Witness Name: Andrew David Curran
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UK COVID-19 INQUIRY

WITNESS STATEMENT OF ANDREW DAVID CURRAN

I, ANDREW DAVID CURRAN, will say as follows: -

1. I am providing this statement in response to the Rule 9 Request sent to me dated 4th March 2023 relating to Module 2 of the Inquiry, and have tried to address my statement to the questions and topics raised in the Rule 9 request, and the outline of scope for Module 2.

Background

2. I am an honorary professor at the University of Manchester where I co-Direct the Thomas Ashton Institute for Risk and Regulatory Research. I hold a BSc (Hons) and PhD. I am a Fellow of the Royal Society of Biology (FRSB), a Fellow of the Chartered Management Institute (FCMI), an Honorary Fellow of the Faculty of Occupational Medicine (Hon FFOM). I was awarded a CBE in the King's New Year Honours List 2023 for my contribution to public service.

3. I joined the Health and Safety Executive in 1991, and I have held a number of leadership and management roles including Deputy Chief Executive at the Health and Safety Laboratory (now known as HSE Science Division).

4. In March 2015 I took up post as HSE Chief Scientific Adviser (CSA) and Director of Research. Many Government departments have a CSA, and most are independent

academics who are appointed on a fixed term contract for 5 years, but my role is different and I often describe myself as "an "Operational CSA". I am on a permanent contract and therefore a Civil Servant bound by the Civil Service Code.

5. The HSE CSA core functions are ensuring the quality of HSE's science, that there is an evidence-based challenge of HSE's policies and procedures, and acting as head of profession for scientists and engineers within HSE and HSE Science Division.

6. In late 2022 I was also appointed as HSE's Director of Science, a role I undertake alongside being Chief Scientific Advisor. I am also the Deputy Head of the Government Science & Engineering Profession under the Government Chief Scientific Advisor (GCSA) who was at the time of COVID-19 Sir Patrick Vallance.

7. I am Chair of the Sheffield Group (the global network of national health and safety research organisations), a member of the Steering Group of PEROSH (the Partnership for European Research in Occupational Safety and Health).

8. Throughout my career I have focused on understanding exposure to harmful substances in workplaces and how to effectively manage those risks.

HSE

9. HSE is a UK Government agency, sponsored by the Department of Work and Pensions. It is Britain's national regulator for workplace health and safety and operates across England, Scotland and Wales. HSE enforces workplace health and safety in the workplace, mainly through the Health and Safety At Work Act 1974 ("HSWA"), although Local Authorities are the enforcing authority for some workplaces by virtue of the Health and Safety (Enforcing Authority) Regulations 1998.

10. HSE is a Category 2 Responder under the Civil Contingencies Act 2004 and has previously provided a witness statement in relation to module 1 explaining its role under that Act. What I say here is designed to give brief context for the rest of my statement.

11. Throughout the COVID-19 pandemic HSE retained its role as the enforcement body for health and safety in the workplace under HSWA, but was not an enforcing body for the Coronavirus Regulations. It is important to understand that this limited the scope of HSE's responsibilities during the pandemic. It meant HSE was concerned with ensuring employers took reasonably practical measures to mitigate the additional risks to health and safety arising from work activities during the pandemic. It did not mean HSE policed or regulated workplaces to ensure specific compliance with Covid Regulations. That enforcing role lay primarily with the police and local authorities.

12. It follows that there were broadly two parts to HSE's role during the pandemic. Firstly, to provide advice to Government and Government agencies on mitigating the risks created by Covid in the workplace. Secondly, to advise and support employers to ensure any additional risks from infection arising at work were reasonably mitigated. Where necessary this could include taking enforcement actions under existing health and safety legislation.

13. So, HSE's role during the pandemic included the following:

i. advising on PPE (personal protective equipment) and RPE (respiratory protective equipment)
ii. being the approval body for biocides
iii. granting easements to allow PPE and RPE that provided appropriate protection but had not undergone full conformity assessment to be used in health care settings for Covid purposes
iv. supporting Public Health England and Scotland and Wales in the review of guidance for workers, including general infection prevention and control, and secondary care,
v. working with other Government Departments and the devolved areas on social distancing and establishing a social distancing concerns and advice team which dealt with a large number of queries relating to COVID-19.
vi. Advising businesses, undertaking 'spot checks' of business to ensure they were "COVID Secure," and using its existing enforcement powers where necessary

14. As part of its advisory work, HSE, including HSE Science Division, developed and

reviewed HSE and central Government guidance on PPE use for healthcare and returning to work; developed and reviewed HSE and Government guidance on returning to COVID-19-secure workplaces; including working with BEIS and the Cabinet office on the plans for the return to work after the first lockdown, conducted research on decontamination of and reuse of PPE; and conducted work on understanding COVID-19 transmission.

15. HSE was also involved in a number of discussions within Government and its advisors about NPI (non-pharmaceutical interventions). It provided an advisory role on evidence, as opposed to what policy decisions should be made, in relation to the national lockdowns, local and regional restrictions, circuit breakers and working from home. HSE had involvement in the discussions on the use of face coverings, although its advisory role in relation to these was focussed on the distinction between face coverings, RPE and PPE, and the provision of advice to businesses and workers.

16. In terms of my personal involvement, I assisted HSE with the work outlined above where appropriate (particularly in relation to PPE), and I was also involved in other pandemic-related work which I describe below. In relation to "core political and administrative decisions" as described in the Outline of Scope for Module 2 of the Inquiry, I would not characterise my role, or HSE's role, as being a decision maker, and nor do I consider us to have been advising decision-makers on what decisions they should take. Rather, my focus was on considering and presenting scientific evidence to decision-makers, not directly but via SAGE (Scientific Advisory Group for Emergencies) and ensuring those decision makers understood what that evidence was showing so that their policy decisions could be informed by it.

