

Science and Technology Committee

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

Friday 24 April 2020

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

Stephen Crabb, Simon Hoare, Jeremy Hunt and Pete Wishart attended the Committee.

Questions 269 - 339

Witnesses

I: Dr Frank Atherton, Chief Medical Officer for Wales; Dr Michael McBride, Chief Medical Officer for Northern Ireland; Dr Gregor Smith, interim Chief Medical Officer for Scotland; and Professor Chris Whitty, Chief Scientific Adviser at the Department of Health and Social Care and Chief Medical Officer for England.



Examination of witnesses

Witnesses: Dr Atherton, Dr McBride, Dr Smith and Professor Whitty.

Q269 **Chair:** The Science and Technology Committee is conducting an inquiry into the role of UK science, research and technology in the handling of this pandemic. Most of the conclusions will need to be reached after the crisis has subsided, but we are taking evidence throughout the pandemic for two reasons in particular. One is to be able to capture contemporary evidence so that we do not need to rely solely on the benefit of hindsight in due course. The second important reason is that, where we can learn lessons about the handling of the pandemic that can inform the ongoing decisions made by policymakers and institutions, it is clearly important to do so.

Today's session is on the response to Covid-19 across the four nations of the United Kingdom. For this purpose, I have asked to join the Committee the Chairs of the Northern Ireland Affairs and Welsh Affairs Select Committees of the House of Commons and the Chair-elect of the Scottish Affairs Select Committee. The Chair of the Health and Social Care Select Committee is also joining us.

I welcome all our witnesses today. Can I say on behalf of everyone on the Committee how grateful we are not just for your attendance here today but for the extraordinary work and dedication you have shown throughout this crisis? The work has been crucial to everyone across the United Kingdom, and we are very grateful for it.

Before turning to my colleagues for some questions, can I start by asking each of the witnesses to comment very briefly on how the four nations of the United Kingdom have been working together?

Dr Smith: Since the beginning of the crisis, there have been regular discussions between the four UK CMOs. My predecessor, Dr Calderwood, was primarily involved in those conversations with the other UK CMOs in the beginning. Latterly, I have taken over that role in making sure that from a clinical perspective there has been regular liaison. We try to speak to one another at a minimum three times a week, but we take various opportunities to ensure that we link with one another through senior clinician groups or through more ad hoc meetings because things have arisen that we need to speak about with more urgency.

Dr McBride: I am probably the elder statesman among my chief medical officer colleagues, having been in post for nearly 14 years. It has felt a lot longer in the last couple of months. We are built on a platform of very strong professional relationships over many years across the different Administrations, with very strong professional and scientific links between the respective public health agencies: Public Health Scotland and NHS Scotland, Public Health Wales and Public Health England. That has stood the test of time.



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I am probably the last survivor from the previous pandemic, H1N1. It is very telling that during that time there was support for sharing detailed information, modelling, scientific papers, clinical advice and guidance in respect of work we were doing in each jurisdiction as soon as that became available. As Gregor said, the regular engagement three times a week between us as UK chief medical officers and the senior clinical groups and clinicians, including our chief nursing officers, across the Administrations, has been crucially important in ensuring that we all avail of the latest and most up-to-date clinical evidence and then translate it into revised guidance and practice on the frontline.

Dr Atherton: To add to what my colleagues have said, since the get-go with this crisis we have had very good interaction at officer level through the CMOs. As Michael said, we have been meeting at least three times a week and more often when needed. The senior clinicians group, which brings in Public Health England and the NHS Executive, has been absolutely invaluable in understanding some of the operational detail.

We have also had very good links for our teams through the public health agencies—Public Health Wales is very close to Public Health England—and there has been a daily call with DHSC and colleagues on a four-nation basis, which has really helped. On top of that, we have had ministerial groups, Cobra meetings and, more recently, the inter-ministerial groups. I think that architecture has helped to serve us well during this time.

Q270 **Chair:** Professor Whitty, we are delighted to have you, because since you last appeared before a parliamentary committee you have been self-isolating, having suffered the symptoms of Covid-19. I hope you are fully recovered.

Professor Whitty: Pretty well, thank you, Chair.

I do not want to repeat what my colleagues have said. The interaction among the CMOs has been excellent throughout, and we often communicate several times a day if things are urgent. We also all interact with our own chief scientific advisers to Government. I operate incredibly closely with Sir Patrick Vallance and talk to him or communicate with him at least once a day, often more frequently, as things go along.

Each of the four nations has scientific advice in addition to the overall UK structure. Just sticking to the CMO area, that has worked very well. We have also linked up as clinical groups with senior doctors, senior nurses and other professionals to make sure that across the four nations we have a joint professional view about what is going on and what is needed at both a scientific and an operational level.

Q271 **Carol Monaghan:** Perhaps I could direct a couple of questions to Dr Smith from the Scotland perspective. The Scottish Covid-19 Advisory Group was set up to be separate from SAGE. Why was it felt that that was required? Was it offering different advice from that which SAGE was offering? Is the advisory group in Scotland communicating with other



experts around the world? If so, are they hearing different things from what has been communicated in the UK?

Dr Smith: From the early days, Scotland participated in the SAGE advisory structure. We should remember that it is not just the SAGE group itself but the sub-groups of SAGE that are important in the way information comes together. We found that a very useful relationship, but as time progressed it was becoming apparent that a lot of the discussion was increasingly focused on the English context and models were being applied in the English context. I think that, quite rightly, we wondered how we could take that good information—the intelligence that was being developed by the modelling groups in SAGE—and apply it to the Scottish context, recognising our own demography, geography and the differences in the Scottish health and social care system.

We see the Scottish Advisory Group as being very much complementary to the existing SAGE structures, drawing on information about those structures. Very early on, we established the principle of reciprocity with those advisory group structures so that there was sharing of information both ways. As our Scottish Advisory Group began to develop information that was felt to be useful for the wider UK structures, it was shared in the opposite direction as well. Part of the initial founding principles of that group was to make sure that the chair of our Scottish Advisory Group, Professor Andrew Morris, was also a member of the SAGE group.

Just as we learn from SAGE, it is important that we also learn from experience from around the globe. Each one of the very varied backgrounds of the scientists on the Scottish Advisory Group is from a range of different disciplines, from behavioural science to epidemiology and virology. They have their own networks that they can learn from as well, and it is important that we distil the information we are able to gain from their networks into the Scottish picture.

Q272 **Carol Monaghan:** You talk about drawing on expertise and the reciprocity of that, but have you felt confident, when there is a need, that you could diverge from the English or UK strategy? There must be some elements of how we tackle this that will be done differently according to what you have talked about: the demographics, the geography and everything else.

Dr Smith: We have spoken about the different contexts in Scotland. It is important that we apply the models, information and data available to us to our Scottish context. One of the early things we recognised was that experience in Scotland of Covid-19 was slightly different, particularly from that in the south of England, because we were at a different stage of the UK epidemic. At that stage, we had many fewer cases being presented than perhaps were being seen in either the London or the south of England scenarios. It became important for us to be able to apply the models and learning coming from those parts of the country to the unique context of Scotland at that time, which represented a very



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much earlier part of the epidemic, and to the actions we should take in Scotland, perhaps learning from experience elsewhere at different stages.

Q273 **Chair:** Did you and your committee advise on the publication that the Scottish Government put out—their framework for decision making?

Dr Smith: The advisory group was providing advice throughout the period when that document was being developed. Many of the principles in it have their roots in some of the scientific advice coming from both this committee and other committees and UK advisory structures as well. The principles are to make sure that, first of all, we suppress transmission of the virus in order to begin the recovery period, which is really important.

Q274 **Chair:** It reflects your advice. Is there any material aspect in which it departs from advice you have given?

Dr Smith: In any of the discussions across the four nations between the CMOs, there has been a remarkable sense of agreement on the approaches we need to take from the scientific base. After all, the science is the science. Where perhaps we differ very subtly is in the unique differences between our countries and healthcare systems in how we make sure they are protected.

Q275 **Mark Logan:** Before I begin, I have a declaration. I am a shareholder in a residential care home in Northern Ireland.

Dr McBride, thank you for making time today. How does Northern Ireland manage co-ordination with both the rest of the UK, which you touched on earlier, and the Republic of Ireland?

Dr McBride: It is crucial that we do that, and it has been working extremely well. As Gregor, Frank and Chris have already mentioned, there is very close liaison with us as UK chief medical officers and respective public health departments across the United Kingdom. That is also the case in relation to my interface with my counterpart, Dr Tony Holohan, the chief medical officer of the Republic of Ireland, and between our Public Health Agency of Northern Ireland and the Health Service Executive in the Republic of Ireland. We have had five CMO calls that have included on at least three or four occasions Dr Tony Holohan in communication with ourselves, discussing issues such as how the virus is behaving and how the epidemic is evolving in different parts of these islands, and the approaches we are taking in the phases of our responses.

As Frank said, those communications and interactions have occurred not just at official level, including respective public health bodies and authorities, but at ministerial level. In early to mid-March, we had our first North South Ministerial Council meeting, which included the Taoiseach, the Tánaiste, our First Minister and Deputy First Minister and respective Health Ministers and officials. Since that time, we have had a series of teleconferences that have included respective Ministers from



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Northern Ireland, the Northern Ireland Office and the Republic of Ireland, discussing a wide range of issues. I have been able to attend and participate in those conversations.

The Republic of Ireland and ourselves in Northern Ireland have drawn up a memorandum of understanding that builds on the very long-established working arrangements that we have in place. It covers issues such as modelling and behavioural science and issues relating to research ethics. We take the learning and information that colleagues in England, Scotland, Wales and the Republic of Ireland have developed and shared with us, so that we can have a truly integrated and fully informed picture.

The interaction that colleagues have described within the UK is very productive. Similarly, the interface between myself and Dr Holohan and his officials and colleagues in the Republic, and across these islands more generally, is working extremely well, including at ministerial level.

