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UK COVID-19 INQUIRY

MODULE 2

FOURTH WITNESS STATEMENT OF PROFESSOR SIR CHRISTOPHER WHITTY

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I, PROFESSOR SIR CHRISTOPHER JOHN MACRAE WHITTY, will say as follows:

Section 1: Introduction

Overview

- 1.1. I am the current Chief Medical Officer (“CMO”) for England. This is the fourth witness statement that I have submitted to the UK COVID-19 Inquiry (“the Inquiry”) and is made in response to a draft Rule 9 request dated 21 April 2023, and subsequent follow-on questions dated 10 August 2023.
- 1.2. This witness statement should be read alongside the three witness statements that I have previously provided. These are the corporate statements made on behalf of the Office of the Chief Medical Officer (“OCMO”) for Module 1 (“Second Statement”) and Module 2 (“First Statement”) of the Inquiry, and my personal witness statement for Module 1 (“Third Statement”). I also contributed to the corporate witness statements made on behalf of the Department for Health and Social Care (“DHSC”) by Sir Christopher Wormald for both Modules 1 and 2.
- 1.3. This statement is necessarily lengthy as it responds to a request comprising some 490 questions, some of which in turn consisted of multiple sub questions. In making this statement, I have attempted to address these questions where I am the right person to do so. In respect of some of the requests made of me, other people are better placed than me to assist the Inquiry in its work. Where this is the case, or where I have no direct knowledge of the event or issue concerned, I have indicated so.
- 1.4. An important source which describes many of the technical aspects of the COVID-19 response is the Technical Report produced for our successors (**CJMW4/001 - INQ000203933**). This document was co-edited by myself (as lead editor) and the Government Chief Scientific Adviser (“GCSA”), alongside the other UK Chief Medical Officers (“CMOs”), lead Deputy CMOs (“DCMOs”), National Medical Director of NHS England and the Chief Executive of the UK Health Security Agency (“UKHSA”). The report also drew upon the contributions of many other distinguished authors. Unless necessary for the flow of logic, I have avoided repeating material which is available in those other documents.

Background before taking on the role of CMO

- 1.5. I have highlighted my qualifications in previous witness statements, but in response to the Inquiry's request that I lay out my qualifications prior to becoming CMO, I further summarise them below. I was a Professor of Public and International Health at the London School of Hygiene & Tropical Medicine ("LSHTM"), having had an academic career in the clinical epidemiology of infectious diseases. I was (and am) an NHS Consultant Physician in infectious diseases and tropical medicine at University College London Hospitals NHS Trust ("UCLH") and the Hospital for Tropical Diseases. Prior to my appointment as CMO, I was also on the regular rota for acute general medicine at UCLH. I hold a medical degree, a doctorate in science (DSc) in infectious diseases and a degree in physiological sciences, all from the University of Oxford. I have a masters in epidemiology from the University of London, an MBA and an LLM in medical law, and diplomas in economics and tropical medicine and hygiene. At the time I took up the role of CMO, I was a Fellow of the Royal College of Physicians, the Faculty of Public Health, the Academy of Medical Sciences, and an honorary Fellow of the Royal College of Paediatrics and Child Health and the Faculty of Pharmaceutical Medicine, among other learned bodies.

- 1.6. Prior to becoming CMO, I had held the posts of Chief Scientific Adviser ("CSA") at DHSC, interim Government Chief Scientific Adviser ("GCSA"), and CSA at the then Department for International Development ("DFID", now part of the Foreign Commonwealth and Development Office). These afforded me experience of how scientific advice is provided to Government, in particular during emergencies. My experience of emergencies has included the 2009 H1N1 influenza pandemic ("swine flu"), the Ebola epidemic in West Africa starting 2014 (where I took a leading role in the UK response to the epidemic overseas), the 2018 Novichok poisonings (where I chaired SAGE), the Zika epidemic (co-chaired SAGE), the HIV pandemic as a clinician as well as the 2015 Nepal earthquake and others. These roles included work on a number of infectious diseases in both adults and children by all the major transmission routes (respiratory, oral, vector-borne, touch, sexual/bloodborne). In addition, I had been the Director of the multi-disciplinary Malaria Centre at the LSHTM.

- 1.7. My roles have also included several senior positions in medical research. I was head (CEO) of the National Institute of Health Research ("NIHR"), the UK's leading government research funder for applied medical research, and had been director of the extensive DFID research programme. These roles equipped me with a good

understanding of how research can be set up and deployed rapidly. When I was not in Government, I had chaired the National Expert Panel on New and Emerging Infections (“NEPNEI”) and briefly the Advisory Committee on Dangerous Pathogens (“ACDP”). When in a Government role, I chaired the UK Vaccines Network (“UKVN”, both in and out of Government) and the UK Clinical Research Collaborative, among other bodies.

- 1.8. My own research has included clinical, epidemiological, public health, modelling, economic and anthropological studies along with clinical trials. I have worked as a clinician and researcher into infectious diseases in several low and middle income countries in Africa and Asia. I have worked with the World Health Organization (“WHO”), US Centers for Disease Control (“CDC”) and others, and worked closely with many non-governmental organisations (“NGOs”) responding to emergencies. I had some prior experience of the communication of medicine to the general public including in my role as Gresham Professor of Physic.

Section 2: Scientific Advice in Government

Senior Scientific Offices in Government

The Chief Medical Officer

- 2.1. The main responsibilities of the Chief Medical Officer for England are: i) to advise Ministers and senior officials in Government on clinical, public health or scientific issues; ii) leadership, but not management, of the public health profession; and iii) to contribute alongside others to the collective leadership of the medical profession. For the purpose of Module 2 of the Inquiry, it is the advisory aspect of my role which is of most importance.
- 2.2. It is the CMO’s role to advise Ministers and other officials when a senior clinical, public health or scientific opinion is needed. This often includes reflecting and summarising technical concepts in language accessible to an able lay person. If the advice does not require a clinical, public health or science qualification in order to give it, then it is usually better given by others - this includes for example economic, legal, diplomatic, operational or non-clinical policy advice. CMOs are independent in that they do not have to agree in public with government policy, but only when the issue is a clinical, public health or scientific one. CMOs have also always been expected to be involved in communicating to the general public during health emergencies.

- 2.3. There was no change to the formal role of the CMO during the pandemic. There was however inevitably a major shift in the practical application of that role. The CMO is the chief medical adviser to the whole UK Government, rather than to just DHSC; this distinction was important during COVID-19. Under normal circumstances, the CMO works closely with the Secretary of State and Ministers in DHSC (and its predecessors), but has less frequent interactions with other Ministers or Cabinet, and rarely engages with the Prime Minister directly. During the first two years of the pandemic, once its importance and impact had been recognised at the centre of Government, I worked very closely with the Prime Minister, key Cabinet Ministers, No 10 and the Cabinet Office. The responsibilities of the CMO as compared to those of Public Health England (“PHE”), UKHSA and the NHS had to be tested and defined during this time.
- 2.4. I also had to learn very rapidly how to communicate to the public in a way that was useful to the average listener as the level of public exposure was well in excess of what not just I, but any living CMO, had experienced. This learning curve in public communication was not without some errors by me, especially early in the pandemic (some of which I highlight below). I was asked by Ministers to brief the general public and give advice via the media, this took different forms including press conferences on background and live to camera as well as live and pre-recorded broadcast and print interviews. At my own discretion, I additionally gave more detailed information through public lectures (e.g. at Gresham College) or professional lectures and outlets (e.g. at the Royal College of Physicians or via the BMJ). I additionally engaged extensively with leaders of the public health, medical and scientific professions.

Chief Scientific Adviser to the Department of Health and Social Care

- 2.5. During the first two years of the pandemic, I was concurrently both CMO and CSA to DHSC/Head of NIHR. This arrangement had also been the case for my predecessor Professor Dame Sally Davies. It had been my intention to hand the CSA/NIHR role over once a proper open process could be undertaken; this was overtaken by COVID-19.
- 2.6. There were both advantages and disadvantages for the initial COVID-19 response of holding both roles simultaneously. The scientific advisory part of the CSA role was for COVID-19 the less important one, as there was extensive scientific input and challenge

coming into Government from SAGE and several expert scientific committees. The CEO NIHR part of the role was important.

- 2.7. In respect of the NIHR role, the advantages were that there was a single unified view of the strategy for COVID-19 research, and I was able to integrate the research strategy, tactical and operational elements with public health goals and NHS activities. I happen to have a background in infectious diseases, which was the overriding technical need of NIHR in the pandemic. This was not a given. My successor as CEO of NIHR, Professor Lucy Chappell, has a distinguished background in obstetric medicine. My predecessor, Dame Sally Davies, is a highly respected haematologist. Additionally, anyone coming into Government for the first time has a very steep learning curve even under ideal circumstances and I was by then experienced in this.
- 2.8. The obvious disadvantage of holding the CMO and CSA/Head of NIHR roles concurrently was that during COVID-19 both were very stretched. Doing both simultaneously meant that some things in NIHR had to be delegated that under normal circumstances I would have done myself. Fortunately, I had a very able and experienced director in Dr. Louise Wood CBE who took much of the load, but it was not ideal. On balance, in my opinion the advantages outweighed the disadvantages in this crisis, but there were some drawbacks and others might reasonably balance the benefits and disadvantages differently. It would however in practice have been extremely difficult to select by open competition and get up to speed a new CSA/Head of NIHR in the first year of the pandemic wherever the theoretical balance of benefit lay. My role as CMO became considerably easier once Professor Chappell took over the CSA/NIHR post.

The relationship between the Chief Medical Officer, Deputy Chief Medical Officers and Government Chief Scientific Adviser

- 2.9. The division of labour between myself, the DCMOs and the GCSA changed over the course of the first three months of the COVID-19 pandemic. It then became relatively stable. In the first three weeks of 2020, the majority of the day-to-day work on COVID-19 was undertaken by the DCMO for health protection (whose portfolio includes emergencies and infectious diseases) Professor Sir Jonathan Van-Tam. Throughout this time, he remained in close coordination with me.

- 2.10. As the probability that COVID-19 was going to become a major international threat increased, I progressively took the lead in communicating into the centre of Government; this is laid out in my First Statement at paragraphs 5.57 to 5.153, and so I will not repeat it here. Two key inflection points were when I requested on 20 January 2020 that SAGE first meet on 22 January 2020, and then when I informed the Prime Minister that a major pandemic with 100,000 to 300,000 deaths in the UK was now possible on 4 February. From that point on, my view was this was a major risk to the UK and SAGE advice, properly, became the principal official source of scientific advice to the Prime Minister, Cabinet and wider Government where that was practical.
- 2.11. Between the two main DCMOs and myself there was a loose division of labour, but all of us were capable of cross-covering as needed and tried to keep one another briefed on developments. Close working relationships between us were essential. I had ultimate responsibility for all areas and the DCMOs would check with me when there was a serious issue.
- 2.12. Sir Jonathan Van-Tam (often called JVT in communications) had an extensive history in vaccine development and respiratory infections, and he therefore took the lead in the vaccine work including that with the Joint Committee on Vaccination and Immunisation ("JCVI"), and the New and Emerging Respiratory Vaccines Threats Advisory Group ("NERVTAG") (which he had previously chaired). He was later joined in this work by Professor Thomas Waite, who has a background in infectious disease epidemiology, and who was therefore able to take on some of the responsibilities of Sir Jonathan.
- 2.13. Professor Dame Jenny Harries, although officially DCMO for health improvement (i.e. issues such as preventing heart disease and cancer), also had a long history of work in health emergencies and health protection, including in local authorities. She therefore took the lead in several technical areas such as shielding, schools and local authority work. Dr Aidan Fowler was principally working in NHS England in a senior patient safety role, but also had a DCMO position and took the lead in some of the work on testing. As an experienced surgeon, he understood surgical issues in a way we did not. Whilst he was less central than the other two as a DCMO (due to his major NHS role), he provided very useful advice which we used collectively.
- 2.14. Sir Jonathan, and Dame Jenny before she left to head up UKHSA, were however the main DCMOs with responsibility for COVID-19 and did most of the work in checking

- the technical aspects of regulations, guidance and advice from across Government. Given the speed of decision making, there were frequently time clashes between important meetings which were happening in parallel. In these cases, I usually covered meetings with the Prime Minister or Cabinet and SAGE meetings. For some major meetings with the Prime Minister or Secretary of State for Health and Social Care, I might be accompanied by one, or both, DCMOs.
- 2.15. The DCMOs covered the remaining meetings, usually with other Government departments beyond the Cabinet Office and No 10. The sheer volume of these departmental decision-making meetings and associated correspondence meant that it was usually not possible to have both myself and a DCMO in attendance. The DCMOs were therefore often in key meetings where I was not and vice versa, including meeting with the Secretary of State for Health and Social Care where there was a clash with a Prime Minister led meeting. This meant we had to ensure we pre-agreed our position on predictable major issues to ensure we did not accidentally give slightly different advice on the same issue in different meetings.
- 2.16. The DCMOs and I had considerable mutual trust in one another's judgement. This was also important when we were covering different press conferences; the public needed to hear a consistent message, sometimes delivered in different styles, but with the same key technical points. Sir Jonathan and Dame Jenny were fortunately both extremely experienced in both emergencies and infections, strong on the science, good and clear communicators, and exceptionally good to work with. I was very fortunate that both by background, training and temperament the GCSA and DCMOs in post during COVID-19 were excellent at working as a collective as well as individually even under great pressure. We relied on one another very heavily. We also relied on an exceptionally able Private Office.
- 2.17. As GCSA, Sir Patrick Vallance was the principal chair of SAGE. Given that the focus of this emergency was health however, I was co-chair and we agreed agendas and cleared Minutes together. The GCSA and I tried, as far as we could, to give identical technical advice. For the great majority of meetings with the Prime Minister, Cabinet and its sub-committees, and meetings with senior No 10 or Cabinet Office officials such as the Cabinet Secretary and the Prime Minister's Chief Adviser Dominic Cummings, we were both present. This had the advantage of allowing us to pick up any misunderstandings by those listening, reinforce key points and make clear that ours was a collective scientific view rather than a personal one. The same applied to

public statements; when the Prime Minister took a press conference both the GCSA and I were usually present.

