacy of HEPA filters in trapping the particles of the Covid virus. What are your thoughts on that as a basis for restoring air travel?

Professor Noakes: Both those actions would reduce risks. Wearing face coverings in that situation, particularly if it is somebody who is an asymptomatic infector, is likely to limit the number of droplets they put into the environment. It is far from 100%. The efficacy depends on the actual face covering itself, and the material used, and on how well somebody wears it. You have probably all seen pictures in the papers of people wearing masks below their nose, which, to be honest, is not going to do much at all.

On HEPA filters, there is a lot of evidence from laboratory settings that you can use a particle filter or even some other technologies to remove infectious particles from the air. The challenge in practice is how you position them and whether the air that is contaminated goes through them. In your office, if you put one in the corner of the room and it pulls air through it, how are you going to guarantee that the air on your side of the office is going to go through to that side? It is about positioning them. If it is done well, and it is designed correctly, it will reduce the airborne load. I did not see anything about cleaning. Obviously, one of the major routes is still likely to be surface contact, so high-frequency cleaning and cleaning after anybody has used the toilet all should be in there, too.

Q735 **Andrew Griffith:** It is in there. It is a detailed set of protocols, which could be the basis of restoring aviation.

Professor Noakes: I have not looked at the full detail of that.

Professor Curran: I cannot comment on the detail, but I have one specific point on the face mask issue. That issue has been debated long and hard. There is a difference between a face covering and what I would call workplace-suitable personal protective equipment. Wearing a mask for a long period of time, if that is considered for long-haul flights, is not a nice thing to do, so there would be a wearability question. As Cath said, the nature and fit of the mask and the way it is worn over a long period of time would need to be considered, if it was part of a control measure.

Q736 **Katherine Fletcher:** Thank you, Professors. I appreciate that it is not the quietest time for you, so your time with us is valuable, and it warms the cockles of my heart.

I want to join some dots with the previous panel. We heard evidence about the initial categorisation of Covid as requiring a level 3 laboratory. Professor Noakes, could you describe for the man in the street the difference between a level 3 and a level 2 laboratory in terms of its physical shape and set-up?

Professor Noakes: I am not an expert on laboratories, but it has a much higher level of containment requirement in terms of its ventilation systems, surface finishes, pressurisation and so on. Many organisations have a level 2 laboratory, because it is quite a cost-effective thing to run. A level 3 laboratory costs a lot more money to run and needs far more safety training and so on, so far fewer organisations have a level 3 laboratory.

Q737 **Katherine Fletcher:** Is it just about what is in the room and the negative air pressure, or is there anything fancier?

Professor Noakes: I think there might be more to it than that, and I suspect that Andrew might be able to answer better than me on that one.

Professor Curran: Cath has summed it up. It needs different systems of work, so additional training for staff. There is usually an airlock through which people go into a category 3 laboratory. Essentially, that is more to stop things getting out, so that, if there is a spill of a pathogenic organism, it is contained within that space. That is the main difference.

Q738 **Katherine Fletcher:** Given that the initial advice was that you were only allowed to produce tests within what was almost going through an airlock to the lab—I have a mental picture of Hollywood in my head—why was that categorisation put in place, when, as you say, it is a really specialist piece of kit? I believe that Professor Doyle explained that it was a Health and Safety Executive recommendation that suggested level 3 right into March, the end of March.

Professor Curran: Perhaps I can clarify some of the things that were said earlier. First, SARS-CoV-2, which is the name of the virus, is still a category 3 organism. That is the first thing to say. It was actually over the weekend of 1 March that Chris Whitty, the chief medical officer, contacted me to talk about potential issues there might be in relation to testing at category 3 level. Our specialist microbiology inspectors worked over the weekend to agree that, given the exceptional circumstances, we as HSE would work with Public Health England to revise the guidance so that some of the procedures that we would be required to deliver to do the testing could be undertaken at category 2 level.

To be clear, the organism has never been recharacterised; it is still a category 3 organism. That decision is made by the Advisory Committee on Dangerous Pathogens, which has confirmed that it is still the case. We provided that additional approach to enable people doing the testing to do it at category 2, but we also put in some provisos to ensure that there were safe systems of work and that the risk assessments took account of the changing approach; to require training and competency to be assessed for the people who were doing it; and to update the guidance. Clearly, what we do not want is workers doing the testing developing symptoms of Covid-19. It is unfortunate that we have had some RIDDOR reports on workers in laboratories. They have reported RIDDOR reportable incidents, which we are currently investigating.

Q739 **Katherine Fletcher:** There is a possibility that some of the people who have been supporting the testing effort have actually been infected by the working practices around the tests themselves.

Professor Curran: That is what we are investigating, as they have come in to us as RIDDOR reports. There are not very many, probably one or two.

Q740 **Chair:** What is the acronym you used?

Professor Curran: RIDDOR—the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations. Employers are required to report to us certain instances where health and safety breaches may have happened, such as occupational diseases or a dangerous occurrence. We then go out and investigate them as necessary.