Q276 Mark Logan: The memorandum of a few weeks ago is more about guidance as opposed to a kind of unified approach, as I understand it, across the Republic and Northern Ireland. For example, in recent press coverage in the Republic, the Government have talked about 2-metre distancing for people going out to exercise. Are there instances where, politics aside, you think that from an epidemiological point of view policy should be more consistent across the border?

Dr McBride: We as officials advise and Ministers decide, as was said in response to the earlier question from Carol Monaghan. As chief medical officers and chief scientific advisers, we provide advice to Ministers, and Ministers make decisions in their own jurisdictions. As Gregor said, the epidemic in individual countries and parts of the UK has behaved a little differently. Many factors may feed into that, including population density. It is important that Ministers in each jurisdiction make the decisions that are most appropriate to ensure that the appropriate measures are applied at the appropriate points in time, including any conversation in future about how we may step back from any of the measures.

We need to bear in mind that, while there may be some regional variation in public health on a scientific basis, public messaging is crucially important as well. We share a land border with the Republic of Ireland. As you know, many villages span the border. A third of the villages are in the Republic of Ireland and two thirds are in Northern Ireland. Those interfaces and the interfaces between Wales and England and between parts of England and Scotland are really important issues, which we will be approaching in a joined-up way. The long-established relationship we have as chief medical officers with the respective public health bodies in providing advice to Ministers will be helpful in that respect.

Chair: Thank you, Dr McBride. If we can keep answers as short as possible, we will get through lots of questions.

Q277 Stephen Crabb: Thank you, Dr Atherton, for everything you are doing at



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this time for the people of Wales. I would like to ask you about the importance of testing and tracing in the Welsh context and how it fits in with the wider UK approach to tackling coronavirus. It is not clear to me that there is a very clear plan for unrolling testing in Wales.

Today, the Welsh Government, unlike the Scottish Government, have chosen not to be part of the UK Government testing portal that went live. The Welsh Minister has dropped the testing targets in Wales. I hear that some of the health boards in Wales have not been fully sighted on the Deloitte roll-out of the regional testing centres. Can you give us a bit of an insight into how the policy on testing is being developed in Wales and who is calling the shots? Is there a UK-wide framework? Is it the Welsh Government? Is it Deloitte? Where is policy being made, and how is it being executed?

Dr Atherton: I will try to be brief. One of the structures we created in Wales was a technical advisory cell that was the equivalent of what Gregor described in Scotland. It was our attempt to take the scientific information from SAGE and translate it into the Welsh context.

One of the uses of that advisory cell was to look in detail at testing. Quite early on, it developed for the Welsh Government a testing policy, which we have been using consistently since then. That talked about the ramping up of our numbers and the increasing capacity we have been driving forward in Wales, which has been subject to a lot of discussion. More importantly, it talked about how we were going to use the testing.

It was very clear from early days that we had four main areas where we wanted to use testing. First, we wanted to make sure it was used for direct patient care, for testing patients who were presenting through the health system. Secondly, it was to look after the interests of health and care workers. Very early on we recognised that we needed to look after their health, so we turned a lot of our testing capacity to that use. The third area was always surveillance and getting a better understanding of how the virus was transmitting in the population and in sub-groups of the population, particularly hospitals and care homes. The fourth priority was to look after other key workers—police, fire and others—who were unable to work because they or their family members were unwell. That has been our approach throughout.

We were very fortunate in Wales in that, very early in the epidemic, we were able to develop testing capacity in the university hospitals of Wales because we have some very gifted and talented virologists working there. We got that up and running very quickly, and that is how we have been using our testing ever since.

Q278 **Stephen Crabb:** Were you consulted on the decision by the Welsh Government not to be part of the new testing portal launched today? Was that decision run past you?

Dr Atherton: We should distinguish between the sharing of science and understanding and the sharing of policy. Some of the areas, like that



portal, were not discussed in detail across the four nations. One of the issues we have had is to understand how practice is working across the different nations. Although broad strategy has been very clearly agreed and we have been discussing it through the four CMOs group and the senior clinicians group, there have been occasions when we would have liked to have in Wales a little earlier notification of some of the practical details. I sense that that would be one of them.

Having said that, we have our own approach to the testing of key workers, surveillance and some of the other issues we are involved with. There are some things we need to do distinctly in Wales, other things we need to do sometimes in a joined-up way across the four nations, and sometimes, because our border is with England, in England and Wales specifically.

Q279 **Chair:** On the point about being part of the portal or not, I think you were drawing a distinction between the operational aspects and the scientific ones. Would that be right? Do you confine your advice to the science, and do you regard the administration of the testing regime as something separate?

Dr Atherton: Understanding both is important to us and to our teams as we move forward. The CMO group tends to look at more strategic issues, but the clinicians group that meets and includes NHS England tends to look at it in more operational detail. Along with colleagues from Northern Ireland and Scotland, we became involved with the second group perhaps a little later in the epidemic, but we have found it absolutely invaluable in understanding some of the operational detail. In Wales, we often get information from that source, which then gives us lines to follow up across the border in England.

Q280 **Chair:** Are you a member of SAGE, Dr Atherton?

Dr Atherton: I am not personally a member. We have a representative in SAGE who is an observer. Our chief scientific officer for health, Dr Rob Orford, has been an observer in SAGE from the very early days. That is really helpful, because he chairs our technical advisory cell, which then translates SAGE advice into advice to me and to Welsh Ministers.

Q281 **Chair:** Does that provide a means for you to have visibility of what is being done at UK level simultaneously with England as well as Scotland and Northern Ireland?

Dr Atherton: A portal is a way of getting information across the four nations of the UK, and it is a very valuable route for information flows.

Q282 **Andrew Griffith:** I thank all the CMOs for joining us. I would like to take the opportunity of this unrivalled line-up to explore with each of you a little your experience of the process, in particular the scope limitations of your advice. Do you think, from your experience, that when you are advising Ministers or Administrations you are always sufficiently clear about the limitations of the datasets you are working with? For example,



do you cite a statistical confidence interval when you give predictions or scenarios? Do you feel that is always fully understood by Ministers and other advisers? Perhaps Professor Whitty and Dr Smith could respond initially.

Professor Whitty: Providing uncertainty around something, in the sense, as you put it, of the limits of the data, is a key part of trying to explain any kind of scientific information in any operational sense. One of the things you are trying to convey is both the central projection—this is where on average we think things will go—and the uncertainty around that, and, if there are formal confidence intervals, although you cannot have them in all settings, you ideally also provide confidence intervals. The reason why I am differentiating confidence intervals and uncertainty is that quite a lot of the key information and science is social science and qualitative science, and, for that, formal confidence intervals would not be the right thing to do, but certainly you need to be able to convey a level of certainty as part of any kind of scientific communication information.

Q283 **Andrew Griffith:** In the interests of moving around the panel a bit, perhaps Dr Smith could give us his experience.

Dr Smith: I agree wholeheartedly with Professor Whitty's view about the use of uncertainty and confidence intervals and the importance of not confusing the two. We have to acknowledge that, particularly in the early days, the science and knowledge about the virus was growing very rapidly. Much of the data we were using at that stage had great uncertainty about it, so a very strong feature of the conversations I had with my politicians was ensuring that they understood that. I am fortunate to work with politicians who are very comfortable with using data, and the explanations that were given at that early stage were very much taken on board.

Q284 **Andrew Griffith:** When we think about management, research into high-performing teams reveals that typically they have a very high range of cognitive diversity among their membership, and they deliberately seek out dissenting views. Could each of you give us an example of where that has been the case during the process of your giving advice on Covid-19?

Dr McBride: My audio-link broke up a bit then, but on the main thrust of the question, I think it is incumbent on all of us that we express to Ministers on matters of this importance the limitations of the advice we are providing. I am not sure whether that was the full question.

Q285 **Chair:** Let us turn to Professor Whitty. It was about dissent, disagreement and diversity of views being something that contributes to the process.

Professor Whitty: In a sense, there are two different sorts of diversity to think about, with multiple forms. There is diversity of experience and diversity of discipline. That is very important in this kind of area, where essentially you have to integrate multiple sciences with very different



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intellectual traditions. You have to remember that underneath the SAGE structure sit multiple other professional scientific advisory groups, and underneath that is a whole body of fantastic academic work.

There is a huge amount of dissent and a very large amount of debate. In a sense, the whole point of the system is to try to bring together dissenting views and views from very many disciplines to a central agreement and then, as you pointed out in your first question, to say to people that there is a range of opinion, where that is true. It is important to capture that range of opinion whether it is in a committee room or brought in from outside.

Q286 **Chair:** Have you always been able to give unified advice in the committee?

Professor Whitty: In this particular epidemic we have certainly been able to say, "This is a central projection." We have also had to say that there is quite a wide range around that. In particular, as Dr Smith said right at the beginning of his answer, this is an area where we were starting off with a completely new disease, so there was a very large degree of uncertainty at the beginning. Even on some of the basic quantitative numbers, we had very wide confidence intervals around things like mortality rates at the beginning. Those began to narrow, but there are still significant areas of science where we have considerable uncertainty, and some areas of science where we have to say that we simply do not know. We might want to come back to that later in the session because for some of the critical bits of information we still do not know the answer.

Q287 **Chair:** We'll do that. There is obvious uncertainty about something that is happening very quickly in real time, but in an advisory group to Government are there any material instances in which the committee felt it necessary to offer differing advice--in other words to present different opinions within the advisory group--or has everyone come to a consensus on what the advice should be, notwithstanding the uncertainty of the model?

Professor Whitty: It is not very useful to Ministers or other decision makers to say, "There are 16 opinions. Here are all 16. Make up your mind." Part of the process is to say in a unified way, "Here is the central view," and then, if there are either dissenting views or a range of uncertainty quantitatively around that, to convey it in a way that is comprehensible to the people who are listening so that they understand the certainty with which the advice is being proffered. If they do not, it is clearly going to lead to bad decision making.

Q288 **Chair:** In terms of that central view, has that in every material instance included your colleagues in all four nations of the United Kingdom?