- 2.18. I was, and in my view the UK was, very fortunate that Sir Patrick Vallance was GCSA during this pandemic. As a distinguished clinical pharmacologist and previous Professor of Medicine he had a really strong understanding of the medical as well as the scientific concepts. He was consistently exceptionally level headed and collegiate over the prolonged period of stress of the pandemic. It therefore made the CMO-GCSA interactions extremely easy at a technical and personal level. This was far from a given. As previous President, R&D at GlaxoSmithKline (GSK) he also had a deep understanding of industry that was essential, especially on vaccines. Sir Patrick and I also benefitted greatly from the advice of the CSA network across Government in addition to the scientific committee structure.

Sources of Scientific Advice in Government

Scientific Advisory Group for Emergencies (SAGE)

Rationale for SAGE

- 2.19. For the great majority of major decisions, SAGE remained the principal conduit by which scientific advice to Government was channelled. In doing so, it integrated research findings and opinions from various scientific advisory committees, including NERVTAG for clinical advice, SPI-M-O for modelling, SPI-B for behavioural science, and input from other bodies such as the ACDP, Royal Society, Academy of Medical Sciences and other Academies, advisory groups and committees. Several subject specific subcommittees were set up as needed including around shielding (the UK Clinical Panel for Shielding Patients) and school risks (Children's Task and Finish Working Group). The work of SAGE and its subgroups was informed by thousands of scientific inputs from many disciplines in the UK and internationally.
- 2.20. As co-chair of SAGE, I am likely to be biased in its favour. It is not however obvious to me what an alternative better mechanism for the provision of scientific advice would be. We were aware of the scientific advisory structures in other countries but the degree to which they were independent of Government, which confers both strengths and weaknesses, varied internationally.

- 2.21. The purpose of the SAGE mechanism is to provide a single integrated view of the science provided by multiple disciplines which takes account of the various competing schools of thought. This does not mean it can or should provide a consensus, except when consensus reflects the reality of scientific opinion. Rather, SAGE attempts to provide a central view of scientific understanding at that point in time, and where necessary indicates the spread of opinion or uncertainty around that central view. Without SAGE, or some similar mechanism, Ministers would be provided with multiple competing scientific opinions from which they would have to choose.
- 2.22. Inevitably, when the science is not yet settled (i.e. there is ongoing and significant movement in the central view) those who hold outlier opinions in either direction tend to be critical of the SAGE mechanism. In my opinion however, the more uncertain the science, the more important it is to have a collective integration of the breadth of scientific opinion to put before decision-makers. The alternative would be to have decision-makers confronted by widely varying (and often strongly held) scientific opinions, which might represent different ends of the spectrum of scientific views at that time.

SAGE Membership

- 2.23. The mechanics of SAGE and the process by which members are selected is best described by the SAGE secretariat which was, and is, based in GO-Science. Nevertheless, it is in my opinion uncontroversial to observe that over the course of the pandemic, the relative importance of different sciences to the pandemic response evolved. The balance of scientific input into SAGE therefore changed to reflect these needs.
- 2.24. The initial selection of participants in the first SAGE meetings was made by GO-Science, using people who had experience of epidemic modelling and other sciences in the context of previous emergencies such as Ebola. Although I did not make the selection, I thought they were a sensible initial group which was then augmented as the range of questions extended. I was more involved in decisions on some of the later additions to SAGE meetings as the pandemic progressed.
- 2.25. It is important to stress that SAGE does not have a membership other than the chair; the meeting brings together scientists relevant to the questions that are thought most important at that point in time. In the context of COVID-19, SAGE's membership could

therefore be adapted to the evolving policy need. This is to my mind an advantage of the SAGE system.

- 2.26. The right balance of expertise in SAGE in any given emergency is inevitably to some extent subjective. As with many advisory groups, the principal tension was between having a group small enough to have proper expert discussions, with sufficient time to challenge opinions, and having a large enough body so that it was representative of all the sciences needed to address the key questions at that point in the pandemic.
- 2.27. That being said, SAGE is not intended to be a wholly representative body; it is an ad hoc expert group of the best scientists who are willing and able to address particular questions, often at very short notice. There are major downsides to very large groups which include every possible representative group in the context of a need to provide highly technical information in a very short timeframe. If every possible scientific discipline, clinical expertise, representative group (including protected characteristics), geographical spread and other legitimate interest had been represented, SAGE would have been impossibly large (potentially running to hundreds of scientists). Political leaders needed to be reassured that not only had the best available scientific opinion fed into the technical advice they were being provided, but as importantly, that those scientists had been afforded the time to challenge each other's opinions and properly interrogate the science and data.
- 2.28. It is likely that the first SAGE groups were too narrow in their composition but, in my view, this was very quickly rectified by GO-Science. Given that SAGE meetings were usually very time constrained, and especially early in the pandemic often met just before major political decisions were taken, expanding the membership for any given meeting would have inevitably led to less opportunity for those present to challenge and debate the science, which is one of the essential purposes of SAGE. There is a clear tension between a smaller body which can get through the business and provide mutual challenge and a larger body which represents a wider range of expertise.
- 2.29. For similar reasons, getting the right balance of UK national and regional experience was not always straightforward. Particular areas of scientific excellence can be concentrated in certain geographical areas or even particular universities or departments. The GCSA and I tried to ensure proper involvement from all four nations of the United Kingdom. This became easier with time as it became clear who in the

academic community was getting involved in the COVID-19 response and had particular skills to contribute.

- 2.30. I am not aware of any situation where someone was excluded from SAGE because of concerns they would disagree with the group's output or discussions. Whilst only the SAGE secretariat could confirm that definitively, I would be very surprised if it were the case. The aim of SAGE was to have the best available scientists for any given question and to reflect the central position of the science at any point in time, not to advance a particular position. Legitimate outlier opinions often tended to dominate media discussions, but the job of SAGE was to provide a central view of the current science, alongside an indication of the spread, rather than give equal weight to every opinion, no matter how minor.
- 2.31. Given the speed of decision-making, SAGE had to be selective in the range of questions and disciplines covered at any given point in time. The aim was to provide focussed scientific advice in order to aid decision-making rather than to express and summarise the full range of interesting and outlier opinions on the subject. Different GCSAs might come to slightly different conclusions on the best balance. In my view, the GCSA and SAGE secretariat did their best to achieve a balance whilst avoiding the committee becoming unwieldy. Over the course of the pandemic the GCSA and I received representations from several disciplines that thought their one was not sufficiently well represented and we took these seriously. Sometimes these concerns were based on a misunderstanding of the skill sets of those around the table, which were in fact very wide. If I were rerunning the SAGE process, I might have increased the amount of anthropological expertise at some points (as distinct from behavioural science), as that was exceptionally useful during the West African Ebola epidemic, but the issues of having too many people round the table would have weighed on that decision.

SAGE subgroups

- 2.32. SAGE itself took account of multiple scientific inputs from various sources. The formal subgroups were particularly influential but were not the only source of information. These groups included (but were not limited to) SPI-M-O, SPI-B, the COVID-19 Clinical Information Network (CO-CIN), NERVTAG, the Environmental Modelling Group (EMG) and various ad hoc advisory groups including the Children's Task and Finish Working Group (TFC), the Hospital Onset COVID-19 Working Group (HOIC), the Ethnicity

Subgroup and the Social Care Working Group (SCWG). Other sources of information included the WHO, Academies such as the Royal Society and Academy of Medical Sciences, information coming from specialist agencies such as PHE and Porton Down, as well as the large volume of UK generated and international scientific literature.

- 2.33. The advantage of the subgroup system was that it allowed data and scientific opinion within a single discipline or related disciplines to be integrated before that input was itself fed into the central SAGE system. The disadvantage was principally one of time; this sequence of primary analysis followed by consideration and integration of the various scientific views on a particular topic by a subgroup, which in turn sent a summary to SAGE which SAGE then integrated with other scientific inputs, inevitably added a delay. Usually, this was measured in days, but it could on occasion be a little longer.
- 2.34. Whether this process was advantageous was a product of the benefits of more informed science versus the risks associated with the delay. If the integration of various scientific viewpoints within a particular field had not happened via the subgroups, then SAGE, which was largely an opportunity for the views of distinct scientific disciplines to be integrated, would have been significantly less expert in its advice to Government. It would however potentially have been slightly quicker in its outputs. In general, it is my view that the expertise provided by the subgroups exceeded the risks introduced by any delay. Therefore, my overall view is that the subgroups were very important to SAGE, providing a solid integrated scientific input to policy-making.

Commissioning of SAGE's work

- 2.35. SAGE was commissioned via a variety of different routes but two dominated. The Cabinet Office and Civil Contingencies Secretariat ("CCS") had a major role in directly commissioning the work of SAGE and its subgroups. They were however not the only commissioning bodies and the SAGE secretariat housed in GO-Science commissioned much of SAGE's output. The secretariat, alongside SAGE itself, also had an important role in commissioning work from the various subgroups. The SAGE Secretariat are best placed to explain how this worked in practice; I was not usually involved in commissioning except through SAGE.
- 2.36. That much of the commissioning was in practice internal (i.e. within GO-Science) reflected the fact that the next important scientific questions were often most obvious

to technical experts. The fact that multiple groups commissioned SAGE and its subgroups was not in itself unreasonable given the scale of the issues involved. There were however periods when too many different individuals and bodies were trying to commission SAGE and its subgroups leading to more questions than could reasonably be answered properly given the time and resource available. There was also a risk that commissioning was biased towards those who were most vocal in their requirements rather than those whose questions were most important for policy, or where science had the most to offer.

- 2.37. Trying to centralise this via secretariats in GO-Science and the Cabinet Office was important to making it manageable. SPI-M-O and SPI-B in particular were frequently commissioned directly rather than via SAGE. In retrospect, my view is that an early central clearinghouse for policy requests to SAGE and its subgroups with senior scientists and policymakers triaging the requests would have improved prioritisation. The question of whether the outputs from SAGE were what policymakers needed is best answered by them.

SAGE's operations during COVID-19

- 2.38. Arriving at the central scientific view from SAGE was not always straightforward. This was particularly so in the earlier stages of COVID-19 when much about the science was uncertain and the data were changing very rapidly. For some questions, subgroups such as SPI-M-O would come to a central view of their own which SAGE then endorsed (or not). For matters on which SAGE was asked to opine, the GCSA would sum up the meeting and attempt to summarise the points on which there was consensus, the points where there was a central view but some spread of opinion, and the areas where it was not possible to draw a solid conclusion. In my view, he did this with great skill and balance. On some issues there were strong differing opinions around the table and the aim was to provide an accurate reflection of the central view but also the spread of opinion. The GCSA and I then edited the minute to reflect as best we could our understanding of the central view which had been arrived at, as well as uncertainties. This was available for members to challenge if they felt the group's discussions had not been accurately captured.
- 2.39. The provision of advice to core decision-makers inevitably took slightly longer because of the SAGE system than if any individual (including me) had simply given our scientific opinion directly to policymakers. In my view however, as one of the scientists in

Government who would otherwise have been required to advise based solely on my own opinion of the science, the SAGE mechanism considerably strengthened and broadened the scientific advice and ensured decision-makers or the public received a better opinion. Neither the GCSA, the DCMOs nor I had the full range of expertise that was present in SAGE and its subgroups. Nor am I aware of any external scientist who could combine in one person all the relevant skills and expertise necessary to properly opine on the full breadth of science required by the COVID-19 response.

- 2.40. Outputs from SAGE and its subgroups were communicated officially to core decision-makers via one or both of two mechanisms: the official Minutes cleared by GCSA and me; or the GCSA and/or me providing a readout of a meeting in advance of formal minutes when there had not been time to clear them (and where necessary expanding on points in the minutes). Additionally, many officials sat in on SAGE, which allowed them to get an early understanding of the direction of travel and the degree of consensus or not in the room. These included officials from the Cabinet Office, No 10, devolved nations, HM Treasury and DHSC amongst others. The GCSA and I were however clear in the SAGE meetings that communication to the Prime Minister, Cabinet or Cabinet Office Briefing Rooms (“COBR”) members should be via the official route, not via observers. This was to avoid partial, or partially misunderstood, versions of SAGE outputs circulating in advance of the formal minutes or advice causing confusion. Especially early on in the COVID-19 pandemic, the advice of SAGE had very considerable weight. Ensuring accuracy of reporting of its conclusions was therefore in our view essential. On some occasions, where in good faith an official sitting in as an observer communicated their own version of events to Ministers in advance of the formal route, it resulted in problems and confusion.
- 2.41. I have been asked by the Inquiry whether I think the SAGE minutes were sufficiently detailed. Since I signed them off, by definition I did. There was a very strong premium towards speed of turnaround and circulation of Minutes and the longer they are the slower they are to produce. In general, additionally, the longer a document is the less likely it will be read by senior decision-makers who in an emergency have very little time. The aim of SAGE Minutes was not to record the entire conversation, which had in any case been attended by observers from across Government, but to bring out key points which in our view decision-makers wanted or needed to know, and to be accurate. They could then ask follow-up questions where they wanted greater detail. The underlying papers which provided the detail were also published from relatively early on in the pandemic and are available on an open repository.