17. I did not meet with the Prime Minister or give direct advice to him or other decision makers. I did however meet with Therese Coffey, who was Secretary of State at the Department for Work and Pensions (HSE's sponsoring department). Those were informal briefing sessions during which I would update her on the evidence and assist her understanding of the scientific / SAGE papers she had been provided with. Those meetings were not decision-making meetings and were not minuted.

18. Throughout this statement, I have used the term "COVID-19" when referring to the

pandemic, which is the disease which is caused by the virus SARS-Cov-2, which I refer to as "the virus".

SAGE (Scientific Advice to Government in Emergencies) and the establishment of SAGE EMG

19. During the pandemic, I was a participant at SAGE, which is the mechanism by which Government obtains independent scientific expertise and advice in response to an emergency.

20. I attended my first SAGE meeting regarding COVID-19 on 18th March 2020, although SAGE had begun meeting prior to that. The issue had been raised at CSA breakfast meetings since early January, and I had had some informal contact with GCSA and CMO prior to 18th March 2020.

21. SAGE had a number of COVID-19 sub-groups, but the only one I regularly attended was EMG (Environmental and Modelling Group). I was the co-chair of this group along with Professor Cath Noakes of Leeds University and latterly Professor Harry Rutter of the University of Bath.

22. SAGE EMG was established following the 25th SAGE meeting on 14th April 2020. I attended SAGE on that day to discuss a paper (published alongside the SAGE 25 papers) which I exhibit as [ADC/01 - INQ000189678] and which I had contributed to entitled *"Evidence of environmental dispersion for different mechanisms, and the risks and potential mitigations/measures of control within different environments from what we know about COVID19: A brief evidence summary for SAGE, 14 Apr 2020"*. This paper considered available evidence on different modes of transmission of COVID-19, and recommended that further work needed to be done to increase understanding.

23. At the meeting, Cath Noakes was tasked with setting up a group to consider environmental spread, and this became EMG. In summary, its role was to undertake work to increase understanding of how COVID-19 is transmitted from person to person, either directly or through intermediaries such as surface or the air, and consider mitigations to that transmission.

24. I was asked by GCSA to co-chair along with Cath Noakes. We then sought out people who would have the knowledge and expertise to assist us. Given the urgency, we did this by reaching out to people who we knew within the scientific community, and then the group grew over time as we utilised those contacts and existing scientific networks and existing literature to identify others with relevant experience. EMG held its first formal meeting on 21st April 2020.

25. My understanding of the need for EMG is that it was designed to increase understanding as to how the virus was transmitted, which was not the focus of work being done by existing groups. NERVTAG (The New and Emerging Respiratory Virus Threats Advisory Group) is a permanent body which advises the Government on the threat posed by new and emerging respiratory viruses, but their focus was on establishing the virus' properties, whilst SPI-M (Scientific Pandemic Influenza Group on Modelling) was responsible for conducting modelling work. EMG's role was to consider emerging evidence about the way in which the virus was transmitted, and to use this information to consider the effects of non-pharmaceutical interventions in reducing transmission.

26. Initially EMG held weekly meetings, which became more frequent if required. That was reduced to fortnightly from July 2020, and then monthly from April 2021.

27. There was also an EMG Transmission Sub-group set up in January 2021. This was set up to assist EMG in accessing data from PHE/UKHSA (UK Health Security Agency), and was chaired by Professor Paul Monks – Chief Scientific Adviser at BEIS (The Department for Business, Energy and Industrial Strategy) and then latterly co-chaired by Professor Isabel Oliver at Public Health England, who is now Chief Scientific Adviser at UKHSA (UK Health Security Agency).

EMG and Role as Chair

28. Professors Harry Rutter and Cath Noakes were academics and approached matters from that perspective, but my role and experience means that I came at the issue from a more practical perspective and my experience from science within Government, particularly in relation to the science/policy interface. These approaches complemented each other.

29. Both SAGE and EMG had a good interdisciplinary mix of expertise, which included behavioural, microbiological, risk assessment, public health, communications and ventilation experts, and we were able to bring in additional expertise where and when we needed it. This ensured we had the expertise to understand the virus, and the impact of the environment and human behaviour on transmission. It also meant that experts from different perspectives challenged each other – we approached the questions which were posed of us from different perspectives, and that often led to a healthy debate.

30. The pandemic presented challenges from a resourcing perspective because of the speed in which everyone was having to work. Everything had to be done at pace, and we were under pressure to provide advice in rapid time. We could not, for example, undertake a formal recruitment exercise, and instead had to approach people who we knew had expertise which was of use. EMG was a brand new entity set up in response to the pandemic. It was different, therefore, from SPI-M or NERVTAG, which were standing committees which could be built upon, but we broadly followed the COPSAC (Code of Practice for Scientific Advisory Committees) model and based our approach on that. This document is published online, but I exhibit the current version dated 14 December 2021 as [ADC/15 - INQ000224559].

31. I believe we did manage to secure the expertise we needed. Although EMG was comprised to a significant extent of individuals, especially academics, who were undertaking work on a voluntary basis, I do not believe this had an impact on our work. I believe latterly academic institutions were provided with some funding, but regardless, the people who worked with us were motivated, gave their time freely and flexibly and I am not aware that any of them faced challenge from their respective institutions. I believe they and their institutions saw this work as valuable and were happy to support it.

32. My role at HSE meant that I had access to technical resource – for example, I was able to access an expert on microbiology and cleaning / decontamination, an expert on Risk Assessment, and an expert on ventilation and they participated in EMG subgroups where needed. Obviously, not all the expertise came from within HSE, for example, Cath Noakes is a ventilation expert based at Leeds University.