Professor Whitty: There are two ways in which that happens. The science from which the central view is derived comes absolutely from all four nations, not through any deliberate engineering. For example, the



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chairs of different groups and the people who have particular expertise come from around the UK, unsurprisingly. As Dr Atherton was saying, representatives of all four nations are in the SAGE discussions. Whether people are called observers or not depends slightly on their technical expertise, but all will contribute. If there are views that would lead to significant divergence—for example, because the epidemiology is different—that needs to be captured as part of the decision making.

Q289 Chair: Dr Smith, going back to Andrew's question about diversity, you have heard Professor Whitty's and Dr McBride's answers.

Dr Smith: A very important feature of the development of our CMO Advisory Group is to get a range of diverse scientific opinion. That is why, when we set up the group, it was important for us to make sure that it had largely independent status from the mechanisms of the Scottish Government and took in a range of people we knew were willing to express a diverse range of opinions. Anyone who has been around the scientific community for any length of time knows that very often a wide range of opinions is expressed. It is the synthesis of those arguments that brings value in the advice we are then able to provide to Ministers so that they can apply their judgment to the decisions they make.

Q290 Pete Wishart: Thank you, Chair, for the very kind invitation to attend your proceedings today. You will know that the Government are not obliged to establish my Committee at this time, so this is the closest we will come to scrutiny in Scotland just now.

Can I ask the CMOs from the devolved nations whether they feel that the four-nation strategy and approach that has been adopted has allowed them the operational independence to respond to particular issues and trends in their own nation? As we start to think about coming out of lockdown, surely it would be practical for each of the four nations to determine its own approach, given that each nation is in a different place on the curve, and there is a disparity of severity across all the nations of the United Kingdom.

Dr Smith: One of the very important things all the way through has been to share the science so that we can develop advice for our respective Ministers to be able to develop policy that underpins that science. The science tends to be the science no matter which part of the United Kingdom you are in.

There will be different stages of the epidemic in the UK that each of the countries finds itself in, but there is value in making sure in the messaging to the public that the measures that have been applied are communicated consistently and that we see the right level of compliance from the public. Once you start to develop a mixed message to the public, there is always the risk that people will misunderstand it and will not know in one part of the country what they are supposed to be doing compared with another one, so messaging becomes very important. That is not to say that, when there is the need to apply a different type of



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measure because of the different stages, we should not undertake that, but we should be very confident that it is the right thing for that part of the country to do at that point in time.

In Scotland, we have had the benefit of the advisory group to give us additional advice to that which we receive from UK advisory structures. That has led to a slightly nuanced or different approach on occasion, when it was the right thing for Scotland. If that applies on the way into applying the measures, equally it applies on the way out of the measures. However, I emphasise that we needed good reasons, to make sure that it was absolutely necessary, because the needs of Scotland in those instances were very different from the rest of the UK.

Q291 **Chair:** There would need to be particular differences in the circumstances of Scotland.

Dr Smith: The differences in circumstances might be that the stage of the epidemic was so wildly different in Scotland from the rest of the country that there was a need to take a different approach. The alternative could be that the approach taken in other parts of the UK was so different that it would not be right for Scotland to do that at the time. Then we would apply the scientific evidence to the Scottish context through the structures we have developed here to make sure that we can give the right advice to our Ministers so that they can use their judgment in how we approach it.

Q292 **Chair:** Can I put those questions to Dr Atherton?

Dr Atherton: I come back to my point about broad agreement on overall strategy and operational independence. In Wales, we feel that we have the freedom to do that. After all, we run our own devolved and integrated health and social care system. I can mention several examples where the broad strategic agreement has translated into different approaches. We touched on one: the testing programme and our approach to managing the shielding of the most vulnerable individuals in society had a Welsh twist to it. We followed a slightly different process in Wales. Our arrangements for distributing personal protective equipment are slightly different in Wales from those of the other countries.

You are right to stress the exit from lockdown, and we are currently thinking about our approach to that. Our First Minister has been clear that we have seven tests in Wales that we will apply as to how and when we can start to lift measures. They relate very much to the five measures that have been announced by the Secretary of State in England. There is not a huge amount of difference in strategic terms, but there are some operational differences. We have that flexibility. It is important to us in Wales that we are able to tailor our response to the needs of the people of Wales.

Q293 **Chair:** Dr McBride?



Dr McBride: Health is devolved and Ministers will have ultimate discretion on the decisions made in respect of jurisdiction. The science is the science, as Gregor said, and there are important aspects as to how the local health and social care systems look and operate in the different jurisdictions, but as we move to step back from whatever measures are in place and in what order, I think there will be more in common than will be different.

Chair: I take it that for all of you there is no difference in the science between the nations, but there may be differences in the incidence or the stage of development of the pandemic and operational arrangements. That accounts for the differences.

Q294 **Pete Wishart:** I thank the witnesses for their very full answers. What surprises me a little bit is that, given that we all have our own health services, there has been a unified approach and next to no operational difference across the United Kingdom. That is starting to matter now as we think about leaving lockdown.

I was impressed by the First Minister's programme yesterday that started to talk about the processes involved. I am thinking about specifics such as schools in Scotland--for example, where holidays are different from the rest of the United Kingdom. Can Dr Smith help me on whether there would be a temptation just to fall into line, because it would seem to be the right thing to do, with what is happening in England and the rest of the United Kingdom because it is a bigger partner? If there is a sense that the nations of the United Kingdom are at different stages, would it not have to be agreed by every CMO before certain steps were taken about coming out of lockdown?

Dr Smith: I restate that being guided by the science becomes very important when there are differences in the approaches between the countries due to operational considerations. I have already stated that there may be some nuances in the different countries. Those will be taken into account. Not only is the scientific advice provided to politicians and Ministers important but the way the advice is interpreted in the context of the country becomes critical. I go back to the point that that is why we have the CMO Advisory Group in Scotland; it is able to take scientific evidence and apply it to the Scottish context and the unique considerations that we have in this country.

Q295 **Chair:** Professor Whitty, in your capacity as an adviser to the Government did SAGE give advice to the Government on the target of 100,000 tests a day?

Professor Whitty: SAGE did not give that specific target. SAGE and I have consistently said that one of the things we need is a greater capacity to test across the whole of the UK, and I am glad to say that is now happening. The aim to increase it is absolutely shared not just by SAGE but, to be clear, by all public health bodies or Ministers. I do not think there is much difference there. The main questions on that were



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operational: how fast could the increase happen? The actual number was not specifically recommended by SAGE, but the general trend of it was. SAGE thinks there are quite a lot of things to be done with testing, and therefore increasing it is very important for several reasons.

Q296 Chair: Does SAGE have a view as to what the volume of testing should be? There is an obvious interaction between what is desirable and what is operationally possible, but how is that discussion reflected?

Professor Whitty: SAGE is developing a view at the moment about the maximum amount of antigen testing and antibody testing—those are different answers, on which I can expand, if you like—under a number of different scenarios. There is a base case that everybody agrees has to be done, which includes patients and allows critical workers to be tested; and it certainly includes greater testing within hospitals of people who currently do not have symptoms, for example those who might be coming in for elective things, and greater testing in care homes.

We are trying to get that basic number and build on top of it other things we could use in a number of different ways for the next stage of the epidemic, which will be a prolonged one. We are giving advice to all four nations, and the UK as a whole, about what we think broadly the numbers might end up looking like, if we could get to an optimal number, but we have not yet got to the point where we finally have a number.

Q297 Chair: Clearly, a lot of trust is being placed in science. We hear that from the witnesses today. All the Governments have made a clear commitment to be guided by the science. Science proceeds through openness and sometimes dispute, as we have heard already.

It seems to me very important that we should keep faith in the science that is informing decisions by Ministers. The evidence base on which SAGE has drawn when giving advice has been published. That is the scientific advice supporting the Government's response to Covid-19. The website containing it says that the page will be updated on a regular basis with the latest available evidence provided to SAGE. The latest evidence on the website was 16 March, about five weeks ago. In advance of this meeting, as you know, I wrote to you, Professor Whitty, and to Sir Patrick Vallance to ask whether that could be supplemented with the recent evidence so that we could understand it and ask questions about it. Is there any reason why five weeks from the last publication of evidence the papers on which advice has been given should not be available for scrutiny?

Professor Whitty: I will come back to a caveat on this, but in this particular crisis there is no reason in principle why evidence should not be available. It is probably worth saying a number of things. The first is a practical one, which as a distinguished former Cabinet member yourself you will appreciate: advice should be given to Ministers first, rather than a continual churn of stuff. That is probably not likely to change, but, as



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SAGE advice translates into ministerial advice, that advice to Ministers is incredibly fast, and I do not think that itself is much of a barrier.

There are also operational things. One practical thing is that the SAGE team is under huge pressure, and that feeds in. Finally, quite a lot of the things that come to SAGE are in a very early stage of development. In ordinary academic circumstances, you would not put them out until they had been peer reviewed and brought into final form and, in many cases, got through a publication process. That has also provided delay in certain circumstances. As a scientist, I think that is right. We need to get things in an incredibly timely way in SAGE. On the other hand, we do not wish to put into the public domain stuff that has not yet got to the point where it has been properly completed and, ideally, peer reviewed in the usual way for proper critique.

The letter from Sir Patrick Vallance made it clear that he was absolutely committed to publishing things on a regular cycle. If we can exceed that cycle, fine, but as always we try not to over-promise on these things. Absolutely everything will be on the website after this is over and, ideally, we will update it all the way along. I fully accept the general principle you are making, but we need to be realistic about the reasons why you will not get every single paper published the next day, for a combination of reasons.

I have one additional caveat. SAGE on this occasion is dealing with something that is a straight science-to-policy question. The last time there was a SAGE thing was the Novichok poisonings in Salisbury; at that point I was interim chief Government scientific adviser and I chaired it. There was absolutely no way we were going to put those documents into the public domain, nor will we. I have also been involved previously in SAGE meetings where some of the information was at a classified level and some was not. There will be a mixture.