- 2.42. The GCSA and I tried to communicate the range of opinion around the central SAGE conclusion, in particular in verbal briefings to the Prime Minister and other Ministers. As I have said above, the aim of SAGE is not to advance a particular argument, but to provide technical input into a complex political or policy decision. It was therefore important that senior decision-makers understood the uncertainties (within the time available). SAGE minutes sometimes gave a formal level of certainty rating (e.g. high confidence, low confidence) where we thought this was important. It was open to SAGE members had they requested it to have a dissenting opinion recorded, but more usually the aim was to record the fact that there was uncertainty.
- 2.43. In response to a question from the Inquiry, it is not my view that SAGE restricted itself to politically palatable options. At many points during the pandemic the great majority of SAGE advice was deeply unpalatable to political leaders who were in receipt of it (and they said as much). SAGE did however tend to restrict itself to things which we considered practical. Spending time discussing things which had no chance of being enacted was a poor use of limited time and resource.
- 2.44. Several policies which, once 'lockdown'¹ had been implemented, appeared practical if difficult and unpleasant, looked incredibly difficult to achieve in advance. In particular, draconian curbs on individual freedoms for prolonged periods and restrictions on large parts of the economy beyond those normally used in epidemics were quite difficult to contemplate as a measured response at a time when there were relatively few cases and deaths in Europe. This includes the period up to March 2020; as of 4 March 2020, the UK had only recorded 85 cases and no deaths (**CJMW4/002 - INQ000203876**). Whilst this could be considered a failure of imagination by a group of scientists who understood the nature of epidemics and their history, it was not for reasons of political expediency. Non-pharmaceutical interventions ("NPIs"), including ones which involve significant curbs on normal behaviours including quarantine, self-isolation, the closing of high risk professions such as hospitality or hairdressing and school closures have all been used for decades and in many cases centuries. They all have obvious

¹ It is important that I make clear at this stage that 'lockdown' is not the same as quarantine, or self-isolation, or closing specifically high risk sectors of the economy. As I will explain later in this statement, the latter are well established options in an epidemic or pandemic and ones that would always have been considered (and were considered) whatever the focus of the planning. A 'lockdown' which involves a stay-at-home order for the entire population and the complete closure of all non-essential social and economic activity, by law, for prolonged periods is very different. It was evident to me in following Module 1 of the Inquiry that this distinction was, in some cases, not fully appreciated or understood by observers or some of those who gave evidence to the Inquiry.

downsides but were considered a normal part of the range of options to be considered in response to an epidemic or pandemic, and were in the early stages of this pandemic. What was new was a complete closure of all non-essential social and economic activity, by law, for prolonged periods.

- 2.45. SAGE had a responsibility to provide scientific advice relevant to all areas of the UK. SAGE should be seen, and in my view largely was seen, as a UK wide technical resource. It only engaged on issues of national or regional difference where there was a strong technical (e.g. epidemiological) rather than political or operational reason to do so. Where they had technical capacity, the three devolved nations had local advisory scientific committees or groups able to take local conditions and data into account. As I understand it, these were informed by SAGE thinking, and seldom came to significantly different scientific conclusions on the major issues. Throughout the pandemic, SAGE came under very considerable scrutiny. This came from the press, Parliament, Ministers and individual scientists. Some distinguished scientists such as Professors Sunetra Gupta and Carl Hennegan, along with others who associated themselves with the Great Barrington Declaration, strongly expressed the view that SAGE was providing evidence that implied more action was needed than was necessary (**4 October 2020 - CJMW4/003 – INQ000203988**). Others equally eminent, particularly concentrated around the zero COVID thesis (many participating in independent SAGE), argued that SAGE should be providing greater evidence in support of more extreme and longer social interventions. It would therefore be misleading to imply that SAGE had no challenge or scrutiny. There is a legitimate question about whether that challenge occurred in real time, in the sense that sometimes the challenge would occur after a policy decision has been made rather than before it but given the necessary speed of decision-making to some extent this was inevitable.

Limitations of, and reflections on, SAGE

- 2.46. It is always possible to say that anybody providing advice at very high speed could be more transparent and accurate. This applies to SAGE as much as any other advice in an emergency.
- 2.47. In my view, SAGE's minutes should have been made public earlier than May 2020. This was also the view of the GCSA, as laid out to the Science and Technology

Committee of the House of Commons on 25 March 2020 and was in general an expression of the scientific opinion at the time (**CJMW4/004 - INQ000064520**). There are clear advantages in doing so for both public understanding and reasons of peer review.

- 2.48. As I understand it, the reason for the official advice that they should not be made public largely stemmed from the fact that SAGE began its life entirely as an input to COBR, where the norm is that Minutes are not published. Save for situations where SAGE Minutes cannot be published (e.g. on issues of national security), in my opinion publication of scientific advice should be the default.
- 2.49. SAGE Minutes were however widely circulated in Government from the outset. From relatively early in the pandemic, the deficit in the publication of the underlying papers for people outside Government to read and understand was remedied. I therefore consider the scientific advice as summarised by SAGE that was seen by Ministers to have been at least as transparent, and arguably more so, than for example the economic advice.
- 2.50. In principle I am in favour of the membership of SAGE being public in most emergencies, but in this case I do have some concerns. Members of SAGE received substantial abuse and hostility from a minority. In my case, I was advised by the Home Office that the threat was sufficiently high that I had to have police close protection for nine months. Others had threats made to their families. If by making names public individual scientists or their families are targeted, or the best available scientists feel unable to take the risk of advising Government, the benefits of transparency may be outweighed by the risks to personal safety (to the scientists involved and their families) and proper advice (to Government and wider society). I therefore think it is a very easy decision on publication of minutes to maximise transparency of advice, and a more complex one on publication of names. Clearly, public figures such as the CMO and GCSA will always be known.
- 2.51. I am more cautious about policy advice given within Government being published, at least contemporaneously. Ministers have a difficult job in which they need to take often hard decisions. If they can not only be criticised for the decision on its merits (legitimate) but also subject to a running commentary on the advice that has been taken and not taken by them it makes the job of Ministers harder still. Whilst the arguments for transparency have some force, they would in my view create a risk that

Ministers would in response either avoid getting advice from people who might give advice that could be used against them, or advisers would hedge their advice so that it would not cause friction in public. Neither would be conducive to good Government decisions. Ministers need to get a clear view where experienced officials disagree with their first instincts, but also remain able to take the final decision. The general assumption is that policy advice given to Ministers within Government is private. If a future CMO was specifically excluded from this assumption, I think it is entirely possible they would also be excluded from important decisions where their input would help decision making.

- 2.52. The SAGE mechanism only exists to provide advice on science. It does not consider other fields relevant to the Government's wider considerations including macroeconomic issues. Whilst there was some limited health economic input (microeconomic) into the formulation of advice by SAGE, health economics being a discipline that regularly feeds into public health advice, the major questions for the principal decision-makers were around the fiscal and macroeconomic impacts of the decisions taken and how to balance these against the public health implications.
- 2.53. SAGE did not have the expertise to consider these important technical areas, and it would have been wholly inappropriate for it to have attempted to do so. The assumption within Government was that this was all done within the Treasury and that external scrutiny of the sort SAGE was subject to was therefore not needed. A legitimate question is whether a SAGE-like mechanism for economic advice would have helped decision-makers. Economic advisers as well as independent scientists regularly challenged the scientific advice (entirely reasonably), but it was impossible to do so the other way round as the economic advice was not available for independent economists to critique in the same way. I do not have a view about what is best for political senior decision makers, but there was a major imbalance between the degree of external or indeed internal scrutiny given to scientific and economic technical inputs.
- 2.54. The Inquiry has asked whether I agree with the statement by the then Chancellor of the Exchequer, the Rt Hon Rishi Sunak, that scientists were 'inappropriately empowered'. If by this it was meant that there was too much scientific advice, and this was taken seriously by decision-makers, unsurprisingly I would not agree. If however what he meant, which is my understanding, is that he was concerned that the balance between scientific and other disciplines was wrong, I think that is a matter of legitimate judgement.

- 2.55. I would not wish to have had less scientific advice. I cannot see how this would have served to improve decision-making. It would however have been helpful to have had more, and more open and transparent, input from other disciplines, in particular economics. All the scientific advice was published, and the GCSA and I gave advice openly in Cabinet as well as in private to the Prime Minister. We also laid out our thinking in public including at press conferences. There would in my view have been a strong argument for having a similar degree of transparency about the economic technical (as opposed to policy) advice and its intellectual underpinnings. I certainly never perceived scientific and economic advice as inevitably in conflict (as they were sometimes portrayed), but rather as two important inputs into the decisions made by political leaders, along with their view on social and wider issues.
- 2.56. There is always a risk of groupthink in any group working under pressure. To that extent, SAGE was at risk of groupthink. The GCSA and I tried to reduce that risk as best we could. This included having people in SAGE and its subgroups who had a range of views and experiences as well as disciplines, whilst keeping the groups small enough they could debate issues. Evidence to the Inquiry, and the reality at the time of scientists from SAGE and its subgroups commenting, occasionally critically, in the media shows there was not unanimity of opinion on SAGE (nor should there have been). The risk however was practically lower than, for example, when national security makes it impossible to discuss the evidence in public. Scientists from the wider scientific community and from all ranges of opinion were debating the issues that SAGE was considering every day and on every channel in the media. None of these eliminate the potential for groupthink, but they provide some mitigation. Groupthink was a phrase that featured heavily in Module 1 of the Inquiry, including arising from the public comments of my distinguished predecessor, Dame Sally Davies, but it is important to note that Dame Sally's comments were (as she has explained) intended to address the groupthink of the entire Western medical and scientific community rather than directed towards any individual committee.
- 2.57. I am not the right person to comment on resource and funding of SAGE – this should be the SAGE secretariat. I do however think that as a matter of routine all SAGE and other external scientists advising Government should be indemnified by Government against the risk of civil cases as a result of them giving advice to Government, in much the same way as doctors are covered by Crown indemnity when working for an NHS Trust. It cannot be right that individual scientists, freely giving their expertise to society,

are put at personal legal risk if they have behaved in a proper way. It would also remove a potential way by which malign actors could try to pressure them by threat of a civil case.

Office of the Chief Medical Officer and Government Chief Scientific Adviser

- 2.58. Within Government, I provided advice repeatedly to among others the Prime Minister, the Secretary of State for Health and Social Care, the Cabinet Secretary, the Prime Minister's Chief Adviser Dominic Cummings, and several individual Cabinet Ministers at their request. I also provided advice to COBR, Cabinet, Cabinet sub-committees, official small Ministerial groups and COBR-officials meetings (COBR-O). At the request of Ministers, I briefed the House of Commons, The House of Lords (open meetings), the Leader of the Opposition and other Opposition figures (on Privy Council terms).
- 2.59. In the initial phases of the response, core decision-makers were understandably often unsure what the right questions were to ask of scientific advisers and found the scale of the issues they were dealing with in very rapid time quite challenging. As the pandemic went on, the relative roles of different individuals and groups became clearer and the understanding of the technical issues and options by the Prime Minister and other Ministers became better. Accordingly, the questions we were asked and the commissioning of scientific advice became more focused.
- 2.60. The UK COVID-19 Dashboards and the Cabinet Office Dashboard became essential tools which assisted me and others to inform senior decision-makers. Although the data presented were extensive, because they were largely provided in a format repeated from day-to-day, Ministers and others got to know their way around it and were able to see how things were progressing. The fact it was very well visualised made it a very useful tool for explaining issues. Once the routine of daily Dashboards was introduced the process of providing technical updates and advice became substantially easier. Good data visualisation of course depends on good data, something which was limited in the initial months of the pandemic by a lack of testing capacity. The creation of the excellent data by the Joint Biosecurity Centre ("JBC"), PHE and the Cabinet Office post May 2020 was in my view one of the great successes which aided rational decision-making.
- 2.61. The majority of my advice to the Prime Minister and other decision-makers over the course of the pandemic was given verbally in minuted decision making meetings or

the pre-meetings which preceded them. This was for two reasons: the speed of change of the situation often made it much easier to do verbally; and for both the Prime Minister and the Secretary of State for Health and Social Care this appeared to be the most effective way of ensuring they understood the advice and could ask follow-on questions. Occasionally, I provided written advice, but the principal form of written advice were the minutes of SAGE. Some examples of the written advice I did produce are: 'Coronavirus: summary of strategic and tactical approach to the epidemic' – sent to the Secretary of State for Health and Social Care on 21 March 2020, the Prime Minister's Adviser on 22 March 2020 and the Cabinet Secretary on 23 March 2020 (**CJMW4/005 – INQ000203890**) and 'Three scenarios over winter' – sent to Simon Case (who led on COVID-19 for No 10 and then became Cabinet Secretary) on 3 September 2020 (**CJMW4/006 – INQ000070554**).