33. I am also able to commission work by HSE's Workplace Health Expert Committee

(WHEC), a body established by HSE to provide independent advice on workplace health. In January 2021, a member of WHEC contacted me expressing concern about potential reliance on lateral flow testing in workplaces. I commissioned WHEC to produce a report considering the effectiveness of different testing approaches and their value in supporting risk management in the wide variety of work environments which need to be COVID-secure. WHEC did produce this report which has since been published on the HSE website, entitled *"SARS-CoV 2: testing and the workplace: Rapid review to 16th February 2021"* which I exhibit as [ADC/02 - INQ000189693] and I sent it to GCSA on 19th February 2021, who indicated it should be placed in the SAGE repository. It reached a number of conclusions, amongst which were that testing may play a part in reducing the risk of transmission, but must not be seen as an alternative to the fundamental controls of distancing, hygiene and ventilation, and therefore needed to be considered as part of an overall strategy for reducing the risk of disease transmission.

34. We were also able to draw on international expertise, and we would make contact with International Groups where we felt that would assist, for example, we held meetings with experts in New Zealand (a piece of work relating to quarantine hotels), Australia, USA and Republic of Ireland. We also drew on expertise from other International groups – for example PEROSH (Partnership for European Research in Occupational Safety and Health) and shared learning with them.

35. We also worked with NIOSH (The National Institute for Occupational Safety and Health) which is based in the USA, IOSH (The Institution of Occupational Safety and Health), and The Sheffield Group which is the international network of national institutes for occupational safety and health (OSH).

36. Members of EMG were constantly reviewing published papers from across the world, and sharing them with the group if they added to our understanding. This can be seen from the published EMG papers themselves, each of which lists the extensive evidence to which we had regard when writing the paper.

37. Virus transmission is a very small field of expertise, and for that reason, many of the people who worked with me on EMG also participated in the work on the National Core Studies programme. Whilst challenging, I do not recall there ever being an occasion where we were not able to respond to a commission as a result

of a lack of resource.

38. There was a healthy diversity of expertise, knowledge and opinion on EMG. Greater diversity of membership would have been desirable, but the difficulty was to recruit / find expertise at pace from a very small pool of technical experts, in which there is under-representation of vulnerable, marginalised or minority groups. We were also subject to time pressure meaning we had to draw on the existing and available expertise. In this respect, I believe the membership was as diverse as it could have been in the circumstances. Unfortunately, increased diversity in terms of EMG membership could only be achieved by increased diversity within the fields of expertise which is an issue beyond the pandemic response and its complexity means that it will take significant time to address.

39. It is impossible to avoid the possibility that that lack of diversity influenced us, because the experiences of those around the table may have influenced the work we did. However, EMG's role was to establish the evidence that existed in response to questions which were asked of us, and not to formulate policy. We considered the questions which were asked of us and sought to provide the best review of the evidence in answer to them. We tried to do this in a reasonable, fair and accurate way. We were not conscious of being disadvantaged for reasons of lack of diversity and our meetings often came with a high level of debate ensuring different viewpoints and perspectives were considered. Everything EMG produced was also debated at SAGE, which ensured further opportunity to consider diverse perspectives and the input of the ethnicity sub-group.

40. There were also a number of other Chief Scientific Advisers who sat on EMG – including Paul Monks (BEIS), Alan Penn (DLUHC), Gideon Henderson (DEFRA), Tom Rodden (DCMS), Phil Blythe / Sarah Sharples (Department for Transport). These people joined EMG over time at their request – they had seen that the work being done by EMG would help them do their own jobs by giving them access to experts conducting evidence review work, and therefore asked to become involved. This demonstrated that we could provide good, practical advice, and that meant people were seeking out our help and asking to work with us. As the pandemic progressed, joint working increased. I have set out examples of this joint working at paragraphs 44 to 47, and 86 of this statement.

41. I was also able to draw on HSE's staff to ensure EMG was sufficiently resourced from an administrative perspective. HSE voluntarily provided a secretariat function from inception until December 2021. In practice this meant we facilitated meetings, took minutes and circulated and provided action notes with attendee lists. That worked, and the use of HSE staff to do EMG work was convenient for me because it meant I could control the workload, but it was an option which was only available to me because of my role at HSE. In December 2021 we passed the secretariat function back to Go-Science.

42. We were also, in the main, able to access the data which we needed for our work. There were some initial problems getting epidemiological data out of PHE/UKHSA as a result of this being a new, rapidly evolving situation and that there was a need for lines of contact to be fully established, but this was resolved when the Transmission Subgroup was established by BEIS in December 2020. The group's function was to bring together data sources from across government and provide a standard route for information. In terms of EMG members sharing information, There was a shared repository put together by Go-Science but access was intermittent and given the volume of information, and speed at which we were working, members of EMG generally shared information via email, and I believe this was appropriate, because it enabled us to share information in quick time.

43. Likewise, it may have been easier if EMG had existed prior to the pandemic rather than having to establish itself from scratch. EMG now exists on a permanent basis within UKHSA, and I understand that the intention is that UKHSA will arrange for it to meet annually and continue to refresh the membership so that the group can be stood up again quickly when needed. This should also ensure that they have secretariat support from the outset. This may also help to address the lack of diversity as described above, because they will have more time to seek out a diverse membership and will not be having to recruit at pace, but the longer term issue of ensuring that this field of science has a diverse make-up is not an issue which can be solved by EMG.

Relationships with Government, SAGE and other groups

44. In my opinion, EMG had a good relationship with SAGE. Expectations were clear and when we presented papers in response to a commission there was good

discussion with SAGE members. The evidence was discussed, critically reviewed, and a way forward agreed to make the evidence available once any comments were addressed. There were also good relationships between the various SAGE subgroups.

45. There was effective cross-group working which developed over time – including the attendance of other Chief Scientific Advisers as described above. EMG was a new group and initially there may have been a lack of understanding of our role, but as that understanding developed, and as people came to realise that the nature of EMG's work meant that we were able to help other departments to understand the virus and in particular, the mitigations which could be used in different environments, the desire to work with us increased.