The point about that is that, wherever possible, we absolutely should be putting out the data and trying to give the underlying workings, which was something Sir Patrick made clear in his correspondence with you, but we have to be realistic about those practical things. If you ask the average academic how long it takes between the first draft of a paper and the one that is actually published after peer review, a month is a very short time.

Q298 **Chair:** Everyone would understand the reservations, in fact the impossibility, of publishing matters that have impacts on national security, but would it not be a source of concern if a paper that was not ready for publication and not fit to be put in the public domain was nevertheless used as a basis for important decisions?

Professor Whitty: This goes back to an important point you made earlier. One of the things you do with an early draft is place a greater degree of uncertainty around it than you would around the same thing when it had gone through peer review and was, in a sense, in its final



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form. Part of what you say is, "These people have been working through the night because this is a crisis. They have done a terrific job, but they are going to clean this up and go through peer review, and the published paper will probably end up looking slightly different from this one." Part of our job is to put that degree of uncertainty around something, so we can say either that we are really confident about it or that we are confident to a certain degree. That is part of the process. I suspect that people listening to this who are scientists or other academics will fully appreciate the point I am making.

Q299 **Chris Clarkson:** You have picked up the theme I was going to ask about, which is transparency in the medical and scientific advice. Dr Smith, do you think it is important that Scotland's Covid-19 Advisory Group publishes the membership of the group and its minutes?

Dr Smith: When the group was set up in Scotland by my predecessor, Dr Calderwood, the decision was taken to publish both the membership and the minutes, and that is probably consistent with the approach that I know we have taken in Government since I started working with the Scottish Government in 2012, so it does not seem unusual in that sense. It was right in the Scottish context for the Scottish group at that point in time. I do not think we should read anything more into it than that.

Q300 **Chris Clarkson:** Are you aware of any instances of lobbying or security issues as a result of the public being aware of the membership of that group?

Dr Smith: I have not been made aware of any instances such as that.

Q301 **Chris Clarkson:** My next question is to Professor Whitty. Are you content that the membership of SAGE still remains secret?

Professor Whitty: Remember that SAGE is a body that meets under quite a lot of different circumstances. Sir Patrick is chair of SAGE, and I am co-chair for the purposes of this. Neither of us has any problem in principle with the names being made public. Many people talk about their own work on SAGE perfectly legitimately. I am on SAGE; he is on SAGE. All of that is perfectly open.

We were given quite clear advice from the Centre for the Protection of National Infrastructure based on the fact that SAGE is a sub-committee of Cobra and meets in a range of circumstances, some of which are very much security related. This is not. The principle needed to be thought through quite carefully. There is absolutely no barrier from me or from Sir Patrick in principle.

The idea that it is a secret is rather strong. It is not published, but I suspect that most members are known one way or another, and all of the sub-committees are extremely open.

Q302 **Chris Clarkson:** I take your point about national security, and certainly there are situations in which the membership probably needs to be kept



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off the record, but in the current climate, when we have a national health emergency, do you not think it would be conducive to the free flow of information and would boost confidence in the advice coming out if people knew where it was coming from and who was involved in making those decisions?

Professor Whitty: I gave you a rather long version of the word “yes”, so I will now give you the short version. Yes.

Chris Clarkson: Thank you.

Professor Whitty: But we have to take advice when we are given it by serious bodies like the CPNI, but my view is yes and, to be clear, so is Sir Patrick’s.

Q303 **Chair:** As part of SAGE, is there consideration of some of the economic impacts of measures being taken?

Professor Whitty: If you mean does SAGE have a specific economic group, no, it does not. Do some of the things that are being done have economic consequences? Absolutely, yes, they do. There is a very legitimate question, which Sir Patrick might have a view on as well, on what format is best to bring together the science in the broadest sense, which includes medical sciences, epidemiology, behavioural sciences and so on, and the economics. Is it through the SAGE mechanism, or do you bring them together in a different mechanism? That is a very real example where it is being tested. I can lay out what I think are the strengths and weaknesses of either side, but it is not clearcut that it should definitely go one way or the other. Would it be useful for me to lay that out?

Q304 **Chair:** For example, is there an economist or are there several economists on SAGE at the moment?

Professor Whitty: No, because that is not part of the advice we are giving. Advice on economics is absolutely going to Government, but it is not coming from SAGE. SAGE is providing certain bits of the evidence. To row back on that, there is one excellent economist from the Treasury, but the SAGE advice is not economic advice. She can feed in important insights, and because she comes from a different disciplinary and intellectual background that is very useful.

SAGE is not giving economic advice at the moment and it is not constituted to do so. If you were to try to turn it into a body that gave economic advice, it would need different membership for that bit of advice. With the current membership of SAGE, I and they would not feel comfortable about giving economic advice; it is not its current make-up.

Q305 **Chair:** Currently, SAGE is an advisory group on the medical and epidemiological aspects of the crisis.

Professor Whitty: It covers everything from immunology to behavioural sciences to epidemiology and modelling and clinical and public health. It



is doing a very wide range of things, but the bit it is not currently doing is the economic bit, and that is explicit. It is not that people do not think that is important; they do, but, if it is to be done, it has to be done really well. It would need a very different sub-group or membership. The question is: does that expand it into such a large group that it is almost impossible to do what it is currently doing, which already covers quite a wide waterfront?

Q306 Chair: We will turn to some of the non-pharmaceutical interventions and measures that have been taken, including the path to lifting some of the restrictions, but I think it is understood by everyone that the economic impact is not to be taken in isolation. It has an impact on public health and people's experience across the country. Are steps being taken, given that this is the phase of the pandemic in which we could at least anticipate needing to make those decisions? Is there work under way to convene a body that will be capable of giving advice, drawing on the strengths of UK experts in those disciplines?

Professor Whitty: Can I divide that into two questions? One of the things I have tried to say several times in public and will say again here is that, looking at just public health, this epidemic will have four forms of major negative impact narrowly on health. There are direct deaths from Covid with the NHS working well. There are indirect deaths because of the NHS becoming overwhelmed, which it has not been due to the fantastic work of the whole of the UK public, as well as the absolutely remarkable work of the NHS. The second risk was the emergency services becoming overwhelmed.

The third one is indirect deaths caused by downscaling other public health services—for example, elective surgery. We might want to come back to this. Health problems will probably come back when people have delayed things or stuff has not been picked up or dealt with earlier than it otherwise will now be. That is an indirect effect.

The final one, which is absolutely within the scope of SAGE, and we have looked at, is that we all know there is a gradient between health and deprivation. If as a result of economic downturns for prolonged periods deprivation increases, that will have a health effect. SAGE has looked explicitly at that specific bit because it is a key part of the health metric.

There is also advice coming to Ministers, the Cabinet Office, No. 10 and others that is very much on the economic side. It is constituted through a different mechanism. You could argue about whether the SAGE mechanism should be replicated on the economic side. I do not feel that I am the right person to answer that; I am not an economist, but it is an entirely legitimate question. I have seen quite a lot of that advice, but not all of it, and do not feel competent to do more than read it and understand it. That advice has to be integrated with the science—medical and all the other things—that comes through SAGE.

Q307 Chair: The Committee wants to be helpful in learning the lessons and



anticipating some of the next demands. Given the connections with the economy, we think that is important. My colleagues on the Committee are strongly supportive, as I think the public in general are, of steps taken being informed by the best scientific advice possible. However, in many respects it would help people's confidence if they could see, for example, the papers on which scientific advice was given, who the members of SAGE were--subject to any security concerns for individuals--and, referring to the Scottish example, published minutes. They would then know whether, when the Government maintained they were following scientific advice, their actions actually accorded with the advice that had been given.

The public's confidence in science will not be damaged by transparency. Keeping with the tradition in science of robust scrutiny and openness, to see whether tests and models can be replicated, is in keeping with our best traditions.

Professor Whitty: I agree.

Chair: I am grateful. We will perhaps reflect on how that can apply in the next stage.

Q308 **Graham Stringer:** I want to touch on the point you made Chair. Professor Whitty, is there not a point about transparency in that, quite legitimately, members of SAGE will have outside interests? They may be consultants for different pharmaceutical companies or have other business interests. Should we not have a right to know that that might affect their advice? It is standard procedure when people come before Select Committees or write academic papers.

Professor Whitty: First, within the SAGE process itself we certainly take account of conflicts of interest. In a sense, this is an important variant of the question the Chair has just asked. The Chair asked, and we in principle agree, that there should be openness on this. In this particular setting, which is not a national security emergency, there is not really a strong counter-argument from a scientific point of view, but we absolutely have to take advice. SAGE sits on top of multiple other committees that feed in, and there is a much larger academic effort behind that. In my view, there is no particular reason, in this setting, for secrecy about the SAGE mechanism per se. I accept that that potentially leads to the risk of lobbying and all those sorts of things, but openness in general should be the starting position and there has to be a strong argument against it, so in a sense I am agreeing.

Q309 **Graham Stringer:** When the policy moved from mitigation to suppression, this Committee was given a number of quite frightening figures about the number of people who might die from Covid-19. Were similar figures produced for the collateral damage that might be caused? You have just been through four causes of death through this crisis. Were equivalent figures looked at when that change of policy happened?



Professor Whitty: First, there is a need to clarify, because this is something that is repeatedly reported inaccurately in the media. What we are doing at the moment is, in a sense, the third stage of what we were trying to do: initially, to contain it, if it was containable; then delay; and, at a certain point, mitigate, meaning stopping the NHS being overwhelmed. A lot of what we are trying to do at the moment is that. People can call it suppression or mitigation. It is the same thing; it is stopping the NHS being overwhelmed. That is the policy we have and the policy we were always likely to have, because that is absolutely critical for reasons that are obvious to all your viewers.

This goes to the heart of many of the difficulties. One of the difficult decisions about timing, for example, is about when you should start to do these things. If you view the reduction of the Covid peak absolutely in isolation—assume it does absolutely no harm and that is all you have to do—you end up with a slightly different answer than if you said, “Let’s balance multiple different things in health across different areas.” We now have a much better understanding of what the potentials were, but our view was that for a short period the impacts of the secondary effects were broadly likely to be significantly smaller—that was relatively qualitative, not quantitative—than if we had not brought in the measures necessary to get the R, the force of transmission, below 1. Clearly, we needed to get the force of transmission below 1 or the NHS would have been overwhelmed.