- 2.62. The Prime Minister, Secretary of State for Health and Social Care and Mr Cummings among others sometimes asked for advice by WhatsApp. My view was that it was a poor means of communicating often quite complicated technical advice and I predominantly used it only when asked. The Prime Minister, Secretary of State for Health and Social Care, and more rarely the Chancellor and other Ministers would also sometimes phone for technical advice. I also found the pre-meetings before press conferences with the Prime Minister to be a very important opportunity to reinforce key technical messages and address misconceptions in a small group and in a relatively private setting. In almost all the most important decision making meetings, the GCSA was also present. As I have said, this allowed us to mutually reinforce key points, and pick up when an issue had been misunderstood or could have been explained better.
- 2.63. I hope that my advice to senior decision-makers was clear, including what was not known, but they are in a better position to confirm or refute that. Inevitably, I got better at giving advice as the pandemic went on for at least three reasons: i) the data on which the advice was based was much stronger with a more stable scientific foundation; ii) I understood the thought processes and styles of communication of the senior principals much better and was able to tailor my advice to their needs and styles; and iii) they built up a degree of trust in the advice I was giving based on their prior experience.
- 2.64. The Inquiry has asked about my views of the grasp of scientific, medical and mathematical concepts by the principal decision-makers. All doctors are trained to explain technical and medical concepts as clearly as possible, tailored to the prior

- knowledge and training of the person receiving the advice. This is one of the fundamentals of medical practice. Although none of the principal decision-makers had a scientific background, all were used to using numerical data in their decision-making.
- 2.65. Following from this, provided that senior decision-makers were prepared to take the time to listen, which in almost all cases they were, insofar as they did not understand the concepts I or the GCSA were presenting, I saw this as a failure of our ability to present data and concepts rather than their failure to comprehend. Relatively few of the concepts most important to the major decisions were intrinsically complicated, although I was struck by the fact that even some economists who understood compounding sometimes underestimated the power of exponential growth if left unchecked to change the situation over very short periods of time. A difficulty we from time to time had was that non-specialist external commentators, many with very strong prior beliefs influencing their views, sometimes provided counter-narratives based on misunderstood, cherry picked or possibly deliberately distorted science. If these were picked up by political leaders via the media it could cause confusion. The GCSA, DCMOs and I tried both to explain the scientific concepts and to explain the range of uncertainty around them, as well as to correct technical misunderstandings.
- 2.66. Very early in the pandemic, the GCSA and I agreed that the most important thing in order to support the Prime Minister, senior Ministers and other decision-makers was to ensure we coordinated our views and advice continuously. We thought it would be very confusing for them to receive two different versions of reality from each of us. We therefore took a lot of time and effort to ensure we were aligned, and if we were not that we understood why.
- 2.67. There were in my view no occasions when the GCSA and I disagreed on the fundamental science or a key point of medical advice. We sometimes expressed it differently, in particular early in the pandemic when we were trying to work out the best way to support senior decision-makers, but this was about presentation not substance. Occasionally, one of us expressed something less well in public (I give an example of my own below) that made it difficult for the other, but this was inevitable during a period in which we were exposed to huge media interest in which we were not experienced, and every sentence was potentially subject to minute public scrutiny. Where there were differences in the way we expressed advice, we attempted to resolve them immediately to avoid confusion setting in.

- 2.68. In general, my view was that our advice was sought appropriately. There were occasional relatively minor decisions where I felt it had not been, but almost always this was a case of oversight in the context of a very fast paced response rather than a deliberate choice, and none of them stand out that are not covered elsewhere in this Statement. On a few occasions, my view was that it would have been prudent to have sought the advice of myself, the GCSA or DCMOs at an earlier stage- for example we would be asked to comment at speed on a detailed policy document about to be produced when it would have been easier to have discussed key principles at an earlier stage of development. Some of the decisions by individual Departments would have benefited from proper scientific or medical advice, but that is to a fair degree inevitable given the multiple calls on our time. Just as frequently, my question in response to the OCMO receiving an enquiry was 'why are we being asked to comment – this is neither science nor medicine?'.
- 2.69. In my opinion, the distinction between scientists providing advice and politicians making decisions remained clear throughout the pandemic and where this was not understood by others I tried to point it out. Most of the very difficult decisions required of decision-makers, including those to go into lockdown or variants of it, required multiple inputs in addition to the scientific, clinical and public health ones. These included economic, social, diplomatic and political considerations.
- 2.70. It was my job, and that of my colleagues, to provide as strong a scientific input to this decision-making as we could. The balancing of the multiple difficult elements which required consideration had to be by elected politicians representing society. Inevitably, there were situations where political leaders wished scientific advisers to state what the policy should be, and in the opposite direction where scientific colleagues outside Government wished to present their views in the media on what policy should be in very complicated areas. There is a very important space for technical advice, but the old cliché that advisers advise and Ministers decide remains current.

Independent Advisory Groups

- 2.71. As CMO, I was the recipient of advice from independent advisory groups, for which I was very grateful. This would further inform my own advice to Government and included that from advisory groups such as NERVTAG and JCVI, which played significant roles in the pandemic response. I provided an overview of this in my First Statement at paragraphs 5.163 to 5.187, and so do not repeat it again.

2.72. I was not a member of these independent advisory groups, although I could attend as an observer if I wanted to and occasionally did. Sir Jonathan Van-Tam attended both NERVTAG and JCVI, but as an observer rather than a member. I had previously been a member or chair of several independent scientific advisory groups, and so this did allow me to understand their role.

Other sources of advice and expertise

2.73. Throughout the pandemic, I attended regular meetings of advisers to discuss and align advice. These meetings with expert colleagues included:

- a. regular meetings with the four UK CMOs to discuss cross-UK issues;
- b. Local Action Committee Silver meetings to feed into Gold decision making meetings for England. I describe the system of Local Action Committees in my First Statement at paragraphs 5.201 and 5.202;
- c. a Senior Clinicians Group to discuss issues and share information;
- d. meetings with the Academy of Medical Royal Colleges, who represent the medical profession, to share information and gain expert views; and
- e. the Directors of Public Health from across the country.

2.74. Further detail on these meetings is set out in my First Statement at paragraphs 5.189 to 5.200. On 21 December 2022, the OCMO provided the Inquiry with a chronology of meetings with experts that I attended from January 2020 to February 2022.

4 Nations collaboration

2.75. I am able to comment on the extent to which there was technical collaboration between the four UK nations during the pandemic, and particularly between the four UK CMOs. In my view, there was close interaction between us on a frequent and regular basis. We all learned from one another, challenged one another and often provided joint guidance aimed either at Government (**CJMW4/007 – INQ000203899**), the medical profession (**CJMW4/008 – INQ00049584**, **CJMW4/009 – INQ000236434**, **CJMW4/010 – INQ00068589**) or the general public (**CJMW4/011 – INQ000070464**). At the end of the acute phase of the pandemic, the other UK CMOs contributed to the joint Technical Report to our successors.

- 2.76. The four CMOs maintained very regular communication along with the constituent nations' DCMOs. Sometimes this consisted purely of information sharing, for example the first few cases and deaths in each nation. Frequently, it was about testing one another's thinking and aligning our technical advice. We were often asked to attend ministerial meetings including COBR alongside Ministers from our respective nations and so being aware of each other's technical thinking was advantageous. We all took note of, and tried to interpret the output of, SAGE meetings, to our Ministers which tended to shape a common position. The four CMOs and the relevant DCMOs had different professional experiences and disciplines and I considered this an advantage in our discussions. In my view, the CMOs in Scotland (Dr. Calderwood and then Sir Gregor Smith), Wales (Sir Frank Atherton), and Northern Ireland (Sir Michael McBride) were excellent colleagues and public health leaders during this major four nations emergency.
- 2.77. When I felt that the views of the CMOs of Scotland, Wales or Northern Ireland were important for UK Ministers to hear, I fed these into my advice. This was particularly important for issues where UK Government decisions had implications for the other three nations alongside England. An example of this was border measures, where many international travellers to the other three nations are likely to come through England. Whilst the differences tended to be modest, there were some occasions where the epidemiology was different between the four nations and this needed to be highlighted to the UK Government. In the advice which I provided the UK Government, I do not recall an occasion when I considered, or said to anyone, that the advice was not appropriate in the other UK nations. Inevitably, there were differences of epidemiology and nuance across the four nations, but the scientific and epidemiological underpinnings of advice were transferrable.
- 2.78. Whilst fully recognising that health is a devolved matter and therefore inevitably some important differences would emerge in the policy responses, our view as the four UK CMOs was that the general public would become confused if different versions of the scientific or clinical evidence were given across the four nations. We therefore tried to stick to the principle that the science and clinical advice both to Ministers and the public would be as similar as possible, whilst acknowledging the policy response might be significantly different for multiple reasons.
- 2.79. The extent to which there was political collaboration is not really a question for me. I do however feel confident in observing that the public health agencies of the four

nations worked closely together, with many shared policies and documents as well as a shared scientific understanding.

International Collaboration

International collaboration in general

- 2.80. Throughout the pandemic, I had extensive interactions with international partners both directly and indirectly. The information provided by international colleagues was essential, particularly at the points where a foreign country had a major outbreak that was potentially a threat to the UK. Without these international insights, it would have been much harder to formulate a rational response. My own views and those of SAGE were heavily influenced by these interactions and they fed into the technical advice given to decision-makers. Information exchanged included our mutual understandings of the virus and its behaviours, as well as the state of the epidemic and the epidemiology both in our countries and abroad. I was and am very grateful for their insights.
- 2.81. In general, there was a practical difficulty that whilst we were particularly interested in the experiences of countries that were at the leading edge of any given wave, the scientists and doctors from those countries were usually working flat out and did not have time to interact on a bilateral basis with every other nation. Medicine, and of course science more widely, are international endeavours with a strong tradition of rapid publication. Accordingly, much of our learning from abroad came from publications and online data. We also gained information from important bilateral discussions, and multilateral meetings such as those with the WHO or G7.
- 2.82. Early in the pandemic, I had very useful bilateral interactions with colleagues from Singapore, Japan, South Korea, Hong Kong and Italy, and indirectly from China, who provided the earliest sources of information with which to inform our own risk assessments. These were augmented by multilateral meetings to exchange information set up by WHO at which senior medical leaders from multiple countries contributed. When the Alpha wave was first detected in the UK, we became net givers rather than recipients of information as other nations wished to learn from our experience. By way of further examples, over the course of the pandemic I had interactions with:

- i. Senior Danish colleagues at the point they had an outbreak of COVID-19 in mink. Their transparency at this time was vital in allowing us to introduce a temporary ban on travel to Denmark, and similarly in removing that ban in due course;
- ii. Indian colleagues around the time of the emergence of the Delta variant; and
- iii. South African scientists, who were very generous with their time and expertise, in the early stages of the Omicron outbreak. Information from them was essential to our understanding of the risk of Omicron; South Africa has some of the best genomic sequencing capacity and epidemiological capacity globally and we learned a huge amount from them. Again, their transparency with data sharing made it much easier for me to inform decision-makers so that they could make rational decisions.

2.83. In most respects, international data allowed us to advise earlier than would have been possible if we were relying only on UK or European data.

2.84. In addition, we developed regular meetings of senior European scientists (chaired by our GCSA) and I had regular bilaterals with US Presidential adviser Dr Anthony Fauci and check ins with Dr Rochelle Walensky, director of the US CDC. Later on, we commenced meetings with the 'five eyes' group of CMO and equivalents from the USA, Canada, Australia, New Zealand and the UK. In parallel, the GCSA and PHE/UKHSA had their own bilateral or multilateral meetings and we shared relevant information between us.

2.85. Throughout the early stages of this pandemic, I was on the Executive Board of the WHO ("WHO EB"). The European members of the WHO also had a separate WHO EURO group. Through these meetings, I gained a lot of indirect and informal information. I was immensely grateful for the amount of time and expertise international colleagues offered on a bilateral and multilateral basis.

2.86. A fuller account of my engagement with international partners is set out in my First Statement, at paragraphs 5.204 to 5.208, and in the chronology of my meetings provided to the Inquiry by the OCMO on 21 December 2022. As such, I do not repeat this material again here.

International comparisons

- 2.87. Key decision-makers were very interested in what other nations were doing, and insofar as we could understand it, why they were doing it and their associated epidemiology. There were however considerable difficulties in proving causation between the public health actions of another nation and their epidemiological situation.
- 2.88. Nevertheless, the International Comparators Joint Unit (“ICJU”) was very useful in facilitating an assessment of what other countries were doing. Whilst there were several academic and other groups tracking the pandemic via a variety of means such as Our World in Data, the ICJU provided very helpful information on how other countries were responding. I supplemented this by information provided from colleagues internationally, and occasional use of the Science and Innovation Network (“SIN”) of FCO/FCDO.
- 2.89. Whilst we had to maintain the professional confidence requested by international colleagues, wherever possible the GCSA and I would feedback to decision-makers our understanding of the logic behind the decisions of other nations, in particular where these differed from the UK/England. We would also communicate our view of the strength of the scientific opinion internationally.
- 2.90. When other countries did things differently, it was very useful to work out why this was the case, test whether we had considered this approach ourselves, and if we had not, establish why. We also examined areas where we thought other nations were doing particularly well, for example the ability of South Korea and Germany to scale up testing in the very early stages of the pandemic. These are examples where emulation, where it was practical, was clearly in the interests of the UK/English response. There were other policies, such as the requirement in some European countries to get official permission even to leave the home, or requiring facemasks to be worn outdoors, where we noted they had chosen to do something for which we could not see a compelling scientific case. This was communicated to senior decision-makers and informed decisions by them as to whether to introduce similar measures in the UK.

The World Health Organization

2.91. The WHO is an important body for international health and has played a significant role in many of the health improvements seen since its inception. I am, unsurprisingly given my background, a strong supporter of a well-funded and empowered WHO equipped with significant technical capacity. The WHO can play an important role in responding to pandemics, for instance by declaring a Public Health Emergency of International Concern (“PHEIC”), as they did on 30 January 2020 in respect of COVID-19. The WHO also has a role in providing guidance to countries on how to respond to health threats. WHO outputs informed my advice to key decision-makers, and technical guidance from the WHO was extensively used in the UK by a wide range of professionals.