46. EMG had no formal contact with Government communications teams, either in No 10 or wider departments, however individual members may have contributed to initiatives. That was appropriate in my view and was what I would have expected in view of mine and EMG's role as a sub-group of SAGE. It reflected the fact that the GCSA and CMO (Chief Medical Officer for England, who at the time of the Pandemic was Professor Chris Whitty) were the contacts between SAGE (and its sub-groups) and Government.

47. EMG provided some input to the large events programme being run by DCMS in early 2021, attending DCMS briefings and being kept updated. In March 2021, we worked alongside SPI-M and SPI-B, and produced a paper (which has been published online) entitled *"Science framework for opening up group events"*. I exhibit this paper as [ADC/03 - INQ000189695]

48. I believe the papers produced by SAGE and EMG were an effective means of communicating complex scientific information to Government. The papers we produced would then be communicated by the GCSA / the CMO to cabinet or other interested parties. I did not attend these presentations.

49. I also consider that the teach-ins which I refer to below were a good way of disseminating messages. There was no formal feedback mechanism, but informal feedback was good, and the questions which were asked at those teach-ins were sensible, which suggested to me both that attendees had read material in advance

and understood the issues.

50. I had regular communication with other CSAs – those discussions also suggested to me that the messages were being understood, and I also met personally with Therese Coffey MP at her request to provide verbal briefings.

Advice and Commissioning

51. During the pandemic, EMG was commissioned to answer questions about what the evidence was showing, to enable policy makers to make decisions. EMG did not itself commission work.

52. When EMG was formed there was no formal commissioning process in place. We were faced with a rapidly developing situation and working practices quickly developed. My recollection is that during the pandemic, Government departments often approached SAGE directly, and then as EMG became more established, Government departments commissioned EMG directly.

53. In response to a commission, EMG would then produce a report or paper, which would be submitted via SAGE.

54. EMG provided significant amounts of feedback on how the commissioning process was working and what could be improved from EMG's perspective. I recall that in the spring of 2021 EMG, with assistance from HSE, produced a standard commissioning template and encouraged its use by those commissioning work. The table was not used universally but when it was it worked well, and the production of this template is a good example of EMG using its experience to improve the process. I exhibit the template as [ADC/16 - INQ000224549]

55. My recollection is that feedback from EMG regarding particular commissions was limited to matters of interpretation, both regarding the question posed and the answer given. EMG did not set the questions, but the commissioning process did enable us to seek clarification if the question appeared to be too narrow or based upon a misunderstanding and we frequently did this. Beyond clarifying questions or clearing up apparent misunderstandings as set out above, SAGE/EMG did not refine commissions so as to answer questions that had not been asked. The process of clarification though would sometimes result in the question changing,

and we could also decline to answer a question if we knew it would not be possible to answer it, or because we had already provided an answer.

56. I felt that we were always able to seek clarification or have a sensible discussion about questions we were being asked, whether or not they were formal commissions. A good example of this in practice was that I recall there being discussions about quantifying the risk of transmission associated with specific spaces, and the feasibility of them being reopened, according to the activity being undertaken in the space – for example, a gym. We were able to explain that this was not possible, because the risk posed was not due to the nature of activity taking place in a space, but on multiple factors, such as adequacy of ventilation, or the ability to introduce other mitigations such as distancing. While one gym may have been able to open with risk managed to an acceptable level because of mitigations, another with inadequate mitigations could not.

57. Likewise, when we submitted a report, we also answered recipients' questions to ensure they understood what it said. I felt EMG had the freedom and space to provide independent scientific advice free of interference from those who sought it. I did not feel that the commissioning process sought to dictate what advice we gave or the language we used.

58. Whilst we were keen to ensure that our advice was understood, what use decision makers made of it, or how it may have aligned with wider strategic aims was, as far as EMG was concerned, a matter for them as the decision-makers. In fact, EMG would not necessarily have known what the strategic aims were behind a commission.

59. As I recall, all members of EMG understood that our scientific advice was only one input to the decision making process and those charged with making decisions would, quite properly, weigh it along with advice from other disciplines in reaching what were obviously policy decisions. EMG members were not involved in decision-making, and therefore I cannot speak to what extent decision-makers took account of our advice during those discussions.

60. Whilst EMG did not seek to set the commissioning questions, I did speak at some of the Whitehall "teach-ins", organised by Go-Science / SAGE (for example, I

spoke about transmission during a teach-in on social distancing on 1st April 2021, emphasising the 3 routes and that transmission is a continuous risk). I exhibit the slides used at this teach-in as [ADC/04 - INQ000189698]. These slides are dated 1st April 2021. The teach-ins were lunchtime speaking sessions, delivered virtually, and open to attendees across Whitehall. These enabled us to increase understanding across Whitehall of aspects of the underlying science of the pandemic, including on matters where our advice had not been specifically sought.

61. It is the very nature of science that there is a range of opinions on any issue, not least a new emerging respiratory virus about which the evidence base was initially limited and then rapidly developing. My recollection from attendance at SAGE meetings is that we subjected the available literature to rigorous review and challenge and sought to reach a consensus. That does not mean that we tried to get to a point where everyone agreed, but rather a position that the majority could support. That position would take account of the uncertainty that was inherent in much of the science, and I think that this seeking of consensus was the most sensible and appropriate option. It would not have been possible or helpful to present decision makers with a variety of different views, but it can be seen within the papers produced that we also sought to communicate the level of confidence we had in each piece of advice depending on the strength of the evidence and level of agreement at that time – i.e. whether it was high, medium etc.

62. The Government CSA and Chief Medical Officer (CMO), as co-chairs of SAGE, would then communicate that consensus view to Government. I do not believe this process led to unnecessary delay.