Going to the next stage—the question you asked—trying to put some figures on how different things play out will be quite important. Some initial analysis has been done; it has not been fully completed, but we are absolutely looking at that question.

Q310 **Graham Stringer:** The question I actually asked was whether those figures were considered at the beginning of the process. We now have some of the figures for what is happening in the NHS and more generally. We know that, fortunately—obviously, everybody welcomes it—the intensive care units have not been overwhelmed, but the rest of the NHS has been underwhelmed, in a sense; 42% of NHS beds are empty at present. I had a meeting of Greater Manchester MPs this morning with the Mayor, and the number of referrals to consultants of people with suspected cancer has reduced by two thirds. One can go through all sorts of medical statistics like that. Was that looked at in the beginning in a statistical way in your approach to the main problem of Covid-19, and are you looking at it in detail now?

Professor Whitty: As for whether it was looked at in statistical terms beforehand, no, because we did not have data that we thought we could do that with, but we absolutely took the general point into account. There are two bits of it, one of which was measurable beforehand, and that was deliberately reducing elective care.

The other side, which has been clear in people’s behaviours but which I do not think was predictable beforehand—it was predictable in general



that it would happen, but not predictable in any quantitative way—was people’s responses on the emergency side. We are very worried about that, and I have made the point in press conferences for that reason, to say to people that what everybody has done, or the NHS has done, is to keep the emergency service running always with capacity, throughout this whole thing. That has been the critical thing, or one of the critical things, that has been achieved, as well as pulling down the total number of Covid deaths, yet when you look at it—we now have data—you see that things like emergency admissions, certainly in England and Scotland, because I do not have data from elsewhere, have gone down from just over 18,000 to a bit over 10,000.

There has been a 41% reduction in A&E attendance, and attendances for things that are not emergencies but are very urgent, such as two-week cancer waits, have also gone down. That is one of the things we need to be clear about: we have capacity for emergencies now, and we have had it all the way through, which is the achievement of the NHS and the whole population, but we need to think seriously about how to minimise the amount of time by which we deal with the urgent but not emergency stuff and make sure that it is moving back up to the appropriate levels. NHS England is working a lot on that, and we now have real data rather than guess data, which clearly makes it much easier to try to work out exactly what we are aiming for.

Q311 Chair: Can I pick up on something you said when you talked about the force of transmission, the R number? At a press conference a couple of days ago, you said that we could not allow R, the force of transmission, to go above 1 for any extended period at any point, and that that will determine what we do in terms of social distancing measures. How do you measure R?

Professor Whitty: Chair, I know that you know this, but for those who are not so used to it, R is a very simple concept. If R is 1, on average one person is giving this disease, or any other disease, to one person, and it is stable in the population. If R is 2, one person gives it to two people, who give it to four people, who give it to eight people. It is exponentially growing if it is anything above 1. If it is below 1, as it is now, due to the work that the whole population has done, it is falling away. Left to its own devices, if we did nothing, the R would naturally go above 1 again.

Q312 Chair: How do you measure it?

Professor Whitty: That was just so that people understand what it is. At the moment, we are measuring it relatively indirectly, through hospital admissions, ICU admissions and, although it is much more delayed, sadly, through people dying of the disease. What we are moving over to, and as of this weekend it is beginning to be ramped up, is a process that the ONS is doing, whereby they will test a random sample of the population across the UK—people who have volunteered.



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We will be sending out swabs, and people will send them back. We are going to do that repeatedly so that we can get information not just on the slightly delayed situation when people reach hospital, but much earlier, when people first exhibit symptoms, or indeed have the virus without any symptoms at all. The aim is that we have a much more accurate, direct and, importantly, earlier measure of R so that, if it starts creeping up towards or above 1, we know about it early and can take action.

Q313 Chair: That will be crucial if it is one of the tests that governs whether restrictions can be lifted. When will that new means of estimating without the time lag of hospital admissions be available? Will it be there in time to inform the decision in a few weeks' time?

Professor Whitty: As I said, ONS is contacting people today, from my knowledge. People will have things sent out over the weekend, as I am told, and we will start to get results from the first cut this week. That does not give you an R, but it gives you a, "This is where we are now." Then the repeated nature of looking at it over time means you can start to see whether the numbers are expanding, contracting or staying the same. In broad terms, if they are expanding, R is above 1; if they are contracting, it is below 1; and, if they are staying the same, it is 1.

Q314 Chair: When do you expect to publish the newly derived R figure?

Professor Whitty: As I said, we will not get data for this week, but the process has started. We can still derive R now, but it looks further back in time, and the direct measurement is a better measure of how to do it. As of next week, once we have actually started to get the repeats, data will be coming in, but as to exactly when the ONS and the public health people working with them will feel that the data is secure enough to publish, I do not have a date. I do not want to put a date in the public domain that is wrong, but I expect it to be up and running relatively soon, certainly in the next couple of weeks. Quite when the data will be secure enough to give a number, I do not want to commit to.

Q315 Jeremy Hunt: I have some questions for Professor Whitty. I start by thanking you for your brilliant work during this crisis. I was lucky enough to benefit from those insights when I was Health Secretary.

You said earlier that you had been pushing for an expansion in our testing capacity, and you also said that we could learn from Germany, which got ahead on testing early. Might that be one reason why their death rates are so much lower than us, France, Spain and Italy?

Professor Whitty: My view is that being able to test enables you to do multiple things that you cannot do otherwise, and there is absolutely no doubt that, operationally, Germany moved ahead of the UK and, indeed, most other countries, although not absolutely all.

Drawing a straight line between testing more and better outcomes is a lot harder, and I think people make it rather simplistic. Testing is simply a tool to allow you to do other things; it is the things you can do with the



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testing that help you. If you do a large amount of undirected testing, it will not particularly help at all.

Germany has done a great job in the way it has controlled this. When it started off doing well, I spoke to my German counterparts, because I spend my time, as I should, talking to counterparts around the world and finding out about their experience; for example, this morning I was talking to my counterparts in Italy. When I asked my German counterparts why they thought they were doing well, their short answer was, "I don't know." I suspect that testing is one component of that, because it has allowed them to do things that others have not been able to do. I fully accept that having the ability to test allows for a better response; absolutely, that is the reason for having it. But just to draw a straight line that says "Testing equals better outcomes" would not be correct.

Q316 Jeremy Hunt: On 5 March, Professor Whitty, you told the Health Committee that it was important not to lock down too early. Did you continue to advise that we should not be locking down right up until 24 March, when we did our national lockdown?

Professor Whitty: First, the answer is no. Secondly, people have the idea that there was a pre-lockdown stage and then there was lockdown, but, actually, multiple things happened in stages all the way through that month, as SAGE advised that different things were brought in, starting with the ones that had big impacts but almost no negative downsides.

People may laugh at things like washing hands, but actually they work a lot more effectively than many of the rather more draconian measures that people can think of. The first of those was individual isolation, followed by household isolation and shielding; then we were into strong recommendations about people working from home; and then on to closing schools, pubs and clubs, and so on, to final lockdown. There were various points along the way, each of which was advised by SAGE as the thing to do.

The difficult question was, first, what was the right combination of things to do and, secondly, what was the exact timing by which it should happen. I note that in the last week I and my colleagues have been berated by one set of professors in one newspaper for going too late and by another professor in another newspaper for doing too much too early. In reality, in due course we will have to go back and look over this and say exactly what is the best way to do it. We will have to do a post-action review and say exactly how we should do it. What we did was to have a phased, staged approach all the way through March, from quite early in March through to the final lockdown on 23 March.

Q317 Jeremy Hunt: The thing that I think is difficult to understand is that, at that point on 24 March, the analysis showed that the number of people with the disease was doubling every five days. If you had done that two weeks earlier, you would have potentially more than halved the number



of people who got the disease. What was the rationale for not going a bit earlier with the heavier measures, given what we saw come later?

Professor Whitty: I can give an incredibly long answer that will take the rest of this session, going through the discussions in SAGE. This is an area in which it is unbelievably easy to be facile, to be honest. I am not saying that you are doing that, but with some of the commentary in the press, you think, “Actually, have you thought this through?” To go back to a previous question about whether we had thought about the downsides of a lockdown too early, in narrow health terms, leaving aside everything else, getting it right between going too early and going too late was a very difficult judgment call.

This thing moved very fast. You talked about a doubling time of five days; actually, by the time it was moving quickly in the UK, it was shorter than that, so it moved quite quickly. The path that was followed was one that we were predicting; the speed of upswing was a bit faster than I would have predicted, if I had been asked on 5 March—not by a huge amount but enough to be appreciable. That is clear even from SAGE data already out there, and it will be from other data. The difference was one of relatively small degree in the window of time between early and late March. This will be gone over multiple times, but the end of the epidemic is the time to do it properly, in a technical and non-partisan way.

Q318 **Darren Jones:** My first question is a short one to Professor Whitty about lifting restrictions on a regional as opposed to a national level. I am a Bristol MP, and we have been blessed with lower infection and death rates compared with other parts of the country. What are the SAGE considerations on different approaches to lifting restrictions in different parts of the country?

Professor Whitty: Clearly, that is a critical question, and I am sure that my CMO colleagues will want to comment from the perspective of the other three nations.

It is fantastic that the south-west has had a less severe experience of this epidemic to date than other parts of the country, although it is still a bad one, and your point is absolutely correct on the epidemiology. But the thing to understand with this epidemic is that, first, the peak we are going through at the moment is an artificial one, almost the same everywhere, as a result of what people did in terms of starting with all the various measures that I was talking about with Mr Hunt in the last interchange, such as self-isolation.

Those things happened across the country at almost exactly the same time, so that peak is occurring at broadly the same time around the country. It is not exactly the same, but the difference is relatively small. But—this is the important “but”—to go from where we are now to an R of above 1, even if it is not a lot above 1 would put you in exponential growth again, and that is possible everywhere in the country. We are confident that the great majority of the population have not had Covid, in



your area and in every other area of the UK. Therefore, the ability for this to take off again in a really serious second wave, if we are not careful, is absolutely identical.