Q741 **Katherine Fletcher:** To round this off, we have heard an awful lot of evidence about how to make workplaces safe, with tape on the floor and PPE, although you said that if we get to PPE we have failed. Can you understand why, when at the start of March you have to go through a negative air pressure airlocked lab, the idea that you are being encouraged to go back to a workplace is challenging for the man in the street? I hold my hands up and say that I have worked in a category 3 lab, and I understand that your advice is safe, but the man in the street does not or cannot understand that difference. How do you want us, as parliamentarians, to explain to our constituents that they are safe when they go back to work?

Professor Curran: That is a really important point. I made reference earlier to having better communications, so that the public can really understand the risk, and the relative risk in the context of other activities that they undertake. Clearly, for some people, exposure to any micro-organism is potentially a life-threatening issue.

Different parts of society have been dealing with these kinds of issues for many years. If you see it as all-pervasive and all around you, it is not surprising that you fear leaving your home and, indeed, going back to work. Of course, that is not the case; it is not everywhere. The numbers of people who are infected are dropping on a daily basis. The latest data from the Office for National Statistics would suggest that about 1 in 400 people has the virus.

Putting some of those facts out in a way that enables people to make judgments about the relative risk is going to be really helpful. There is perhaps more work that we need to do: how best to describe that in terms that enable people to make judgments as citizens, given all the other things we do. For example, we drive to work or drive our kids to school, and there is a risk associated with that. There is a risk associated with crossing the road.

Q742 **Katherine Fletcher:** Yes, from the metaphorical bus that appears. In essence, the work that the British public have done during lockdown to reduce the transmission risk allows for the difference in the scenarios, because there is less of it around.

Professor Curran: That is a very good way of putting it. The fantastic work that people have done in maintaining a very difficult situation, with social distancing, isolation and all the other things that have happened, has meant that we have a bit of wiggle room now to move forward in steps that enable us to manage the risk at the national level.

Q743 **Katherine Fletcher:** Safely.

Professor Curran: Exactly, yes.

Q744 **Chair:** Can I follow up on some of the information you gave Katherine? How many reports of potential infections in labs have you received?

Professor Curran: The RIDDOR reports on labs have been coming in, and we have had two reported under RIDDOR from Lighthouse Labs. We had another one reported from a trust that does not require any follow-up. They are not large numbers. The point is that we should not forget that people doing the laboratory testing are still at risk, if not more at risk, because they are handling samples from people who have most likely been infected with the virus, in a concentrated form to some extent.

Q745 **Chair:** It is very important; they are doing absolutely crucial work. You have had three reports. Is that three people or three clusters, as it were?

Professor Curran: Three people.

Q746 **Chair:** When were they? At what period in the length of the testing programme? Was it recently?

Professor Curran: I am afraid I do not have that information, Chair, but I am happy to write to the Committee, if that would help.

Q747 **Chair:** I would be grateful if you could do that promptly. To be clear, are they confirmed infections, or are they people who have had Covid while working or volunteering in the labs, and it is unknown whether they got it there or from the community?

Professor Curran: To be clear, these may also be dangerous occurrences. They may have been things that people reported that could lead to infection, and our investigations will identify exactly what the circumstances are.

Q748 **Chair:** It is three that you are investigating; you have not concluded the investigation.

Professor Curran: Yes, that is correct. We can provide an update on that in our written submission.

Q749 **Chair:** It is not that you know that people have contracted Covid from the lab; there has been some reportable breach of procedure there. Is that it?

Professor Curran: Yes, that is correct. They have reported occurrences that fall within the RIDDOR requirements, which we are investigating now.

Q750 **Chair:** We would be very grateful if you would follow that up, and we are grateful for your evidence today. I have a couple of points.

If you saw our earlier session with Public Health England, you will know that the basis of that was to understand what account had been taken of international approaches, given that the pandemic affects virtually every country in the world, and different countries have been ahead of us. Obviously, that applies to what we have been talking about on social distancing. We had some discussion in the earlier session about how we are something of an outlier on the 2-metre rule. Professor Curran, are you taking full account in a formal way, assessing what is being done by your comparable bodies in other countries?

Professor Curran: One of the things that we did very early in the current situation was to use a network that we have, called the Partnership for European Research in Occupational Safety and Health, which is 13 national laboratories around Europe. We set up a forum for sharing information, which enables us to ask questions and look at various control measures that have been taken. We have not specifically looked at the 2-metre issue, but we have used that source of information to exchange information about PPE, for example, including issues around the best kind of standards for PPE, and so on.

We also have something called the Sheffield Group, the international network of national laboratories, and we do the same kind of activity there. We are using those international links to learn as much as we can in a very active sense to inform our approaches in the UK, but we have not specially looked at the 2-metre rule.

Q751 **Chair:** Why not? Probably the most visible policy of social distancing is that you need to keep 2 metres apart if you are out. Why would you have chosen to set that rule, or that advice, which is somewhat different from most international practice, without having formally assessed what international practice and its effects have been?

Professor Curran: The advice is set by Public Health England, not by HSE. HSE will enforce against the guidance set by Public Health England. We were not specifically involved in discussions about the 2-metre rule at the early stage of the outbreak.