Work of EMG

63. It is important to understand that SAGE / EMG's role was not to give advice on policy, proposed decisions, or make recommendations. Whilst we did at times comment on whether the evidence would support a particular measure being adopted (for example, school closures), I did not consider it to be our role to recommend the adoption of particular measures. Our role was to provide evidence and explanations of that evidence to enable the Government to make those decisions, and the primary means of us doing so was to submit papers via SAGE

in response to commissions as outlined above. These papers would then be finalised, and published online. There are also joint papers, for example with NERVTAG or SPI-M.

64. Whilst I would have seen all these papers before they were submitted to SAGE, my input into each paper varied depending on the subject matter. I would have authored some of them, commented on others, and some I may not have contributed at all. Where I did comment, this was often by commenting on a version which was uploaded to a server by one of the other EMG members.

65. EMG had a number of task and finish / working groups, and the 3 co-chairs would determine the need for these and which group would undertake each commission, generally led by a member of EMG. The groups would draw in additional expertise where necessary. For example, there were working groups on Risk Analysis and Transmission, Engineering Systems, Hospitals, Design and Behaviour, Singing & Instruments, and Theatre Ventilation, and there are papers which cover transmission in general, and also papers which are more focussed on particular sectors or environments – such as a paper on ground public transport in May 2020, and papers on Hospital Transmission Risks.

Three routes for transmission of Covid

66. A dominant theme which runs throughout the EMG papers is that there are 3 potential routes for transmission – namely airborne, contact, and person to person transmission. This was the case from the outset, including within the paper presented at SAGE on 14th April 2020 described above and exhibited as [ADC/01 - INQ000189678], which led to the establishment of EMG. To try and explain these routes, the below extract is taken from an EMG paper entitled *"Transmission of SARS-CoV-2 and Mitigating Measures - update, 4 June 2020"* which was considered at SAGE 40 on 4 June 2020 and which I exhibit as [ADC/05 - INQ000189684]:

- ***"Close-range direct person-to-person transmission** happens when someone is directly exposed to the respiratory droplets emitted by another person. These virus carrying droplets and aerosols can lead to virus entering the body through*

eyes, nasal membranes, oral mucosa, or the respiratory system. Close range transmission can also be through direct physical contact with the infectious person.

- ***Indirect surface contact transmission*** *happens when someone touches a surface that has been contaminated with the virus. They may then become infected when they touch their nose, eyes or mouth with a contaminated hand or object (fomite). Surfaces can be contaminated through the deposition of respiratory droplets and by people who are infectious touching surfaces with their hands.*
- ***Aerosol transmission*** *occurs when small virus containing respiratory droplets evaporate to less than 5 micron diameter particles (droplet nuclei) and are carried by the air, where they are subsequently inhaled. This may be released from respiratory actions (breathing, talking, coughing etc) as well as through aerosol generating procedures in a hospital or dental environment. These particles principally transit infection over short distances but potentially could transmit over longer distances (>2m too)."*

Evolution in the EMG advice to Government

67. EMG was, throughout the pandemic, assessing the emerging evidence to try to understand which of these routes of transmission were the most important, and what mitigation could be put in place in different environments to reduce transmission. Throughout the pandemic there was evidence coming in from a wide variety of sources, and we tried to be comprehensive in our assessment of that evidence, because often different studies would give different indications. If you select one particular article or study in isolation, it may give a misleading impression.

68. The underpinning principle of our work was assessment of risk resulting from the three routes of exposure for each activity under consideration followed by the application of the "hierarchy of control" to identify ways in which the identified risks could be controlled. This led to requests from other Government departments to run workshops to assist them in applying the same approach and joint working which I have described above.

69. Whilst airborne or aerosol transmission was recognised as one of the potential methods of transmission from the outset, and consideration of ventilation was also included in EMG papers from the outset, as the pandemic went on, the strength of evidence for airborne transmission became more persuasive, and this is reflected in the evidence which I gave at the Science and Technology Select Committee in October 2021. At that stage I was of the view that airborne transmission may be the most important route, but that the other routes remained important as well. I accepted that we could have focused more on airborne transmission at the start but that had been corrected. However, the EMG papers from the start consistently referred to airborne transmission as one of the routes and the need for risk assessment, and control measures to mitigate the risks from all 3 routes, including ventilation. It is important to note this was a dynamic situation with fresh research and analysis becoming available over time which could impact on the EMG advice.

Ventilation

70. As set out above, ventilation was being referenced in EMG papers from the outset. In September 2020, EMG received a specific commission from Cabinet Office asking us to address questions about the importance of ventilation as a mitigation measure, which I exhibit as [ADC/06 - INQ000189690]. In response, EMG produced a paper entitled *"EMG: Role of ventilation in controlling SARS-CoV-2 transmission"* on the importance of ventilation, and emphasising again the 3 routes for transmission. This paper, which I exhibit as [ADC/07 - INQ000189691] was discussed at SAGE 60 on 1st October 20202. The paper also refers to a document dated 4th May 2020 on ventilation. The full title of that document is *"Improving ventilation where it is practical to do so is an appropriate precautionary measure, especially in poorly ventilated areas"*. I exhibit it as [ADC/08 - INQ000189681]. This document had been provided to SAGE. It stressed that whilst the importance of airborne transmission had not yet been firmly established, there was some emerging evidence, and recommended improving ventilation where possible.

71. It is my recollection that the Government was making reference to the risk of transmission being lower outdoors from relatively early on in the pandemic, and then increasingly referred to the importance of ventilation as the evidence became clearer, but ventilation remained one control measure, and it remained important

to consider a range of control measures in different scenarios.