If you put those two together, the argument for strong regional variation in what we do is not terribly convincing. Whether there are arguments for milder regional variation is something that I sense is probably not for quite now. We cannot say with confidence, as for example you could have said in bits of China initially, after the Wuhan outbreak, or in bits of Italy, that there are different epidemics in different parts of the country. Our epidemic was much more similar across the country, so I think the arguments for a regional approach are less strong.

Q319 Darren Jones: Thank you for that. Do any of the CMOs from the other regions or nations want to take a different view on that, or is it a shared view?

Chair: Does everyone share Professor Whitty's view on that? I see nods, so I think that is assent.

Q320 Darren Jones: Professor Whitty, as we move into the next peak, when we start to lift restrictions at some point in future, presumably the availability of antibody and surveillance testing and the ability to contact-trace, whether by mobile app or human endeavours, is going to be extremely important. Could you give us an update on where we are on effective antibody testing, and your views on the effectiveness of mobile applications for tracing, either in their own right or in partnership with human tracing?

Professor Whitty: On the first one, serology testing is the antibody testing to tell whether someone has had the infection; again, I know that you know this, but I am saying it for any viewers who are not aware of it. The other test, which we were talking about earlier, is for people who have got it at the moment.

The first thing to say is that the antibody tests that were initially available were only moderate. Better ones are available now, but there are none that I would say are absolutely terrific in terms of antibody testing. What you want is something that can say with a high degree of accuracy that, if it is positive, you have definitely had it and, if it is negative, you have definitely not. That is the sensitivity and specificity of a test.

We are still with early tests, and very often with early tests there is a trade-off, so you have a high sensitivity with a lower specificity, and vice versa. The tests at the moment are not perfect, although they will undoubtedly get better, but they are good enough for us to be able to get a feel for how many people, or what proportion of the population, have actually had the infection, with a bit of aiming off. They are not, in my view, yet good enough to say at an individual level that you have definitely had it or you have definitely not. The first thing is that there is a certain amount of uncertainty about the tests.



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There are serology surveys going on in the UK and internationally. Both are important because, obviously, we learn from other countries. The first data are beginning to come back from those at the moment, but we are not yet at a point where I feel confident that I can say, give or take, "This is the proportion of the population in the UK who have had it." There is a big "but" to that, and it is one of the key things we need to know in looking back over time.

In a situation where, let us say, two thirds of the British population had had Covid, first, that would mean that the overall mortality rate from the infection was considerably lower than we currently think it is and, secondly, it might have implications for immunity across the population. My view at the moment—I would love to be proved wrong—is that it is unlikely that any part of the UK, maybe outside London, will have a seroprevalence much above 10%. I would expect, for example, the south-west to be lower than London, for the reasons you gave earlier. It is quite a small proportion of the population, but the only way of knowing that for sure is to look—it is absolutely critical to look—and I would be delighted if it was higher than that. It would be very good news.

Q321 Darren Jones: On the specificity question on the test, what is the accuracy of the current test that we have available and what is the gap between that and the accuracy that you would like to have?

Professor Whitty: There are a lot of tests now, and a lot are being developed in the academic sector; there are a number of dipsticks and a variety of things. I am generalising a bit but, in general, we have quite a lot of tests with pretty good specificity; they do not pick up false positives, but they miss quite a lot of true positives, based against people we know had it, because they were swabbed and, several weeks later, the test did not go positive. Most of them are not much more than 80% and quite a lot are a lot less than 80%. The danger is that, as people push up the sensitivity, the specificity may go down, so you start getting a lot of false positives. There is no doubt that that will improve, but we are not yet at the point where I would feel confident in basing my decisions as an individual on the tests we have. They are probably now good enough to say, broadly, "This is the percentage in the population."

On your other question, about the app, I am not an app expert. I understand contact tracing, however, which, done conventionally, is a very powerful tool of public health, and most useful when you have relatively small numbers, but it is unbelievably labour intensive to do, if you do it the old-fashioned way, with people contacting other people, ringing round and all those sorts of things. If we can get an app that takes a lot of the heavy lifting and does the contact tracing by means of proximity and a variety of other things, it would obviously widen our ability to do contact tracing. That is what some of our colleagues are trying to develop, but app development is a skill beyond my skillset.

Chair: The Committee will be taking evidence next week on precisely that subject with representatives from NHSX and other experts.



Q322 **Katherine Fletcher:** Professor Whitty, it is nice to see you back; I hope you are feeling better.

We have spoken very briefly in the past about data and the importance of different trends coming out in the data on this novel disease. I think Zarah is probably going to make a similar point; there are some really concerning reports in the press about BAME communities perhaps being differentially affected. Are there any datasets sub-nationally, nationally or even globally that allow us to look into people with different inherited immunotypes and understand whether they need different advice?

Professor Whitty: This is a really important question both for the general population and, I have to say—I feel this very strongly as a jobbing NHS person—among healthcare workers, where there has been a clear signal that a very high proportion who have, sadly, died were BAME colleagues. There is pretty clear evidence that there is over-representation, at least in certain areas, of people from BAME backgrounds in the number of people who get into severe difficulties with this disease. What is not clear is the reason. Is it because of directly ethnic genetic issues, if they have African or south Asian genetic heritage, for example? Is it because they might have comorbidities, or are there socioeconomic or other factors that explain it?

On the facts, there is no doubt that there is something we need to look at seriously and as fast as we can, but what we need is to know the causes. If we understand the causes, we can do something to improve the situation. There is ITU data, which we have looked at to get a first cut of this. I have asked Public Health England to look seriously at any datasets, because it is a major concern. In the National Institute for Health Research, we have put out a call for our academic colleagues also to look at it. People can look in different ways and triangulate and try to work out, not whether there is a problem but why—the key question—and whether it is because of ethnicity or because of something else that we need to be addressing. This is something we must get better at.

Q323 **Katherine Fletcher:** For confirmation, is data coming in through a number of different streams, including immunotypes, but also index of deprivation or levels of exposure depending on job type, and will SAGE be part of looking at those three different datasets to see whether there is a signal there?

Professor Whitty: Yes. In the first instance, the data needs to be brought together by academic and public health colleagues. SAGE is very interested in the output from that, but SAGE is the final path through to Ministers. First, we need to get the data right, with lots of people who are good at looking at data in different ways, including, as you say, genetic and other areas, and making sure that we get the data as tight as we can. The pattern in the UK will be different, inevitably, from that in other nations, because our ethnic mix is different, which is obviously a very good thing. One of the great things about the NHS is that it is one of the most multi-ethnic employers in the world, but we worry about the fact



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that colleagues from BAME backgrounds are, sadly, over-represented in people who have died from this terrible disease.

Katherine Fletcher: You gave us a briefing months ago and, broadly, architecturally, that strategy still holds true now. I know that it must have taken a lot of hard work to get from that point to this, so my thanks.

Chair: Thank you, Katherine. I am sure that the whole Committee joins you in that view.

Q324 **Zarah Sultana:** To follow up on Katherine's line of questioning, the Government have said that ethnicity will not be recorded on death certificates. Will that change in order for us to have the data that we need to see whether there are trends and what the causes are regarding BAME communities, which are disproportionately affected by Covid-19?

Professor Whitty: The question of what should be recorded on death certificates is a long-standing one, and it is unlikely that we will change it just for this particular reason. The point you make is whether we should record ethnicity much more systematically across a whole range of things—the other one we should be recording much more systematically is gender—so that when these kinds of questions arise we can address them much better. Basically, I am broadly in agreement with you that we need much better data on multiple sources. I do not want to make promises on death certificates, because it is not in my line of responsibility.

Q325 **Chair:** Can I ask the representatives of other nations whether it is the same practice in Scotland, Wales and Northern Ireland, and ethnicity is not recorded?

Dr Atherton: It is the same process in Wales. I endorse what Professor Whitty said; getting more information would be useful in general terms, and that is something that needs to be looked at in a broader context.

Q326 **Chair:** You share his view. Some of you are members of the scientific advisory group to Government. Data has been so central to the handling of this pandemic that not to have information on ethnicity, and indeed gender, seems a pretty basic gap. Given that we are scaling up lots of other things at pace, is that not something that could be done very quickly, so that we capture data on behalf of people who are, very sadly, losing their lives in this pandemic?

Dr Atherton: If your thesis is that it should be looked at, I would absolutely agree. More data is needed. We are trying to use science to drive our response to this unprecedented epidemic, and the more data we have, the better.

Q327 **Zarah Sultana:** Professor Whitty, on 22 April you said that, until a vaccine could be developed, we would have to rely on other socially disruptive measures for quite a long period of time. However, you have



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also previously said that, societally, long periods of social isolation are not a good thing. At the same time, the Government's chief scientific adviser has said that the development of a vaccine is not certain. What does it mean for the long-term management of the pandemic if a vaccine is not found?

Professor Whitty: That is a central question. To be clear, there is a vaccine, and the alternative route by which health science would naturally get us out of an infectious disease, is treatment. There are some diseases—HIV is the most obvious—for which we do not have a vaccine, but we have highly effective treatments. Obviously, we are trying to go down both paths. On vaccines specifically, until we have either a vaccine or a drug, we will have to rely on social measures, and, as we all know, these are really problematic, as everyone is seeing at the moment.

On vaccine probability, the first thing we do not know is whether you get natural immunity to this disease for a prolonged period of time. If we do not, it does not make a vaccine impossible, but it makes it much less likely, and we simply do not know that yet. There is a little bit of evidence that some people may have been re-infected, having had a previous infection, which is a slightly concerning situation. Certainly, with some other coronaviruses, immunity wanes relatively quickly. We need to be careful that we do not assume that we will have a vaccine for this disease, as we have, say, for measles, whereby once you have it you are protected for life. We may or we may not, but we need to be absolutely clear about it.