2.92. Due to the nature of the WHO as a body comprised of its constituent member states (which includes almost all countries globally), it aims to provide guidance that is applicable to all of its members. The individual circumstances of each member state inevitably vary considerably, for instance for reasons of economic prosperity, technical capacity, as well as factors which directly impact on disease susceptibility, such as geography and climate. WHO guidance will therefore always be both high level and less well targeted to local circumstances than national guidance would be. By way of example, on 4 February 2020, the WHO released guidance on COVID-19 that described the objectives of the response strategy as:

- *“Limit human-to-human transmission, including reducing secondary infections among close contacts and healthcare workers, preventing transmission amplification events, and preventing further international spread from China;*
- *Identify, isolate, and care for patients early, including providing optimized care for infected patients;*
- *Identify and reduce transmission from the animal source;*
- *Address crucial unknowns regarding clinical severity, extent of transmission and infection, treatment options, and accelerate the development of diagnostics, therapeutics, and vaccines;*
- *Communicate critical risk and event information to all communities, and counter misinformation;*

- *Minimize social and economic impact through multisectoral partnerships.*

These objectives can be achieved by:

A) Rapidly establishing international coordination to deliver strategic, technical, and operational support through existing mechanisms and partnerships;

B) Scaling up country preparedness and response operations, including strengthening readiness to rapidly identify, diagnose and treat cases; identification and follow-up of contacts when feasible (with priority given to high-risk settings such as healthcare facilities); infection prevention and control in healthcare settings; implementation of health measures for travellers; and awareness raising in the population through risk communication and community engagement.

C) Accelerating priority research and innovation to support a clear and transparent global process to set research and innovation priorities to fast track and scale-up research, development, and the equitable availability of candidate therapeutics, vaccines, and diagnostics. This will build a common platform for standardized processes, protocols and tools, to facilitate multidisciplinary and collaborative research integrated with the response.

The response strategy is based on several planning assumptions. Owing to the considerable uncertainty surrounding the extent of the outbreak within China, the transmissibility of the virus, and the clinical spectrum of the disease, it will be necessary to regularly update these assumptions as gaps in our knowledge of the disease are filled. The current response plan assumes that human-to-human transmission takes place, and that it may be amplified in specific settings, including healthcare facilities. We also assume that human-to-human transmission is widespread within Hubei, and possibly other population centres in China.

It is expected that cases will continue to be exported to other countries while the outbreak continues in China. While the response emphasis will be to rapidly identify and isolate imported cases, there is a risk of clusters of cases caused by localized community transmission outside China. In some cases, countries may require operational assistance to strengthen their capacity to detect and respond to these imported cases. However, there remain significant uncertainties around the potential for more widespread transmission outside China, and it will therefore be necessary to have contingency plans in place to mitigate the challenges this would present.” (CJMW4/012 – INQ000087457).

2.93. Further detail was set out in the rest of the report, but it remained a blueprint for national guidance to work within. In this sense, the WHO guidance was useful as a guide, but it usually needed considerable additional technical input in order to be usable in any given country. As regards the above advice, my view is that the UK's approach was consistent with it.

2.94. This remained the case as more information about COVID-19 became available. The WHO COVID-19 strategy update on 14 April 2020 stated:

"Each country must continue to implement National Action Plans based on a whole of society approach and a realistic appraisal of what is feasible to achieve first in terms of slowing down transmission and reducing mortality, and subsequently in terms of sustaining low level transmission while society and economic activity resumes" **(CJMW4/013 - INQ000228104)**.

2.95. Whilst this was clearly sensible, it makes the point that each country was required to decide how best to implement WHO guidance for themselves.

2.96. There were instances where the UK could not follow WHO guidance due to practical constraints. One example was the WHO advice to "test, test, test" e.g. to test every suspected case. I and others were well aware of this advice. To the extent that testing was available, we agreed with it. Particularly early in the pandemic however, it was not entirely clear to which countries this advice applied. Even in high income countries competition for key materials and limitations in the expansion of capacity were a problem; in low-income countries the availability of testing was unfortunately even further delayed. There was therefore no theoretical disagreement with the advice, but practical limitations on the extent to which it could be applied in the UK and indeed most other countries due to the limited availability of tests. Once testing was scaled up this was of course something where the UK put a lot of emphasis.

2.97. It follows that on some occasions, the UK took a slightly different approach to that advocated by the WHO. This was also the case for instance in its approach to clinical trials, where we were stronger in our view that novel therapies should be trialled. I discuss this specific point in more detail below at paragraphs 16.18 to 16.22. Nevertheless, in my view such occasions happened fairly rarely, and it was much more frequently the case that the UK's approach was consistent with advice emanating from the WHO.

- 2.98. Accordingly, in my view advice and guidance from the WHO was a helpful resource for local national decision makers to take into account, and for local national advisers to consider when formulating their advice. The UK worked closely with the WHO and usually was broadly aligned with it. Where there was divergence, this generally was a reflection of the fact that WHO guidance needed to be applicable to all countries.
- 2.99. The Inquiry has made specific requests as to how the WHO guidance dated 9 January 2020, 4 February 2020 and 28 February 2020 applied to the UK. I have explained my approach to the guidance dated 4 February 2020 above. Similarly, I considered that those other pieces of WHO guidance applied to the UK, albeit that their direct applicability should be understood in the context of my comments above and the need to tailor advice designed to be internationally applicable to a national context.

Section 3: Executive Agencies

Public Health England/UK Health Security Agency

- 3.1. The Inquiry has asked me to comment on the effectiveness of PHE during the early stages of the pandemic and the decision in August 2020 to disband PHE and create the UK Health Security Agency. In January and February 2020, PHE played to its considerable scientific strengths. PHE scientists very rapidly created a PCR diagnostic test after the genetic sequence of SARS-CoV-2 was published. Operationally, PHE was effective at contact tracing when the numbers of cases initially identified were small.
- 3.2. PHE did however struggle when it came to rapid scale up, in particular of diagnostics and contact tracing. In my opinion, this was the inevitable result of an erosion of the health protection capabilities of PHE over a number of years. This is not a criticism either of the professionalism of PHE staff or of the political decisions to prioritise other areas in budgetary decisions. I make this point however because I consider the ability to scale up rapidly was demonstrated to be weak in the UK and I am concerned that this will remain a weakness for future pandemics and other health emergencies on this scale.
- 3.3. The decision to disband PHE in the middle of the pandemic and create new entities was principally a political one. It was not based on my technical advice or that of the

DCMOs. Unsurprisingly, an emergency on the scale of the COVID-19 pandemic exposed weaknesses. These clearly needed to be rectified. Whether disbanding and reforming the principal health protection agency which had extensive responsibilities in the middle of an infectious disease emergency was the best way of achieving this, is an open question. In my view, key PHE staff responded with professionalism to this change and did their best to minimise the impact it had on their operational response.

Joint Biosecurity Centre

- 3.4. The Joint Biosecurity Centre (“JBC”) was established in May 2020 to bring together expertise and analysis to inform the policy response to the pandemic. In considering the creation and role of the JBC, I would like to separate out the process of its creation and its operational impact.
- 3.5. Many of those involved in the decision to create JBC had experience in national security matters and viewed things through that prism but JBC had significant public health expertise at its creation in addition to pulling in analytical experts from many other parts of Government. I thought the JBC staff did a remarkably good job of standing up a very strong analytical response from a standing start. They provided reliable data in rapid time, very well presented in a way that was interpretable by policymakers. The sophistication of their data visualisation both geographically (maps) and temporally (charts and graphs) really helped decision-making. It pulled in analytical and data visualisation expertise from across Government including bodies such as the national security agencies, the Bank of England, as well as PHE and wider skills from the public health and epidemiological community.
- 3.6. The need for the skills brought together in JBC was clear. I was and am agnostic as to whether it needed to be freestanding or could have been placed within PHE. Overall however, I consider the bringing together of JBC skills to be one of the significant steps forward in analytical and data visualisation to inform policy response.
- 3.7. Outside the intense period of a pandemic, it did not however make sense for JBC to be freestanding. Under normal circumstances, with typical numbers of outbreaks and public health events and smaller scale emergencies, having two organisations providing technical analytical input in parallel ran the risk of duplication of effort and conflicting

advice. I was therefore supportive of the merger of JBC with UKHSA once the worst stages of the pandemic were over.

- 3.8. I noted with interest suggestions that JBC could replace SAGE in the longer term. The suggestions came out of a misunderstanding of the roles of both bodies. JBC was and is a highly effective analytical body with a central emphasis on the tactical analysis of data and data visualisation. SAGE is an emergency mechanism to bring together the best relevant scientists in the UK to provide advice to policymakers in response to an emergency. These might include issues as diverse as solar flares, flooding, volcanic eruptions closing airspace, national power outages, a major cyberattack, nuclear accidents as well as human, animal and plant infections. SAGE is only stood up in emergencies and designed around the emergency in hand, usually drawing on the wide skillset of the external academic community. The idea that JBC and SAGE could take on one another's roles makes no sense.

Section 4: Data and Modelling

Sources of data

- 4.1. I, the GCSA and other professional advisers used multiple sources of data to inform our advice to core decision-makers. These included but were not limited to: data from clinical studies and trials; NHS activity data; epidemiological data; genomic data; data from virological studies; qualitative and quantitative social science data; and data from the private sector. Which predominated at any given point depended on the stage of the pandemic, the question to be addressed and which input at that time we considered the most reliable.
- 4.2. In the first weeks of the pandemic, the data were almost entirely from international studies, firstly from China and then more widely. By the middle of 2020, reliable UK domestic data was rapidly expanding and by summer 2020, the quality of UK domestic data had reached a point where we were able to provide highly geographically detailed data in something approaching near time for the purposes of the No 10 dashboard and the Silver and Gold Local Action Committee meetings. This included data obtained by the ONS household survey.
- 4.3. Some of the key sources of data used to understand the virus and its spread included:

- i. the First Few Hundred study, a largely descriptive clinical study of early cases which followed a protocol previously used for MERS in 2015 and 'swine flu' in 2009 (started in January 2020);
- ii. CO-CIN, a study of hospitalised patients with COVID-19, in particular those in the Intensive Care Unit (started March 2020);
- iii. SIREN, a study of healthcare workers with serial sampling to understand infection rates, reinfection and in due course vaccine efficacy in working-age adults (started June 2020);
- iv. VIVALDI, a study in care homes which looked at how many care home staff and residents had been infected with COVID-19 and the effectiveness of vaccines against infection (started May 2020);
- v. the ONS COVID-19 Infection Survey, a study of the proportion of the general population with infection (started April 2020);
- vi. COMIX, a survey of a sample of the UK adult population looking at social contact trends (started March 2020);
- vii. PITCH, a study to understand T-cell responses in healthcare workers (started March 2020);
- viii. the ONS COVID-19 Schools Infection Survey, a study to understand and assess infection and transmission in schools (started October 2020);
- ix. Virus Watch, a study of households focusing on transmission, immunity and symptoms (started June 2020); and
- x. ATACCC, a cohort study of healthcare workers studying the secondary attack rate and time between exposure and infection (started September 2020).

4.4. As outlined in the previous section of this statement, the data from the JBC and PHE/UKHSA surveillance was also very valuable in understanding COVID-19. Clearly this is a sub-set of the total data used, but it gives an indication of some of the key surveillance studies. We set out further detail on this in the Technical Report.

4.5. A different but similarly important set of data came from the research into medical countermeasures which led to treatments and vaccines becoming available. I understand that these topics will be the focus of future Inquiry modules. I therefore do not cover the role of research trials in providing data to inform the COVID-19 response in detail here. Again, further detail can be found in the Technical Report if this is of assistance.

Data limitations

- 4.6. In considering the role of data, and the limitations in data as a barrier to good decision-making, I will divide the pandemic into three stages.
- 4.7. In the very initial weeks, the data were extremely limited for everyone globally, and were all international in nature; decisions had to be taken based on very sparse data and this was made clear in the advice given.
- 4.8. In the third stage, from approximately the middle of 2020 onwards, the full apparatus of JBC, analytical flows from NHS Test and Trace, the ONS survey and several observational cohort studies such as SIREN provided very detailed data. From here on, I consider that the data provision to Government was one of the real strengths of the UK response. The publicly available data were also more detailed and reliable than in most other countries.
- 4.9. The phase between those periods, for practical purposes from mid-February to the middle of 2020, was a time of relative weakness in the UK's data provision. The response to rapidly spreading COVID-19 required a very substantial change in the way data were provided, shared, analysed and the data from the increasing testing capacity fed in. Inevitably, some elements of this could have been faster and this was a source of frustration at the time. This should not however detract from the extraordinary contribution of data scientists, analysts, visualisation experts and others in providing and interpreting data over the pandemic as a whole.
- 4.10. By way of further detail, as the UK pandemic developed beyond the first few cases in mid-February 2020, there was a period until approximately the middle of that year where the data were incomplete. Limited testing capacity combined with an inability to merge different datasets, including those from the NHS, in order to make best use of the routine data sources available, was undoubtedly a limitation. Resolving these issues was critical to being able to provide professional advice based on reliable data. There were also difficulties with data sharing between various parts of Government, academia and the NHS. Over the first three to five months of the pandemic, these issues were resolved.
- 4.11. Some of the delay in achieving this was in my view inevitable and occurs in every emergency I have ever worked in. There are a multitude of reasons for this, including

cultural norms about sharing data, worries about legal risk and mechanistic difficulties in sharing data in a way and format it can be used by others. It is also clear that there was insufficient capacity in the data and analytical capabilities of PHE and NHS England, which were simply not equipped for a crisis on the scale of COVID-19. This latter problem was eventually solved, in large part by drafting analysts from other parts of Government, both departments and agencies.