The 2 metre rule

72. The 2 metre social distancing rule was introduced in early 2020. I believe this was prior to my involvement with SAGE or to EMG being established, and therefore I did not advise on its introduction. EMG and SAGE did consider the rule during the course of the pandemic, and reference was made to it in our papers, where we considered its effectiveness in controlling transmission, and also made international comparisons.

73. For example, EMG gave fairly detailed consideration to the rule in our first paper entitled *"Environmental Influence on Transmission"* which was considered at SAGE 29 on 28th April 2020, under a heading "How effective is the 2m rule". It stated *"For most circumstances the 2m rule is simple and is a good measure of the distance where the direct person-to-person transmission risk drops significantly although should be seen as a ballpark guide to distancing rather than an absolute value"* and we recommended the rule be retained. I exhibit this paper as [ADC/09 - INQ000189680]. The date of this paper is 30th April 2020 as it was revised slightly after the meeting on 28th April.

74. The paper contains far more detailed considerations but the point which was being made was, in my view, correct. There was no "safe distance" beyond which transmission from person to person would not take place, and as such, any measure of social distancing in this context could be considered an arbitrary measure. The greater the distance, the lower the risk, although other factors would also play a part such as whether the contact was face to face or back to back. However, 2 metres provided a readily understood public health message which most people could follow in most contexts, and was a sensible risk mitigation measure in light of the evidence known at the time.

75. The two-metre rule was not, however, a complete solution and would always have needed to be one of a range of control measures in the context of a risk management approach. It also posed significant challenges in some settings, particularly workplaces, and is to be noted that the rule was modified in terms that provided for one metre distancing with additional mitigations where two metres was

not achievable.

76. In late May 2020, EMG was asked to consider whether the distance could safely be reduced to 1 metre. My understanding was that this was being considered within Central Government, and I was sent a summary which I understand Cabinet Office had compiled bringing together previous advice and analysis. I exhibit this as [ADC/10 - INQ000189683]. It is dated 23rd May 2020. In response, EMG produced the paper which I have exhibited as [ADC/05 - INQ000189684] above in June 2020 which again outlined the 3 routes of transmission, and considered the 2 metre rule in detail.

77. The paper included consideration of what measures were being adopted by other countries, and it can be seen from the SAGE and EMG papers that this is reflective of our approach throughout the pandemic, in that we considered all evidence available to us, including international studies and approaches

"Eat Out To Help Out"

78. I have no recollection of EMG receiving commissions about the "Eat Out To Help Out" scheme or being asked to advise on it, which is understandable as it was not EMG's role to comment on policy initiatives. EMG was a multidisciplinary group and therefore it is difficult for me to be definitive about what we would have said had we been asked. However, I think it is unlikely EMG would have agreed to provide advice on the scheme in its totality, because the science was only part of the picture, and policy decisions would also need to take into account other information such as economic impact. Had we been asked for advice on mitigating the risks within a restaurant or hospitality environment, then our advice would have been consistent with the advice we gave in relation to other settings – i.e. that transmission is a continuous risk, that there are 3 routes of transmission, and a risk assessment would be needed to establish what control measures should be implemented based on the specific situation to reduce the risk of transmission via each of those routes. I cannot comment on what impact the scheme itself had on transmission of the virus. To do that, I would need to undertake an academic exercise to consider the available data and information. That is not something I have done or been asked to do, and nor would I consider it part of my role or EMG's role. The EMG Transmission Group produced a paper considering transmission in

the hospitality, retail and leisure sector in April 2021 which was considered at SAGE 86 on 8th April 2021. I exhibit this report as published online with the SAGE 86 papers as [ADC/20 - INQ000224560]. This was about these sectors in general, and was not focused solely on hospitality. It does not specifically consider the Eat Out to Help Out scheme.

Public Health Messaging and Communications

79. As set out above, EMG's role was to advise Government on what the scientific evidence was showing. It was not to comment or advise on specific policy initiatives or communications campaigns. I do not have any formal communications training or expertise, so I do not feel able to comment in detail on the Government response or campaigns. The focus of EMG was on providing the scientific evidence to the Government rather than on the wording of communications or their effectiveness.

80. I have no recollection of contributing specifically to or advising on either the "Hands, Face Space", "Hands, Face, Space, Fresh Air", "Hands, Face, Space, Ventilate" or "Stop COVID-19 Hanging Around" campaigns, and therefore I would not be able to comment on whether these campaigns were effective or the strategy that sat behind them.

81. Personally, and from a scientific perspective, I do think that the "Hands, Face Space" message appeared to convey the key messages about the need for good hand hygiene, face coverings and social distancing. I am not aware that there was an intention to list them in order of priority but I was not part of the discussions. They were all important control measures, especially whilst we tried to establish what the developing evidence was showing us about routes of transmission.

82. As set out above, EMG was providing advice on what the evidence was showing about the importance of ventilation as a control measure throughout the pandemic, and its significance became clearer as the pandemic progressed. I consider it likely that this evidence would have been taken into account when decisions were being made about these campaigns, and I did see changes being made to messaging after we had delivered papers which reinforces that view, but I was not present when the campaigns were discussed.

"Following the science"

83. I am aware that the phrase "*following the science*" was utilised by Government ministers in some public statements. Personally, I might have chosen the phrase "*informed by the science*" instead, because the scientific evidence was only one factor among many in what I am sure would have been complex decision-making processes. The science can help to inform policy decisions, but it cannot, in isolation, determine those decisions, and it does not always point to a clear, unequivocal direction of travel in any event.

84. I recognise that I have no expertise in Government communications and do not know why the specific phrase "following the science" was chosen. For example, it may have been considered a stronger public health message that would contribute to greater compliance among the general public.