However, it is possible to use a vaccine in a number of different ways, and I am going to highlight two of them, because either could give us a route out of this. The first, which is the one everyone imagines when they hear about it, is a vaccine that stops you getting infected, which you give to the whole population, so you actually get population immunity. Incidentally, that is the only situation in which I would use the term "herd immunity" in a useful way, as a policy aim, because you vaccinate people and, therefore, people are protected and everyone around them is protected. It is the only situation in which I would use that term.

The second way is that you can have vaccines that are not capable of providing that level of immunity but provide enough protection so that people do not get severe disease. We might get a vaccine that is rather less effective but is sufficient, so that if we vaccinated everybody who is at high risk of catching it, such as healthcare workers, but, above all, those at high risk of dying from it—the elderly in particular and people with pre-existing health conditions—we might be able massively to reduce mortality, even if there was still natural infection.

We need to follow either of those paths, and there is an enormous international effort in which the UK is very much one of the leaders. As you will have read in newspapers this morning, there was the first vaccination of humans today in an Oxford group, but there are many other groups around the world looking at this to try to get a vaccine.



However, we cannot guarantee success. We look for vaccines for every infectious disease, but they are not found for all of them.

Q328 Zarah Sultana: A month ago in this Committee's evidence session on science advice to the Government, I asked Professor Sharon Peacock of Public Health England about Exercise Cygnus, a recent pandemic preparedness exercise. What lessons were learned from that or more recent preparedness exercises that we might not be aware of? How has it benefited our Covid response? Did it predict shortage of PPE and ventilators, and will the results of the exercise be published?

Professor Whitty: On the results being published, I do not know, because I am not involved in that side of it, but I was involved in the exercise and have absolutely read the report to learn from it. It might be worth asking the same question of Michael McBride from Northern Ireland, because he was actually a CMO then, which I was not at that stage, so he was very intimately involved.

The short version is that a lot of things were learned from that exercise, and the majority of them were to do with how the co-ordination of the response happened. One of its major recommendations, incidentally, was that the four UK CMOs had to work very closely together, which as you heard earlier is happening. There was a lot about a kind of command and control system, if we got to a major pandemic, and a lot about legislation.

There was a very strong push to draw up a kind of draft Bill so that it could get through Parliament. As you will all be aware, being parliamentarians, there was a Covid Bill, which was built very heavily on the Bill designed and heavily modified following that, as I understand it. A lot of it was about those kinds of operational command, control and, above all, co-ordination mechanisms.

I have not seen bits that were specifically about kit. There may have been bits that were not part of what I was doing, because it was a very large exercise that went on over two days, in multiple areas, but it was not the bit that I was involved in. It was about how you make sure that there is proper co-ordination across the system. Michael may know more about that, because he was the CMO during that period.

Q329 Chair: Dr McBride, would you like to comment on that?

Dr McBride: The learning was really around co-ordination and primarily around legislation and the aim for easements in legislative and statutory requirements. The Coronavirus Bill was quickly drawn up as a result of that. There were also issues around workforce and workforce shortages, and the ability, which we had on this occasion, rapidly to bring back retired staff right across health and social care. There were no specific issues, to my recollection, in relation to PPE, but there was an emphasis on the importance of surge planning. Again, you saw our ability to turn that on in our response to Covid-19. Much of that learning was taken forward and integrated in our response to this pandemic.



Q330 **Aaron Bell:** I have a couple of questions to Professor Whitty on the initial response, and then one on face masks. Professor Whitty, thank you for all you are doing.

On 2 March, SAGE concluded that sustained transmission was already happening in the UK. Are you able to put a date on the time you first advised the UK Government that it was highly likely that we would have the epidemic that we have had in the UK?

Professor Whitty: The short answer is no, just because to do that I would need to go through all my notes along the way. As I said, there will be an important time to go back over everything and try to do that, to give you a really accurate answer. I can give you a broad answer on how my thinking evolved over that time, very much informed by SAGE and by the wider community.

The very first point at which anybody outside China knew about this was on 31 December last year, when they notified the WHO. I had my first discussion about it with my deputy, Jonathan Van-Tam, on 2 January. We both agreed that it was something to watch. If you are interested in this area, there is something called ProMED, where you can look at emerging epidemics and potential infections that happen all around the world. This was a serious one to look at, but not one that we were confident would go forward at that point.

I put forward three tests on 5 January on things that would make us worry that it could go further. One was about whether healthcare workers started to be affected, because that is usually the first thing that you start to get with severe person-to-person transmission. We asked whether there was person-to-person transmission in family groups, and a wide geographical spread. My view was that, if any of those were met, we should worry. People know the history of that, and things moved on from there.

There was then a period when it was not really clear to anybody—a lot of people can claim to be wise after the event, but it was not clear to anybody—whether this was going to go down a route similar to what happened with SARS, another very different coronavirus. It was eventually controlled at a point when fewer than 1,000 people had died, but it got outside China originally; it spread to the near abroad and then to Canada, and there was a little bit of a wider spread than that, but it was then contained and has not been seen since. Was it going to emerge a bit like MERS, which, again, had some outbreaks outside its home territory, or was it going to behave, epidemiologically, not clinically, a bit more like a pandemic respiratory thing, of which the best known is influenza?

It was not clear at that early stage, so we had to start planning for both eventualities: a containment strategy and an “if this goes big” strategy. Broadly what happened was that, over the first several weeks, my view, and our view collectively, about whether it was a containable disease or



something that was simply going to spread around the world and, if it spread around the world, was going to come to the UK whatever we did, moved steadily further and further. It was not that one day we could contain it and the next day it was gone; it was a steady slope down. I kept people informed, and, as you know, the Government were in full action on it, in many different aspects, including, I have to say, briefing Members of Parliament by the end of January, within three weeks of all this starting. It then moved by degrees.

That is a broad answer. When we get to the point at which I can spend my time going through absolutely everything, which I want to do, because it is important, I can go through in microscopic detail exactly how we went through the various stages.

Q331 **Aaron Bell:** To follow on from that, and from the questioning from Graham Stringer and Jeremy Hunt earlier, you are right that far too much hindsight has been applied to your judgments at the time by a lot of people, and we recognise the uncertainty. The contemporaneous evidence that we took seemed to suggest that a real risk of going too early with the lockdown was that it would break down on the other end. You said yourself that you have been pleasantly surprised by quite how effective the lockdown has been and how well people have responded to it. With that hindsight yourself, would you potentially have gone earlier, with heavier measures?

Professor Whitty: I honestly think that there is a right time for me to try to go through that. The difference would be a matter of a relatively small number of days. People think that nothing happened until 23 March. Not true. A lot of things happened well in advance of 23 March; it was not the case that nothing happened till 23 March. It is a surprising false memory that people have.

The reasons for doing it were not just concerns that going too early meant that people might not be able to maintain it. The negative health effects, which Mr Stringer mentioned earlier, were obvious. As he points out, we did not have an exact quantification, but it was obvious that there were downsides to lockdowns of a significant sort. We have not talked about mental health, but there is loneliness and all those sorts of issues as well. The idea that it was a cost-free intervention is clearly false, purely in health terms, leaving aside societal, economic and other terms.

It was important, in all our views, and I do not think that anybody would dispute this, that we did not go too late or too early. The difference in what exactly is the right answer on that is quite narrow. Lots of people will debate it and come to different opinions, and it is important that we do that, because we need to learn from this. We need to learn from what happened in different countries, which, knowing what they knew then, took different decisions and took them in different ways.



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We need to learn from all that, and I absolutely agree with that, but at this point in time I do not look back and say, "I'm absolutely confident, if I knew then what I know now, that I would have done this differently." That analysis has to happen. I am not claiming it was exactly the right response; all I am claiming is that I do not think we should try to rush to judgment until we have looked at it quite seriously, including the downsides.

Above all, we need to realise that this is only the beginning of this epidemic. Many people may think that it is now over in every country, but every country in the world still has a serious future problem to deal with. Let's see how we all come out of it and learn from one another, hopefully in a way that minimises mortality everywhere, all around the world. It is going to be difficult for a long time. We are absolutely not in a situation where it would have been sorted if we had done something three days earlier, or even a week earlier, or that the whole thing would have been different. That is not a fully supportable proposition.

Aaron Bell: That is understood.

Q332 **Chair:** Track and trace was not part of the strategy; in fact, it was stood down. Was that because SAGE was advised that the capacity within Public Health England was not available practically to deploy it, when it convened at the end of January?

Professor Whitty: There are probably multiple reasons. I am trying to answer a short question in a very short period of time, but I am trying to avoid giving a rather simplistic answer to what is actually quite an important question.

In the first period, the reason why we were using case finding, isolation and all the things that go with it was that we thought there was a realistic prospect—diminishing, but still realistic—that it could be contained geographically and the disease would simply go away in the world. There would be big problems in China and maybe two other areas, but they would be got on top of locally. There would be spill-over, including to the UK, but we could pick up those cases.

My view was basically dichotomous: either this was something containable, in which case the UK would contain it, or it was uncontainable, in which case no country could contain it, including the UK. Initially, the policy was to see whether we could contain it. Every country in the world took different versions of that, but, broadly, that was what we were doing. Once it became clearly a global pandemic, recognised formally by the WHO, but clearly heading that way a bit before that, it was going to come in from multiple sources. A lot of it came into the UK from Italy, but it could have come from elsewhere; it was just the sequence of events.

At that point, a combination of where the epidemic was in the UK and Europe, and our own capacity, meant that in trying to do this, and



deploying all our resources in trying to do it, with the ratio of people who would be followed up, we could not say that, "Right, we're going to start off with where you come from geographically," was our starting point. We would have to do it on syndrome, with a very non-specific syndrome; most people who transmit this probably have quite small and minor symptoms. With smallpox or even Ebola, it is generally relatively easy to spot the people who are infectious. This is a very different sort of disease, moving at a phenomenal speed and doubling every three to four days at that stage.