- 4.12. Whether these early problems in data sharing could have been resolved faster is a question I am not the best person to answer. Those involved in the system of data sharing and analysis, both users and providers, would be in a better position to assist the Inquiry. The difficulties imposed by the limited data available in the early part of the pandemic were undoubtedly real, but so were some of the limitations in sharing data and it was important these were resolved. However, the well-documented limitations in testing meant that for many purposes, reliable data simply did not exist to share, nor was there the contact tracing infrastructure which provided a lot of the information later in the pandemic.
- 4.13. In any emergency response, it is almost always going to be the case that some useful data could have been shared earlier than it was. Data flows within the UK system early in the pandemic were not optimal but improved considerably over its course. Further detail on this is set out in the Technical Report, in particular Chapter 4, which sets out in some detail data sources and the challenges faced.
- 4.14. The creation of JBC and the No 10 Data Science and Analytics team went a long way to helping resolve some of the problems of data analytic capacity. There were clear advantages to having this capacity in No 10 itself. These included that they could be very responsive to the particular interests of the Prime Minister and his immediate advisers. It was essential however that it was part of a connected data effort across Government rather than a freestanding unit. Multiple standalone data efforts risk confusion with competing analyses addressing similar but not identical questions. This would have given rise to very confused advice to Ministers and other decision-makers.
- 4.15. I would also like to make clear the role of professional advisers in the face of uncertainty. Once reliable data were available it made decision-making considerably better informed. It is of course always easier to give reliable professional advice with a full sweep of data in which you have confidence. It is however the job of a technical adviser during an emergency from whatever discipline (this would be as true for military

advice as medical advice) to understand the limitations of the data they are presented with but still to give the best advice they can based on the data they have. A high degree of uncertainty is inevitable in any emergency, especially early on, and advisers and the policymakers they advise simply have to work with that reality. This is no different from many other aspects of medicine and other disciplines. Waiting for perfect data is often likely to be the wrong approach in a fast moving emergency.

Modelling

Modelling in general

- 4.16. Modelling is one of the important technical skills in an infectious emergency, although the outputs of models have to be interpreted with care and considered alongside the many other inputs from other fields and disciplines. Excellent modelling cannot make up for biased, incorrect or absent source data. Indeed, a model is no stronger than the assumptions on which it is based, and these will in part depend on reliable data sources for their accuracy. The assumptions which inform a model will always mean there is a range of uncertainty around a model's central estimate. The further out in time the model is projecting, the greater that uncertainty will be. This is as true for economic or weather models as it is for epidemiological ones.
- 4.17. Early in the pandemic, the number of modelling groups which could stand up rapidly, and the availability of data, limited the range of inputs that could be given. At the same time, there were relatively few alternative routes by which we could explore possible future scenarios. It was (and is still) widely accepted internationally that the UK has particular strengths in the field of infectious disease modelling, including but not limited to the modelling groups at Imperial College and the LSHTM.
- 4.18. Modelling in the early pandemic was in one sense more straightforward than it was later, as population immunity did not need to be taken into account (there was none) and there were no medical countermeasures to factor in. In the absence of immunity or social or medical countermeasures, the first wave of the pandemic will follow an exponential path. Modelling becomes harder once factors intended to retard the spread of the disease or mitigate its severity need to be taken into account, especially when the impact of these effects is itself hard to estimate e.g. the impact of certain NPIs, or the extent of population immunity.

- 4.19. An epidemic is almost always either doubling or halving; initially it will be doubling and once the doubling time is established the speed of the upswing can be derived. What is not easy to determine is how high the first and subsequent peaks will be. There is a theoretical upper maximum which can be derived but this is seldom reached in the first wave. There were however many unknowns including the degree and duration of immunity and how large the proportion of asymptomatic spread was.
- 4.20. This uncertainty on the amount of asymptomatic infection posed a particular challenge when trying to estimate the infection fatality rate ("IFR"). The IFR is the proportion of all people who are infected with the disease who then die of it, and is distinct to the case fatality rate ("CFR") which can be derived in the absence of knowledge about asymptomatic disease and relies upon the number of known cases who go on to die of the disease. It follows that in a disease with a significant number of asymptomatic cases, the IFR will be lower than CFR (on the basis that those who are asymptomatic are unlikely to be detected as cases), and if there is a lot of asymptomatic infection, may be much lower. Such unknowns had the potential to impact on the accuracy of the models.
- 4.21. As the pandemic went on, the array of models and institutions contributing to modelling efforts increased substantially and the reliability of the data on which they were based became stronger. Alongside this, the way in which we were able to achieve a consensus between modelling outputs became more established. In giving advice, we used whatever models were available from the highly competent groups. At first the number of these was very small but over time it expanded. My view was that the modelers largely collaborated very well when judged against realistic expectations. They were transparent within the norms of their own discipline and drew on data from a variety of sources.
- 4.22. Due to the limitations in models (which I explain further below), wherever possible when presenting data in public I used actual data, or very occasionally very short-term projections. I do not think it is easy to explain the limitations and strengths of models to the general public in the very short time available in broadcast media. Presenting a model without its limitations is usually a mistake. In much longer meetings of decision-makers it was possible to have this more nuanced discussion and present model data, although the GCSA often led on this.

Modelling used during the COVID-19 pandemic

4.23. The details of multiple models are laid out in SPI-M-O minutes, background papers and presentations. We also discuss them in more detail in the Technical Report. Some of the questions asked by the Inquiry are better addressed to the modelling teams and SPI-M. In my First Statement at paragraphs 5.176 to 5.181, I lay out some of the mechanisms by which SPI-M-O, the SAGE sub-group producing most of the models for SAGE, worked. There was also modelling done outside of SPI-M-O from academics in the four nations of the UK, the NHS (principally for operational reasons) and private companies.

Limitations of Models

4.24. I have already touched upon some of the limitations of models in the paragraphs above. In addition, SPI-M-O produced a useful summary of some of the general limitations of models which I set out in part below:

“Models are, by their nature, a simplified representation of reality. Models cannot, and do not try to, account for every possible detail of changes in government policy, the nature of the virus and how the population is interacting. Instead, they try to capture the important aspects. They are often limited by the available data and the models’ outputs are only as good as the quality of the data that goes into them.

There can be substantial uncertainty in the models’ results because the future is, for the most part, highly uncertain. The models factor in what is known with reasonable certainty about the future, for example, the planned progress of vaccine rollouts. Many things are unknowable however, for example if a new variant will emerge and what characteristics it might have. The further into the future the models consider, the greater this uncertainty is as there will be more of these unknowable possibilities.

Each model output (or combination of model outputs) will have a measure of uncertainty associated with it to capture this. This uncertainty interval shows the range of values within which the observed outcomes are highly likely to lie. This does not mean that the actual outcomes data will not be outside the interval, just that it is less likely under those conditions.

Modelling can never exactly replicate reality and therefore no individual model will give a perfect description of the future. It is precisely because of this that we do not rely on

just one model. We consider a wide range of views on the data and intelligence available from several independent groups, who use different approaches to produce a varying set of answers to each question the models are asked. A consensus position is agreed through a robust discussion comparing and challenging the different models' results. Where these independent approaches give similar answers, it gives greater confidence in those outputs; if they differ then understanding why can itself be very informative" (CJMW4/014 – INQ000236423).

- 4.25. Many of the criticisms of models during the first two years of the pandemic made in the press, social media and the political sphere were misleading. Firstly, they implied that models were the only or were the principal driver of policy. This was not correct, nor should it be. Models were only one of many inputs into policy decisions, even within the overall scientific advice, and policymakers made their decisions based on much wider issues.
- 4.26. Secondly, critics sometimes took the most extreme model outputs, generally the upper or lower bounds of the confidence intervals or outlier outputs, implied these were the projection of the modellers, and then attacked the projection as if it was the central projection, and as if it was a prediction of future reality rather than a model. This did not always assist the public in understanding the strengths and weaknesses of models in a balanced way. There was often a conflation of the presentation of actual observed data (i.e. 'things have got worse based on admissions to hospital') and the outputs from models. It was for these reasons that in the great majority of my public appearances, I preferred to present actual recorded data rather than the outputs from models. I have addressed the widely publicised March 2020 modelling report by Imperial College at paragraph 7.101 below.
- 4.27. Models were used initially to demonstrate to decision-makers that in the context of exponential increases, cases would move from very low numbers to very high numbers in a surprisingly short period of time. They also showed how high in principle the peak of infections could get unless action was taken. They were in my view also helpful to policymakers in seeing the likely impact of a small or larger number of interventions. Certainly, in the advice I gave, I did not think that models crowded out other important scientific inputs. They are one important tool amongst others in the scientific advice which itself is only one strand of advice on which decision-makers took their decision.

- 4.28. The Inquiry has asked whether the models overestimated the extent of spread of the virus early in the pandemic. The initial models were there to demonstrate what would happen if no action were taken either by Government or by the general public. I do not believe that in their performance of that task, these models have been shown to be particularly inaccurate, beyond the recognised limitations I have outlined above.
- 4.29. Had no action been taken and the virus left to take its course, the number of people who would have been infected in the first wave would have been significantly higher than that which occurred. The impact of the models on decision-making prior to the first wave was to demonstrate that had no action been taken, the consequences would have been very significant. It is unsurprising that in a situation where the public made multiple decisions of their own to restrict their social interactions, and the Government then took major action to go further still, the initial wave was smaller than the theoretical maximum predicted by models. A recent report by the Royal Society usefully lays out some of the data on the impacts of NPIs (CJMW4/015 – INQ000252720).
- 4.30. The total theoretical maximum infection and total mortality under a do-nothing scenario is in fact fairly easy to calculate. It is simply the total number who are likely to get infected multiplied by the infection fatality rate. The fact that we did not reach those numbers of deaths was not an accident, nor was it a failure of the models. It was because action was taken to avoid it. To criticise the models after the event because, having taken steps to avoid it, the theoretical maximum was not reached, is illogical.
- 4.31. The main thing I would have wished to see more of within modelling was sensitivity analysis, particularly in the early stages of the pandemic. Sensitivity analysis is where the assumptions of the model are varied to see what impact this has on the model's output. It is informative in its own right, and also indicates which of the various inputs to a model have the greatest impact on its outputs. In turn, if this is a variable in which we have very weak confidence, it can modify our interpretation of the model and the reliance we place on its conclusions. I made this point at the time.
- 4.32. The Inquiry has asked whether in my opinion there was an overreliance on epidemiology or infectious disease modelling in the scientific advice. Epidemiology is a wide discipline with many skills within it. It encapsulates data from science across an epidemic, including in this case virological, clinical and social science data. Modelling is only one component of this. It is hard in my view to see a situation where giving less epidemiological information to core decision-makers in a major epidemic would have

improved the decision-making. Generally, the principal epidemiological outputs were a description of data which if properly collected helped orientate decision-makers in the contemporary reality. Epidemiological concepts such as R were relatively easy to explain and also served to assist policymakers in understanding the implications of different future paths.

Section 5: Summary of technical advice by topic

Introduction

- 5.1. The Inquiry has asked a number of questions of a technical nature. What follows is a brief summary of some of the fundamental scientific underpinnings of the COVID-19 response and our understanding at particular times. There is considerably more detail on these matters in the Technical Report which also describes the difficulties in estimating many of the statistical and epidemiological values on which we relied. For a chronological view of how these changed over time, the minutes of SAGE and the underpinning papers generally provide the best contemporaneous record.
- 5.2. It should also be stressed that as with most of the technical judgements in the pandemic, there was seldom a single point in time at which we 'knew' a particular fact (e.g. the value of facemasks) or a particular number (e.g. the reproductive rate or CFR). Rather, our understanding of any given matter usually reflected a probability distribution in which we had a central estimate of the true value, with a wide spread around it in which the true value likely lay. As time went by and data accumulated, the central estimate shifted and the spread of this probability distribution narrowed. Accordingly, over time the confidence we had in our understanding increased.
- 5.3. Although inevitably the issues which caught the most attention were those where the central view shifted, looking back at the initial estimates a surprisingly high proportion of the early judgements stood the test of time. I say that because the difficulty of calculating them is often underestimated, and the early data available were often sparse.

Person to person transmission

- 5.4. On 5 January 2020, I laid out a series of triggers which, if met, would provide an indication that an epidemic of global importance was possible from the outbreak that had been described (**CJMW4/016 – INQ000047484**). These were:

“1. Healthcare workers dying. This is often the early warning that a new infection is both severe and transmissible (eg SARS, MERS, Ebola). This would be the most concerning.

2. Evidence of person-to-person spread eg in families.

3. Geographical spread implying a zoonosis is spreading (in this case we would also want to liaise with DEFRA)”

At this stage, it was unclear whether there was person to person transmission.

- 5.5. On 6 January 2020, Sir Jonathan Van-Tam asked our CDC colleagues if they had any concerns around person-to-person transmission (**CJMW4/017 – INQ000151291**).

- 5.6. On 13 January 2020, NERVTAG met and said:

“Members noted that it has been stated that there has been no ‘significant’ human to human transmission, which implies there may be some evidence of limited human to human transmission which has not yet been made available. Given that the onset dates are over a period of almost one month, and now the case in Thailand, we should be cautious at this point in making conclusions about the absence human to human transmission” (**CJMW4/018 – INQ000023107**).

- 5.7. On 14 January 2020, the WHO announced that:

“Preliminary investigations conducted by the Chinese authorities have found no clear evidence of human-to-human transmission of the novel #coronavirus (2019-nCoV) identified in Wuhan” (**CJMW4/019 – INQ000236435**).

- 5.8. On 19 January 2020, I had an email discussion with Sir Jeremy Farrar (then Director of Wellcome), and subsequently Sir Jonathan based on informal information Sir Jeremy had seen from an unpublished manuscript (**CJMW4/020 – INQ000183355**). This provided evidence, albeit in early form, of person-to-person spread, but not of sustained community transmission. The difference between the two is important when

considering a pathogen's epidemic potential. A disease may be transmissible between individuals who are in close contact, for instance families residing in the same premises or between doctors and patients in medical settings, yet lack the ease of transmission necessary to bring about sustained community spread (e.g. between strangers meeting briefly in shops or on public transport). This is for example the case for the coronavirus MERS.