85. Regardless of why the phrase was chosen, I did not feel that it made scientists accountable for policy decisions that were taken. Throughout my involvement in the pandemic, I never felt my contribution as a scientist was influenced or constrained by actual or perceived policy goals on the part of Government and at all times I felt able to convey my view of the science as I understood it to be. I am satisfied that the uncertainties in the science were communicated by EMG and SAGE to the decision-makers in the ways described above. I cannot comment as to whether that uncertainty was conveyed by the Government to the public or even whether that would have been desirable – it is quite possible that many would simply have found that confusing or frightening.

Attendance / Involvement with Other Groups

86. Alongside my extensive work with SAGE and EMG, I participated in / attended other groups and attended a wide variety of meetings. This included:

a) Go-Science: I also liaised with Go-Science (the Government Office For Science) which is a team which supports The Government's Chief Scientific Advisor and brings together Chief Scientific Advisors from each department (including

myself). Go-Science is a permanent body which is home to SAGE secretariat.

b) I met as a network with other Chief Scientific Advisers from a variety of departments.

c) SPI-B: EMG also worked closely with SPI-B (Scientific Pandemic Insights Group on Behaviour) and produced some joint papers.

d) COVID-O: I also attended some COVID-O (COVID Operations Committee) meetings. These took one of two forms. One was with senior civil servants who made recommendations which then went to ministers / secretaries of state for sign off. The other type of meeting was attended by ministers / secretaries of state. I attended two or three of those and contributed on points of evidence.

e) Star Chambers: In addition to these committees, I also attended some Star Chambers for example, one on non-essential retail on 20th May 2020. The Star Chambers were convened by Cabinet Office in order to put a specific policy proposal to the test. The person proposing the policy would present it to the Star Chamber, and then the attendees (other policy officials, Chief Scientific Advisers, and sometimes external experts) would exercise a challenge function in relation to the policy.

f) Workshops: I also participated in workshops with different sectors, workshopping risk assessments and things they might need to consider to mitigate exposure to the virus via the three routes of exposure. I was often asked to act as a "challenge function," challenging policy makers to ensure they had thought about the issues and understood how to assess risk / give guidance on assessing risk. These included:

- A DCMS (Department for Culture, Media and Sport) workshop on elite sportsmen
- A number of Department for Transport workshops held with Senior Leaders from transport companies such as Transport for London.

g) I was invited to attend the DCMS Cultural Renewal taskforce organised by Oliver Dowden which was attended by senior people from different sectors of the arts. I was there in an advisory capacity to input on evidence when required.

87. I have given evidence before Select Committees in relation to COVID-19 on the following 3 occasions:

- The Science and Technology Committee on 22nd May 2020 alongside Professor Cath Noakes, following which I supplied some brief written evidence regarding HSE investigations under the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR) 2013 related to SARS-CoV-2 exposure in laboratory settings
- The Work and Pensions Committee on 17th March 2021 alongside colleagues from the Health and Safety Executive and Public Health England
- The Science and Technology Committee on 25th October 2021 alongside Professor Mario Mondelli from the University of Pavia, following which I supplied some brief written evidence on the process for updating HSE guidance regarding fomite transmission.

PROTECT National Core Study on Transmission

88. The National Core Studies Portfolio was set up by the GCSA. It was a portfolio of research made up of six programmes,, each of which aimed to address a specific evidence gap.

89. On 8th July 2020, I was asked by the GCSA to lead one of these National Core Studies with a focus on transmission of the virus, specifically The Transmission and Environment Programme subsequently known as "PROTECT". It concluded in March 2023 when the funding ended.

90. The aim of this programme was to provide an evidence generating capability for key stakeholders to access new knowledge about transmission of the SARS-CoV 2 virus by understanding 'real world' transmission in a rapid and responsive manner to inform policy and practice. In addition, the project aimed to deliver a legacy impact for future pandemics

The programme was based on the premise that transmission of SARS-CoV-2 is a consequence of the interaction between human behaviour, the characteristics of

the environment and the features of the virus, and the programme was designed to collect and synthesise data in these areas to understand the risk factors associated with transmission and to test approaches to reduce transmission through this understanding..

91. The Programme was divided into 6 Themes:
    - Theme 1 – outbreak investigations
    - Theme 2 – Transmission modelling
    - Theme 3 – Sector Specific Studies
    - Theme 4 – Tools and Methods
    - Theme 5 – Experimental Infection
    - Theme 6 – What works and Knowledge Synthesis

92. The "PROTECT" programme was a mix of small to medium sized projects, organised into the themes detailed above. The research was delivered by approximately 200 researchers across 20 different organisations. Teams would be tasked to conduct a piece of research with a deliverable output, which was most likely to be a report.

93. The "PROTECT" programme has delivered a vast number of reports, the majority of which have been published on the study's website, and some are still being finalised or awaiting publication in the peer reviewed press.

94. The Programme leadership team (known as the Delivery Management Board (DMB)) met weekly to review progress, consider emerging findings and identify potential end-users in the stakeholder community. We also ran technical seminars where researchers presented their findings to a wide community of invited participants, and monthly updates for the "PROTECT" research community. In addition, I met regularly with the leads of other National Core Studies, and the whole Portfolio was reviewed by an Oversight Group, chaired by Sir Patrick Vallance on a quarterly basis.

95. The emerging findings and evidence from the PROTECT study were fed up to policy makers in a number of ways – via the attendance of other Chief Scientific Advisers at update meetings, who would then use the information to inform their

approaches. In addition, the GCSA and CMO had access to emerging findings to support their activities.

96. One of PROTECT's main aims was to assist with preparedness and pre-planning for any future pandemic. Through our leadership of the PROTECT Study, we delivered a globally unique programme which significantly increased our understanding of how the virus is transmitted.

97. In my view, the science produced by PROTECT, and the other National Core Studies, has achieved its aim by contributing a body of evidence that will assist in the UK's state of preparedness for future management of pandemics. In addition to the knowledge generated, the programme also demonstrated the value of "Mission" driven programmes driving interdisciplinary benefits, and established links across the research ecosystem including PSREs, academic institutions and independent research organisations.