My technical view, and our technical view collectively, was that it was not likely to add a huge amount at that particular point, given the resources we had. In a different situation, with huge, different resources—if you did a mental experiment in which we had infinite testing and infinite numbers of people trained to track the virus—we might have taken a different view. But in any emergency of any sort you deal with the tools you have and the situation you find yourself in.

That would be my answer, but to give a full answer would take a lot longer. It may have seemed a long answer to you, but that was the very short version.

Chair: It is clear, and no doubt we will come back to it in future.

Q333 **Aaron Bell:** All that you have said is understood, Professor Whitty. You have said that this is an epidemic that is going to go on into the future. On face masks, we have heard that the evidence is relatively weak, but we have also heard that SAGE considered it earlier this week, on 21 April. What is your latest assessment of the evidence on face masks and whether we might recommend their use by the population at large?

Professor Whitty: Very atypically, because I never like doing it, this is one I am going to body swerve, only because it has not yet gone properly to Ministers for them to consider. Absolutely, there is evidence we need to talk about, but we need to do it in the context of how Ministers have actually taken a view on it. The evidence did not suddenly turn from weak to incredibly strong, but it is a difficult area. As you have seen from different countries in the world, many countries have taken slightly different approaches.

Q334 **Chair:** Does that conform to what you just described about testing at that early stage? Is it a combination of the scientific advice on desirability and the availability?

Professor Whitty: The only area where availability is something that we would want absolutely to take into consideration is a bit of SAGE advice I am very happy to reveal, because it is pretty obvious and does not really need science. The area where face masks absolutely work is use by healthcare workers of medical grade masks in a healthcare setting. Every country in the world and the World Health Organisation says that, if using face masks in the general public threatens the ability of healthcare or



social care workers to get hold of medical grade face masks, it would be a public health own goal. That is an absolute. Everybody agrees to that extent.

I think that the debates around the world, given that that is true, are about what is now the best way to approach it. That is where I think that, although it is absolutely legitimate that people want to have that discussion in public, it is appropriate that Ministers have the advice and consider it before we go further.

Q335 Simon Hoare: Thank you, Chair, for inviting us to join your Committee this afternoon. These are probably questions for Dr McBride.

We talk about four nations but, of course, there are really five nations to consider. What have the challenges been of trying to work co-operatively with the Government of the Irish Republic? If there have been challenges, have they been resolved?

Dr McBride: I return to my answer to earlier questions. We have very strong, effective and professional working relationships between myself and my counterpart in the Republic of Ireland, and between the public health bodies in the Republic and Northern Ireland. My experience of the co-operation at ministerial level between the Taoiseach, the Tánaiste, Mr Harris, Mr Swann and the First Minister and Deputy First Minister in Northern Ireland has been very positive.

We had a North South Ministerial meeting back in early March, and there have been two subsequent ministerial conference calls, including the Secretary of State for Northern Ireland, and a further meeting and engagement is planned for, I think, Tuesday next week, in which I shall support Ministers. My experience has been that this is a very challenging environment for all of us, but the co-operation north, south, east and west has been exemplary.

Q336 Simon Hoare: We have had the debate about the opening of cemeteries. I know that Stormont is discussing that this afternoon, and we wait to see what it is going to say. Another issue of some concern has been the reuse of PPE. Minister Swann has not ruled out reuse of PPE, whereas the Northern Ireland Royal College of Nursing has come out against it, as I understand it. From a medical perspective, what risks do you associate with the reuse of PPE equipment?

Dr McBride: There are very limited circumstances, and only where the scientific evidence would support it, in which PPE should be reused. For instance, guidance globally, in other parts of the world, is looking at ways potentially of decontaminating and safely reusing respiratory masks—the FFP2 and FFP3 masks. As the Minister indicated, it would be only in circumstances where it is fully supported by the scientific evidence and when there has been full and complete engagement with the relevant professional bodies, including professional representative groups, trade union colleagues, and so on, so that they too are confident that the evidence supports it.



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We need to be clear, as in all of this, that it is important, particularly on an issue where we are asking our frontline health professionals to put themselves potentially in harm's way, that they have all the appropriate personal protective equipment that is required, and that conversations about how it is used and any potential reuse of it are fundamentally informed by the science. That is how it should be.

Q337 Chair: We are almost out of time. Perhaps I can finish with some quick questions directed at Professor Whitty. Professor Neil Ferguson, in evidence to the Committee some weeks ago, made an assessment that the number of fatalities that we would experience in the UK "would probably be unlikely to exceed about 20,000, with effectively a lockdown and an intense social distancing strategy." Very sadly, it seems that we might reach that level in these days. What is the latest estimate from the model as to the number of fatalities that the UK will experience?

Professor Whitty: I have two things to say on that. First, that number does not capture the indirect mortality that will happen as a result of this, nor necessarily does it capture all the mortality that may happen outside hospital. Because it is accurate but narrow, we are measuring hospital mortality. That is pretty accurate data, which we see presented, for example, at the daily press conferences. However, as I have said repeatedly at those, that is not the full thing.

The data that really matters, in my view, and I have said this repeatedly, is the all-cause, age-adjusted and seasonally adjusted mortality figure produced by the ONS. Some people will undoubtedly be missed who have Covid, and some people may well, on death certification, have been ascribed as having Covid when in fact they did not. Ultimately, what matters is that, whether it is direct or indirect, that is the number. I think the number will be higher than that, even in this first wave of the epidemic. That is the first point.

The second thing is that we have not finished with this epidemic by a long shot; we are just getting through the first wave. As a society, we are going to have a very careful think-through about how we are going to manage the next phases but, until we have got to the end of it, and basically until we have exited it, either through a vaccine, drugs or some other means, I would be very cautious about putting numbers on it. The possibility of further waves, if at some point the R escapes and goes above 1, is always with us, so I want to be very careful. For all countries, it should be all-cause mortality, age adjusted, and possibly seasonally adjusted, over the course of the epidemic, and we are not there yet.

Q338 Chair: Normally, in these things you expect to become more certain as you experience the path of a pandemic in other countries. From what you have said, when Professor Ferguson said that it would probably be unlikely to exceed about 20,000, you cannot be as explicit about that, for reasons you have been very clear about. Are we finding that the spread of this pandemic is confounding our expectations that we will become more and more certain about how to handle it, and that we are having to



rely on figures that become less certain?

Professor Whitty: When I reread the minutes from SAGE from January and early February, in preparation for this Committee, one of the things that struck me was that quite a lot of the early calls we got right, with wide uncertainties, but actually the central projection has remained surprisingly stable, although consequently it has come down. There remain some absolutely critical gaps in our knowledge, one of which we will get an answer to fairly soon, which is the background seroprevalence, and one of which we will not, which is how long immunity will last. That is an uncertainty.

In other very large areas of science, the amount of scientific effort around the world that is going into combating this is absolutely extraordinary, and I am very confident that we will know a lot more about it. Were I to have exactly the same set of questions from you in three months, I would probably give you a different set of answers, based on the fact that we understand more about the virus. I am very confident that we will understand things better, but the thing about modelling the first peak is that it does not tell us what is going to happen in the future. A lot of that depends on what happens with the social distancing measures and whether we can construct a package of those that is sustainable and keeps the R below 1, and to which people adhere. If the answer to all those is yes, we may well end up in a situation closer to what Professor Ferguson was talking about; if the answer to that is no, we are obviously in different territory.

Q339 **Chair:** Finally, on that point, a paper published by Imperial College on 30 March concluded that all social distancing measures had to be implemented to reach an R of around 1, which is a rather pessimistic reflection. Is it your view that some combination of measures, short of all of them, will be possible to maintain R below 1, or are we looking at a continuation of the regime in which we are at present?

Professor Whitty: This is clearly something that Ministers in all four nations are looking at really seriously at the moment, because it is a critical question. In broad terms, on the upper and lower bands, as I said the other day in a press conference, the top band is that we cannot allow R to go above 1 for any sustained period of time, and the lower band is that we are not going to eradicate this disease. It is with us; this is the future for us, and we need to work to operate alongside it.

The R that we have at the moment is somewhere between 0.5 and 1. Let's say, for the sake of argument, that it is in the middle of that range, which I think is likely. That gives a little bit of scope for manoeuvre, and taking some things off, while still keeping it below 1, but there are lots of ifs, buts and ands to that. On the one hand, I do not anticipate, as I hope I have repeatedly made reasonably clear, that we are suddenly going to be able to lift everything, but nor do I think it likely that we will have to keep in exactly the current pattern for the indefinite future. It is somewhere between the two, and working out exactly what that is, what



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the timescale is and what the package is going to be is a difficult task for Governments all around the world, certainly including the UK.

Chair: We are very grateful to you and your fellow witnesses. We have covered a lot of ground in the past two hours. Perhaps we should reflect back on the testimony of very good working relationships between the four nations of the United Kingdom, including the chief medical officers and, as you said, between your teams and your staff as well.

You have reflected that, while there may be differences between nations, that is not a reflection of differences in interpretation of the science; they are operational differences, and differences in the incidence of the pandemic in each country. We have talked about the importance of transparency and understanding the basis of the evidence on which SAGE is giving advice to Ministers. We talked about, as we reach the next stage of handling the pandemic, the importance of other disciplines, including economics, to inform the health decisions, as well as some of the other policies that will be required.

We have heard that there are steps in place to develop a measure of the crucial R number, on which easing some of the lockdown measures depends, and that will be deployed in the next few weeks. We have talked about the importance of tracing, and the crucial questions about understanding the incidence of the pandemic on people of different ethnicities and genders. We have talked about the importance of vaccine development and making sure that we have the capacity to manufacture and deploy that, when we develop it, very quickly. We have learned a little, and probably will learn more in due course, about the lessons of Exercise Cygnus. On the role of face masks, we expect an announcement in the days ahead, following the advice to Government.

It was very interesting to hear Professor Whitty's reflections on the initial response, taken under conditions of uncertainty, and to consider the next steps, which will also be difficult decisions, but it is evident from this hearing that they are informed by evidence and expertise from professionals right across the United Kingdom. We are very grateful to you for the work you are doing and very grateful to you for giving evidence to the Committee today.