5.9. On 19 January 2020, WHO tweeted:

“According to the latest information received and @WHO analysis, there is evidence of limited human-to-human transmission of #Ncov. This is in line with experience with other respiratory illnesses and in particular with other coronavirus outbreaks”. **(CJMW4/021 – INQ000236436).**

5.10. On 21 January 2020, WHO tweeted:

“It is now very clear from the latest information that there is at least some human-to-human transmission of #nCoV2019. Infections among health care workers strengthen the evidence for this”. **(CJMW4/022 – INQ000236437).**

5.11. On 22 January 2020, SAGE met and said:

“There is evidence of person-to-person transmission. It is unknown whether transmission is sustainable” **(CJMW4/023 – INQ000174700).**

5.12. On 22 January, a WHO mission summary said:

“Data collected through detailed epidemiological investigation and through the deployment of the new test kit nationally suggests that human-to-human transmission is taking place in Wuhan. More analysis of the epidemiological data is needed to understand the full extent of human-to-human transmission” **(CJMW4/024 – INQ000236429).**

This finding was circulated across Government and was referenced in the top story on BBC news.

5.13. On 24 January 2020, a paper was published suggesting there was person-to-person transmission **(CJMW4/025 – INQ000212897)**. That there was extensive person-to-

person transmission thereafter became clear quite quickly, as the rising case numbers over a wide geographic range could not be explained otherwise.

Modes of transmission

5.14. There are broadly five standard routes of transmission by which an epidemic or pandemic can be transmitted and I give an example of each: respiratory (influenza), touch (Ebola), sexual/intravenous (HIV), oral (cholera) and insect/arachnid vector (Zika). Most infections have a dominant route of transmission, which may be the sole route of transmission capable of maintaining an epidemic. COVID-19 was identified as a predominantly respiratory infection very rapidly in the pandemic.

5.15. One area where the central view both in the UK and internationally (e.g. WHO) changed over the course of the pandemic was the relative contribution of droplet spread (usually at quite close quarters of a few meters) and aerosol spread (capable of infecting at a distance, especially indoors in poorly ventilated settings). Both are mainly transmitted by the respiratory route, but the distinction was important as it had implications for potential countermeasures. In brief, if droplet spread is a more important contribution to transmission then maintaining distance of more than 2 metres from an infected person is of greater importance than it is for aerosol spread; ventilation is more important for aerosol spread. The relative contribution of aerosol transmission was understood to be greater as time went on, but this was a result of gradual accumulation of evidence.

5.16. Transmission was explained by the WHO 23 December 2021:

“- Current evidence suggests that the virus spreads mainly between people who are in close contact with each other, for example at a conversational distance. The virus can spread from an infected person’s mouth or nose in small liquid particles when they cough, sneeze, speak, sing or breathe. Another person can then contract the virus when infectious particles that pass through the air are inhaled at short range (this is often called short-range aerosol or short-range airborne transmission) or if infectious particles come into direct contact with the eyes, nose, or mouth (droplet transmission).

- The virus can also spread in poorly ventilated and/or crowded indoor settings, where people tend to spend longer periods of time. This is because aerosols can remain suspended in the air or travel farther than conversational distance (this is often called long-range aerosol or long-range airborne transmission).

- *People may also become infected when touching their eyes, nose or mouth after touching surfaces or objects that have been contaminated by the virus” (CJMW4/026 – INQ000203978).*

5.17. There was and is scientific debate about the relative importance of droplet and aerosol transmission and their exact contribution remains uncertain (and may be different between Omicron and previous variants). It is the case however that the central scientific view shifted over time to consider suspended aerosols as being of greater importance than was originally thought. In turn, this led to an increased emphasis on the role of ventilation as a countermeasure for COVID-19. In the UK, this can be seen in the outputs of the Environmental Modelling Group (a SAGE sub-group who provide advice on the role environmental modelling, data analysis and environmental sampling can play in understanding COVID-19 transmission) and in the communications campaigns which later emphasised the importance of ventilation **(30 September 2020 – CJMW4/027 – INQ000203979, CJMW4/028 – INQ000203993) (18 November 2020 – CJMW4/029 – INQ000203922).**

5.18. Fuller details can be found in the Technical Report at Chapter 1 **(CJMW4/001 - INQ000203933).**

Pre-symptomatic and asymptomatic transmission

5.19. The changing understanding of asymptomatic transmission was set out in my First Statement, at paragraphs 6.55 to 6.63. Those paragraphs run to some five pages. In light of their length and the fact the Inquiry has already had that material, I do not repeat it again at length here.

5.20. I was aware of the possibility of asymptomatic spread of COVID-19 (as opposed to there being just asymptomatic cases, without the potential for those cases in turn to then generate further infections) from early January 2020. As an example, I discuss this possibility with Sir Jeremy Farrar by email on 19 January 2020 **(CJMW4/020 – INQ000183355).**

5.21. There is however a significant difference between the possibility that asymptomatic infection might occasionally occur (likely), and the idea that asymptomatic transmission would be a major part of the force of transmission. Evidence that asymptomatic transmission was a sufficiently important part of the epidemiology that it had a

significant impact on the pandemic overall accumulated slowly. There was no single point where I and others in the international scientific community moved from thinking it was improbable to thinking it was a major issue; rather it was a gradual process of accumulation of evidence. The UK was not an outlier in this and WHO also gradually changed its position as the evidence accumulated. Even as late as 9 July 2020, the WHO's position was that the scale of asymptomatic transmission was unknown **(CJMW4/030 – INQ000203997)**.

- 5.22. The exact proportion of asymptomatic transmission has still not been established beyond doubt and has likely changed over time. The current central view is that COVID-19 has a greater proportion of asymptomatic transmission than previously seen with other novel coronaviruses. The proportion is likely to have changed throughout the pandemic as new variants with different infectiousness, and the roll-out of vaccination, meant people benefitted from immunity which tends to make symptoms less severe, or less apparent.
- 5.23. The midpoint of the scientific view, and therefore my advice to Ministers and other core decision-makers, about the reliability of testing asymptomatic people changed over the first few months of the pandemic. The initial advice in SAGE given by Dr Maria Zambon, who had originally developed the test and is an acknowledged international expert in this area, was that testing for asymptomatic disease was likely to be less sensitive than that for symptomatic disease **(28 January 2020 - CJMW4/031 – INQ000203936)**. Subsequently, studies showed that it was possible to identify asymptomatic people by means of testing, and so the advice changed.
- 5.24. I would like to make clear the difference between pre-symptomatic and asymptomatic spread as I thought that might have got lost in some evidence in Module 1 and it had and has practical importance. First, it is sensible to repeat a point made in witness statements in Module 1; asymptomatic infection (a person is infected without having symptoms) is different from asymptomatic transmission (a person with no symptoms can transmit to others). Pre-symptomatic transmission is where a person becomes infectious, and becomes symptomatic, but they are infectious for a period (hours or days) before the symptoms appear. In asymptomatic transmission, the individual can transmit the virus despite having no symptoms at any point.
- 5.25. There are important differences between pre-symptomatic transmission and asymptomatic transmission from a perspective of disease control. The most important

is that in pre-symptomatic transmission the case will be identified and counted, and their contacts can be identified and isolated, relatively easily (albeit later than in symptomatic infection). In asymptomatic transmission, it is much less likely the index case will be identified early enough to institute contact tracing unless they are by chance tested whilst infectious. This makes contact tracing as a method of control less effective, and if a large proportion of the infection is from asymptomatic transmission much less effective.

Incubation period

- 5.26. On 9 January 2020, Sir Jonathan Van-Tam set out that we did not know the incubation period in an email to PHE describing our ability at the time to identify likely cases:

“Essentially if we or any other countries get cases we won’t be in a position to diagnose by lab test in the next few weeks; more likely it will be resp infection + travel to Wuhan within last 21 days (we don’t know incubation period) + no obvious common RVI cause. The caveat will still be that +ve for flu (and lots in China at present) would not in my view assure no co-infection with something novel”. (CJMW4/032 – INQ000151296).

- 5.27. On 13 January 2020, NERVTAG said:

“The incubation period distribution is likely to be relatively long for this novel coronavirus when taking into account the long incubation period seen in both SARS and MERS.” (CJMW4/018 – INQ000023107).

- 5.28. On 22 January 2020, SAGE said:

“The incubation period is unclear – but appears to be within 5 to 10 days; 14 days after contact is a sensible outer limit to use” (CJMW4/023 – INQ000174700).

- 5.29. On 3 February 2020, SAGE said:

“Incubation period (time between exposure to infection and symptom onset): consensus of modellers puts this at 5 days, but range is 2 to 14 days” (CJMW4/033 - INQ000203939).

- 5.30. On 11 February 2020, SAGE said:

“Incubation period: 4-5 days average, with range of 1-14 days” (CJMW4/034 – INQ000087552).

5.31. On 4 March 2020, SAGE agreed with the following assumption in a paper:

“Average: 5 days. Range: 1 to 11 days. (assumed for UK)” (CJMW4/035 – INQ000074987).

Broadly, this remained an accurate view of the incubation period for the original COVID strain, although it likely changed with the variants, being probably shorter for Delta and Omicron.

5.32. The incubation period was important when considering the length of time that contacts of cases should isolate. This started out as 14 days, but was changed in December 2020 at the recommendation of the UK CMOs (**1 December 2020 - CJMW4/036 – INQ000071960**). Our view was that a 10 day isolation period for contacts represented the appropriate balance of risk given the current data and the stage of the epidemic at that point, rather than the data on incubation having substantially changed. Our view took account of the need to minimise transmission, but against this the considerable inconvenience of people who were contacts of cases self-isolating even when beyond 10 days the chance they were infectious was very low. This was particularly the case in people who had multiple contacts so had to self-isolate multiple times. We considered it was unreasonable that people should be made to isolate for longer than was necessary, and additionally it was possible (but not proven) that it would increase adherence if isolation was made less onerous.

Duration of infectivity

5.33. The duration of infectivity refers to the time during which a patient who has contracted COVID-19 remains able to transmit the disease on to another individual. It is distinct from the incubation period, which refers to the time it takes for someone who is exposed to the disease to display symptoms. I describe how our understanding of the duration of infectivity changed below.

5.34. On 28 January 2020, SAGE said:

“Duration of infectivity: unknown, but 14 days seems a reasonable estimate” (CJMW4/031 – INQ000203936).

5.35. On 4 February 2020, SAGE said:

“Duration of infectivity: around 2 weeks, but could be longer. Average possibly 7 days. Duration will vary depending on severity of individual cases” (CJMW4/037 – INQ000051925).

5.36. On 11 February 2020, SAGE said:

“Duration of infectivity: 14 days as upper limit (advice to self-isolate for 14 days still stands). Peak infectivity is probably around the start of symptom onset, average 2-6 days” (CJMW4/034 – INQ000087552).

5.37. On 27 February 2020, SAGE set out an assumption for duration of infectivity:

“Duration of infectivity likely to vary depending on severity of individual cases. 14 days as upper limit. Peak infectivity is probably around the start of symptom on set, average 2-6 days, then falling off rapidly” (CJMW4/038 – INQ000074896).

5.38. Further information on the duration of infectivity and when that information became available is set out in the Technical Report at page 60 (CJMW4/001 – INQ000203933).

5.39. The duration of infectivity is an important concept when considering how long the isolation of proven or probable cases should be (as opposed to the isolation of otherwise well case contacts). Here, the balance is between people ending isolation while still infectious and people having to stay isolated once they have become non-infectious.

5.40. The recommendation for people who had tested positive started at self-isolating for 7 days and was increased to 10 days on 30 July 2020 (CJMW4/039 – INQ000086692). This was in response to the evidence which, although still limited, strengthened and showed that people with COVID-19 who remained mildly ill or were recovering retained a low but appreciable possibility of infecting others between seven and nine days after the onset of their illness. Increased testing also meant people were isolating after they tested positive, as opposed to having to isolate only on the basis of their symptoms which may or may not have been caused by COVID-19 (although at the peaks of the

pandemic if people had symptoms of COVID-19 it had a high chance of being COVID-19).

R number (in the absence of NPIs)

5.41. The basic reproduction number (“ R_0 ”) is the natural reproduction number of the virus. This means the reproduction rate in a population where all are susceptible (there is no pre-existing immunity), and no control measures are in place. Put simply, it describes how many people each case will in turn pass the infection on to, where R of 1 means one person infects one other person (the disease is stable); R=2 means one person will infect 2 people and so on. If R is above 1 an epidemic is expanding, if it is below 1 it is receding.

5.42. On 28 January 2020, SAGE set out:

“Reproductive number: estimated as between 2 and 3, in accordance with estimates from the Chinese authorities, but these figures are uncertain” (CJMW4/031 – INQ000203936).

5.43. On 4 February 2020, SAGE said:

“Reproductive number: previous estimate (2 to 3) still valid, with doubling time still 4 to 5 days” (CJMW4/037 – INQ000051925).

5.44. On 27 February 2020, SAGE papers again set out an assumption for the R number:

“Estimated 2-3 in Wuhan. Unknown in other Chinese regions and internationally” (CJMW4/038 – INQ000074896).

5.45. On 4 March 2020, SAGE agreed with the following assumption in a paper:

“2.4 (assumed for the UK)” (CJMW4/035 – INQ000074987).

5.46. The basic R_0 number for subsequent variants increased, with Alpha, Delta and Omicron all having a higher natural R number than the original Wuhan variant. The higher the R number, the more action is required to bring it below 1 and so change the epidemic from one that is doubling to one that is halving. The SPI-M-O estimates of

the R number are available online and I have provided a copy with this statement (15 May 2020 - CJMW4/040 - INQ000203987).