Inequalities

98. EMG's purpose was to establish the evidence around transmission and potential mitigations. Transmission is a continuous risk, and the 3 routes I describe above are the same for all individuals. However, each individual may be rendered more or less vulnerable due to their specific circumstances, such as their environment, or their behaviours. That is a question of consequence, not transmission.

99. All EMG papers went to SAGE, where they would be considered alongside other inputs – importantly, groups who did have a specific remit to consider inequalities, for example the ethnicity subgroup, and the children's task and finish group. SAGE discussed and published a number of papers regarding inequalities, for example SAGE 59 on 24th September 2020 (which I attended) considered specific papers regarding drivers of the higher COVID-19 incidence, morbidity and mortality among minority ethnic groups, and on the impact of public health communications to minority ethnic groups. I exhibit the minutes of SAGE 59 as [ADC/17 - **INQ000215660**. The topic of inequalities was also frequently discussed at SAGE meetings and referenced in other reports.

100. For those reasons, inequalities was not a formal thread or considered formally for every EMG agenda item, but it was something EMG considered, for example, when discussing face coverings, we carefully considered the impact for deaf people / those who rely on lip-reading – for example, this is referenced in the joint EMG-NERVTAG paper on face coverings considered at SAGE 57 on 17th September 2020 which I exhibit as [ADC/11 - INQ000189687]. I exhibit the minutes of SAGE 47 as [ADC/18 - **INQ000120558**].

101. I would like to highlight a significant piece of work relevant to inequalities, which is a cross organisational study which I worked on with Yvonne Doyle of PHE titled *"Risk factors Associated with Places of Enduring Prevalence and potential approaches to monitor changes in this local prevalence".* The study led to a report which was considered at SAGE 87 on 22nd April 2021. This was a study into geographic areas where the COVID-19 rate was slower to decrease than in other areas. In addition, additional work in this area was delivered through Theme 3 of the National Core Study on transmission ("PROTECT"). I exhibit the final published version of this report as [ADC/12 - INQ000189700].

102. We identified certain risk factors which may be associated with increased risk of transmission of the virus leading to enduring prevalence of the disease which included factors such as living in houses of multiple occupation / multi-generational housing, socio-economic status and occupational risk factors. This work also established the importance for some ethnic groups of messaging from locally recognised community leaders, as opposed to National politicians and scientists.

103. The impact of ethnicity was also a primary focus of discussion at SAGE 40 on 4th June 2020, identifying that there was an increased risk from COVID-19 to people from ethnic minority backgrounds, and that social science and biomedical work needed to be done urgently to better understand the risk factors related to ethnicity. This would be looking to establish whether there were genetic causes for the disparity or other causes such as occupational factors. This led to a number of actions, including one for PHE to lead, but involving HSE, on identifying strategies to mitigate ethnicity as a COVID-19 risk factor and identifying health outcomes associated with work. HSE did participate in this work, which led to the publication of a consensus statement entitled *"Mitigation of risks of COVID-19 in occupational settings with a focus on ethnic minority groups"* which was submitted to the SAGE

ethnicity subgroup in August 2020, and updated in March 2021. I exhibit the minutes of SAGE 40 as [ADC/19 - **INQ000120526**] and this report as [ADC/13 - INQ000189696].

Lessons Learned

104. SAGE EMG held discussions on 22nd May 2022 to reflect on what we had learned. There is a write up report from this meeting which was chaired by Paul Monks of BEIS which I exhibit as [ADC/14 - INQ000189702]. UKHSA has taken forward the actions from this meeting, including the establishment of EMG as an ongoing body outlined above.

105. There were a number of lessons identified, many of which were positive, identifying the significant contribution EMG's work had made, and the importance of the work on enduring prevalence. Some of the lessons identified (such as the need for a robust commissioning process from the outset) were in fact rectified during the course of the pandemic itself.

106. There were also identified areas for improvement, including that at times there was a need for increased clarity about expectations and responsibilities of individuals and groups to avoid blurring the line between scientific and operational advice, and that at times we may have benefitted from greater collaboration with other groups such as SPI-M and also from the inclusion of more working level public health professionals. My view is that this collaboration and inclusion of such professionals actually did increase as the pandemic went on.

107. There was also a discussion about the fact that communication of scientific advice was challenging. This was due to the changing and complex nature of the evidence base, which is always going to be challenging to explain to policy makers, who will then have to take into account other inputs before delivering a message to the public. Independent members of EMG did work with Government communications teams as outlined above to try and resolve some of these difficulties.

Operation of SAGE

108. The SAGE model was not designed for an ongoing crisis, and it could not follow the pattern I have experienced previously when called to attend SAGE – i.e. of being stood up and then stood down again very quickly, without significant paperwork being generated.

109. However, I believe SAGE adapted successfully to enable it to function, a good example being the creation of the various subcommittees. This was an effective way of enabling us to deal with the multiple challenges being presented by the pandemic, and widened the access to expertise in an effective way.

110. I also think that the way that EMG and SAGE functioned and fed into policy makers was appropriate. Policy makers will always want immediate answers, and scientists will always want to undertake as much research as possible. Aligning those competing needs is not straightforward, but I think that is what National Core Studies did so successfully.

Improvements to administration

111. There were difficulties in securing administrative support to assist with the management of papers and material, and that is something that could be improved for the future, as well as giving consideration to IT solutions which might assist with sharing and storage of material, with administrative support to facilitate. The establishment of EMG as an ongoing body as described above should hopefully improve those issues.

Statement of Truth

I believe that the facts stated in this witness statement are true. I understand that proceedings may be brought against anyone who makes, or causes to be made, a false statement in a document verified by a statement of truth without an honest belief of its truth.

Signed: 

Dated: 09/08/2023 _____