Q752 **Chair:** You are a member of SAGE, are you not?

Professor Curran: Yes. In SAGE, the environment and modelling group looked at that evidence, and Cath is probably best placed to talk about that, in relation to how it has been used. Of course, SAGE provides advice to Government Departments, which then make best use of that information to set the approaches.

Q753 **Chair:** From your knowledge of SAGE, did SAGE look in a formal, comprehensive way at what other countries were doing on the 2-metre social distancing rule?

Professor Curran: Certainly, in the environment and modelling group, when we were doing the initial work to look at some of the questions being asked of that particular group, we did a literature trawl and literature reviews. The team looked at a whole raft of different issues as part of that process.

Professor Noakes: To follow up what Andrew said, in our SAGE working group we have not formally discussed with other countries why they made their decisions. Essentially, all countries have access to the same scientific knowledge and literature on how this disease is spreading, on how other diseases spread and on the complex physics of what happens to aerosols.

The differences in judgment will be based on, I suspect, expert views in those countries as to the relative importance of the different transmission mechanisms. Perhaps some countries have gone down the route of saying that there is no evidence; therefore X. I think we are, sensibly, in a slightly more precautionary place; it may be over-precautionary, but from what I know about how aerosols can move in the environment, I think that, actually, it is not over-precautionary. Particularly when you are face to face with somebody, there is certainly evidence that people within 2 metres are able to be infected.

Q754 **Chair:** Isn't it surprising? Science is international. The virus does not respect boundaries. Why would we have a UK-alone approach to this, rather than—especially since other countries are ahead of us—learning from what they do? Why would we have adopted a very different position from other countries?

Professor Noakes: I do not think it is the UK alone. Several other countries, including the US, Spain, Italy, and I think Canada and Switzerland, all have something round about 2 metres. It may not be exactly 2 metres; some say 6 feet.

Sometimes, it comes down to the public health measures you have in place in your country, and compliance with those. You highlighted earlier that places like Singapore and Hong Kong have a lower distance, but they have mandatory mask wearing. Wearing a mask probably reduces the amount of droplets that go into space and probably reduces the distance they can be projected.

Whether this country should do that is not a decision for me to make; it would be a policy decision to make in that space. You have to consider whether your population will comply with a measure and comply with it properly. If you go to Singapore, you will find that people all do it and all comply, and that may be why they feel more confident to say that they can have a lower distance than the UK.

Q755 **Chair:** It is assessing the capacity of the British public to understand more nuanced messages.

Professor Noakes: Possibly. Also, there is an awful lot we still do not know about how exactly the disease transmits. We are taking evidence from a raft of different scientific disciplines to try to understand it. We are taking evidence from epidemiology and virology right across to fluid dynamics and engineering to try to understand what happens to the virus. I do not know how other countries are making those judgments; they may be making them with a different set of expertise in the room.

Q756 **Chair:** Thank you; I am grateful. We are trespassing on your time. I have one final question for Professor Curran. In the earlier session, we talked about the expansion of the testing capacity. One of the things that Public Health England said—I hope I am not mischaracterising them—was that they were limited in the ability to use a large number of labs because, through the categorisation process that we were discussing a few moments ago, the system was not allowed to go beyond licensed Public Health England labs, and a few more. Can I check that I have understood your evidence to be that, from 1 March, you changed those procedures to allow more labs to be used? Is that right?

Professor Curran: That is correct. Under the exceptional circumstances that clearly we were all dealing with at the time, we agreed that, with some caveats, which I think I have described, we would be happy for some of the work to be carried out at category 2, and we worked very closely with Public Health England to update the guidance to reflect all of

that and enable that work to be done at category 2. We have also delivered training for organisations that want to take on some of the testing, and our specialist microbiology inspectors have been out and spoken to organisations that are looking to take out the additional testing, to advise them on how best to do it safely.

Q757 **Chair:** When were those additional labs licensed to be deployed?

Professor Curran: They would have been able to do that kind of work in early March. I cannot give you an exact date, because it would depend on when the PHE guidance went out, but, certainly, the response I gave the chief medical officer was on 3 March, to say this is what we had agreed and these were the caveats that we had put in place, and that we needed to work with Public Health England to develop the guidance, which was then followed up that week.

Chair: Thank you very much indeed. It has been a fascinating session and we are very grateful for your evidence. It is clear from what you have been saying that, as we understand from your research and internationally, we know that the chances of contracting the virus, whether from the air or from surfaces, depend on things like the time exposed, whether you cough on other people, whether it is through breathing or whether it is outdoors, all of which means that the design of the appropriate advice that then needs to be implemented in workforces and in public is a matter of some nuance. During the weeks ahead, we know that, as members of SAGE, you will contribute your expertise to that.

It has been a theme of the Committee's hearings that we have taken evidence from international experts and practitioners around the world. At any time, but especially at this time, it is appropriate that we should draw heavily on that experience, not least because some people are further down the path than we are in managing the pandemic. We are very grateful for your extremely informative evidence.