- 5.47. As immunity mounts due to vaccination and infection, the pool of susceptible individuals capable of being infected falls so the effective reproduction number R (sometimes written as R_t where 't' is time) diverges from, and is generally smaller than, R_0 . The effective reproductive number R is more important for decisions on control as it describes the actual force of transmission with current levels of accumulated immunity, rather than the theoretical maximum rate were that immunity not there. For example if R_t was 2 and R_0 was 3, at this point in time you would need to just over halve the force of transmission to get R below 1 (from $R=2$) rather than reduce it by over 3 times (from $R_0=3$). This helps explain why a smaller number of NPIs may be needed to achieve the same effect once some accumulating immunity from vaccination and/or infection in the population have led to a smaller proportion of susceptible individuals.

Doubling time (in the absence of NPIs)

- 5.48. The doubling time is the time taken for the number of cases of the disease to double, and then double again, continuing this doubling pattern repeatedly (exponential growth). With short doubling times epidemics can expand from small numbers to very large numbers extremely rapidly.

- 5.49. On 28 January 2020, SAGE said:

“Doubling rate: estimated at 3 to 4 days” (CJMW4/031 – INQ000203936).

- 5.50. On 3 February 2020, SAGE said:

“The epidemic is still in its early stages. It is a reasonable hypothesis that the epidemic is still growing exponentially – doubling every 4-5 days” (CJMW4/033 - INQ000203939).

- 5.51. On 27 February 2020, SAGE papers set out an assumption for doubling time for COVID-19:

“4-5 days in China” (CJMW4/038 - INQ000074896).

5.52. On 4 March 2020, SAGE agreed with the following assumption in a paper:

“4.6 days (assumed for the UK)” (CJMW4/035 - INQ000074987).

5.53. On 16 March 2020, SAGE said:

“UK cases may be doubling in number every 5-6 days” (CJMW4/041 – INQ000075664)

5.54. The Inquiry has asked for the doubling time absent NPIs. This is less straightforward than it might appear as the broad concept of NPIs incorporates a range of activity that was implemented over time but also peoples' own behaviours absent any action by Government. This would include action taken by the public of their own initiative once they see an epidemic arriving, for instance to avoid crowded spaces or not take their children to school, as well as the more formal initiatives of Government. From mid-March 2020, considerable NPIs were brought in which altered the doubling number. There were however significant changes to behaviour in advance of the Government's actions which almost certainly had an impact on the doubling time prior to the introduction of formal Government policies.

Infection fatality rate for COVID-19

5.55. The infection fatality rate is the proportion of people infected with a pathogen who die. The case fatality rate is the proportion of people diagnosed with a disease who die. In diseases where there is a lot of asymptomatic infection and limited testing, the difference between case fatality rate and infection fatality rate can be substantial.

5.56. The infection fatality rate for COVID-19 was (and is) low compared to the novel coronaviruses SARS or MERS, but is high in comparison to the endemic human coronaviruses 229E, NL63, OC43 and HKU1 that cause cold-like symptoms. It follows that extrapolating an IFR from any of these known viruses would have been hazardous. Perhaps the most notable feature of COVID-19 was how both the IFR and CFR varied significantly by age.

5.57. On 27 February 2020, SAGE agreed with the estimate of a 2-3% CFR, and 1% IFR, for the initial (Wuhan) variant. There was however a wide variation in these values depending on a patient's age and there remained a fair degree of uncertainty. On 28

January 2020, SAGE observed that the CFR was “currently estimated to be lower than SARS, but many uncertainties remain” (CJMW4/031 – INQ000203936).

5.58. On 11 February 2020 and then 27 February 2020, SAGE maintained this estimation of a 2-3% CFR for planning assumptions, albeit that this had wide confidence intervals (CJMW4/034 – INQ000087552, CJMW4/038 – INQ000074896). The estimate for IFR on 27 February 2020 was 1% (CJMW4/042 - INQ000203873, CJMW4/043 - INQ000203874).

5.59. On 4 March 2020, SAGE agreed with the following assumptions in a paper (CJMW4/035 – INQ000074987):

Age	Proportion of infected that die
0-9	0.01%
10-19	0.01%
20-29	0.04%
30-39	0.09%
40-49	0.15%
50-59	0.69%
60-69	2.21%
70-79	5.92%
80+	8.76%

5.60. It remained the case that the estimated IFR differed widely by age, with much higher mortality in older ages. As new variants and vaccines altered the relationship between infection and death, the estimated IFR and CFR fell substantially.

5.61. It was not until late spring 2020, when many countries were experiencing high transmission and testing was increased alongside designated surveillance studies, that it was possible to shift from a reliance on the CFR to the IFR. This is because in the absence of a way of accurately assessing the number of asymptomatic cases, it was extremely difficult to identify the IFR reliably. At the same time and for the same reasons, the estimates for IFR converged towards a value of 1%, in which we were able to have increasing confidence compared to our initial impressions from earlier in 2020. Whilst this understanding occurred after the peak of the first wave in the UK, the estimate fell within the values previously arrived at by SAGE and NERVTAG (27 February 2020 - CJMW4/043 - INQ000203874, CJMW4/038 – INQ000074896).

Overall use of these data to inform policy decisions

- 5.62. In terms of our knowledge of the features of COVID-19 described above, as our knowledge increased or changed I, the GCSA and DCMOs in turn changed our advice to decision makers based on that new knowledge, as summarised by SAGE. The concepts above underpinned essentially all of the advice given on COVID-19, as the response to a pandemic is inevitably predicated on the features and characteristics of the pathogen causing it, with mortality, force of transmission, and route of transmission being particularly important in determining the most effective and proportionate likely policy responses.
- 5.63. Clearly, in respect of many of these features, the advice alters in terms of its scale and the operational response as the exact estimates change, but the underlying scientific logic did not change. There was for instance consistency in advising that where the R number is above 1, action is needed if exponential growth is to be stopped and reversed. The aspect of this advice more liable to changes over time concerned the measures needed to bring R back below 1, as the degree to which R exceeds 1 will affect how much action is required.

Section 6: Decision making

Decision Making Structures

- 6.1. There were a wide range of decision-making meetings that considered the UK Government's response to COVID-19. These naturally evolved over time as the understanding of the disease and the challenges presented by it changed. It is, rightly, for the relevant government department and Ministers to decide on those structures, and they are best placed to explain their purpose and how they evolved.
- 6.2. A chronology of decision-making meetings that I attended from January 2020 to February 2022 was provided to the Inquiry on 21 December 2022. This included meetings such as:
- COBR (M) and COBR (O);
 - Cabinet as required;
 - MICS (Ministerial Implementation Committees) which became MIGS (Ministerial Implementation Groups);

- COVID-S and COVID-O;
- 'Quad' meetings of the Prime Minister, Secretary of State for Health and Social Care, Chancellor of the Exchequer and Chancellor of the Duchy of Lancaster;
- Meetings with the Secretary of State for Health and Social Care;
- Other meetings with the Prime Minister, including daily Dashboard meetings, pre-press conference briefings and *ad hoc* meetings with him and his No 10 advisers; and
- UK CMOs.

6.3. My role in these meeting was to provide clinical/public health and scientific advice as required by Ministers and other decision makers to inform their decision-making. That remained my role in these meetings over the relevant time period.

Cabinet Office Structures

6.4. As a technical adviser, my view is that Cabinet Office and No 10 structures and processes were and are a matter for the Prime Minister and Cabinet. It is the job of technical advisers to provide advice to as high a technical standard as is practical in the timeframe, within whatever formal or informal structure works best for the political leaders and other senior decision-makers at the time. In my experience in Government, the personality, preferences and skills of the political leaders, rather than the formal structures in place, dictate how best to provide advice, and how that advice is used. More formal structures are usually better for recording decisions, but not always for making them.

6.5. That said, the effectiveness of feeding in clinical and scientific advice to decision-making certainly improved substantially over the first 6 months of the pandemic. This was as much to do with the fact that very able people started to be placed in the right roles as it became clearer the COVID-19 response was the central mission of Government, and that we all got used to working together effectively and understood one another's roles and skills, as it was to do with the structures in place. In addition, the amount of reliable data on which to base decisions significantly improved, and the science became much more settled, making technical advice more certain.

DHSC Structures

- 6.6. The same is true for the Ministerial decision-making structures of DHSC. Different Ministers choose different structures and technical advisers have to work within their preferences. There is always a balance between having a wide enough group in the (virtual) room to ensure relevant expertise is present and challenge is possible and having such a large group that decisions become slow or impossible. Ministers vary widely in their preference on size and formality of decision-making forums.
- 6.7. The official structures in DHSC worked in the sense that I did not at any point think the structure of decision-making bodies was the main limitation in the quality of the decision being made. Generally, the effectiveness of emergency responses flow from the capabilities of the people involved, their ability to work together and the strength of the technical information they have to work from, rather than the formal structure within which they work *per se*.
- 6.8. In practice, there will always be a lead government department for a limited emergency, and this will always be superseded by the No 10 and Cabinet Office machinery once it becomes clear the emergency is either on a major scale, the central mission of Government, or if the response crosses multiple departments. It would not be efficient to have Cabinet Office holding the technical capacity to respond to a moderate flood (DEFRA), rail bridge collapse (DfT) or limited infectious disease outbreak (DHSC).
- 6.9. Equally, once an event becomes a major emergency requiring multiple government departments to work together, No 10 and Cabinet Office will always have to provide a co-ordination role and lead the overall response. In these circumstances technical advice will need to be fed through them, but with individual departments retaining responsibility for their sector- for example DfE for COVID-19 schools policy. The question is when the crossover from a lead department to the centre should happen as the scale of an emergency escalates. In the case of COVID-19, there is an argument that it should have occurred sooner, but it was not inevitable that COVID-19 would escalate to that extent in, for example, early January 2020.

Decision-Making

Formal and informal decision making

- 6.10. Formal decision-making meetings into which I fed technical advice included, as laid out above, COBR, Cabinet, Cabinet sub-committees, small Ministerial groups, meetings chaired by the Prime Minister, the Chancellor of the Duchy of Lancaster or the Secretary of State for Health and Social Care, meetings chaired by other Cabinet Ministers and Ministers, and officials meetings chaired by the Cabinet Secretary or other Cabinet Office officials.
- 6.11. Some of the 4-nation CMO meetings, which I generally chaired, also resulted in decision-making on technical clinical advice, including to the general public. Once the Bronze/Silver/Gold Local Action Committee system was set up, I chaired most of the Silver meetings which fed technical advice into the Gold meetings chaired by the Secretary of State for Health and Social Care.
- 6.12. I have been asked about the extent to which key decisions regarding the UK Government response to COVID-19 were made outside of formal government processes. I can only comment on the decision-making that I witnessed. On that basis, I formed the view that almost all major decisions that needed to be taken by elected political leaders were taken via a formal process. That is however not to say that all of the thought process that led up to the formal decision being made was via a formal process, although in my view this was inevitable given the speed of the pandemic. For example, the Prime Minister might have a pre-meeting with a small group of his advisers, sometimes including a few Ministers and/or me and the GCSA where technical advice was relevant. These pre-meetings allowed him to test his own views and understanding of the issues, and might lead to him coming to a provisional view on the best next steps. The formal decision would subsequently be taken in a formal meeting, often Cabinet, a Cabinet sub-committee or occasionally COBR, in which other senior Ministers could, and in meetings I was in often did, challenge the initial view or interrogate the technical advice underpinning it. The degree of time and space for challenge that I observed was, unsurprisingly, greater in smaller meetings of Ministers than large groups.
- 6.13. WhatsApp is an informal platform that was used during the pandemic to share information and views among other things. It was used bilaterally and by groups. These included groups of colleagues and mixed groups of advisers and Ministers. In my

experience, the groups that included me did not supplant formal decision making on important issues and I certainly saw nothing which made me think that WhatsApp was being used to take on a role or make decisions that would normally be performed or taken by Cabinet or its sub-committees. The use of WhatsApp was akin to the informal conversations that might previously have been had by telephone, or by colleagues working in the same office who now worked remotely. It did however allow real-time conversations between people who were physically separated without the need to set up a group call or meeting, particularly in circumstances where that might not be practical.

- 6.14. As such, I considered that WhatsApp messaging overall probably provided more benefits than harms given the need to communicate often many times a day on multiple topics at a time physical meeting was minimised. It was least useful for trying to convey more complex technical information. Sometimes it took on a role like that of a pre-meeting outlined above. That is, it helped inform decisions, but the decisions themselves were subsequently taken through a formal process where issues could be laid out more fully, ideally with data. It was in my view much less good when more technical information needed to be fed into decision making which often needed data from charts, maps, or an iterated conversation where misapprehensions were corrected.
- 6.15. I think that I should note that WhatsApp was also used for line management and morale reasons, including occasional discussions of the health issues of colleagues and their families (e.g. in the context of compassionate leave). Such correspondence when discussing health would normally be considered as medical-in-confidence. It would be improper for a medical practitioner to disclose such messages under normal GMC guidelines unless under the direction of a Court.

Decision-making in general

- 6.16. In my firm view, the primary decision-makers for issues around societal interventions against COVID-19 should be, and were, elected political leaders. Issues such as closing schools, workplaces, transport and port measures have very wide-ranging social, economic, political, legal, diplomatic and philosophical ramifications. The balance of these issues against health priorities has to be for elected leaders in a democracy, representing society.

- 6.17. In a pandemic, the scientific and clinical advice is clearly a major consideration but it is only one of the factors to be taken into account in decision-making. The GCSA and I were from the outset very uncomfortable with the formulation 'following the science' and consider the correct formulation to be that decisions were 'informed by science', in so far as they could be, accepting that science is by its nature often uncertain and changing. The decisions of political leaders were also, correctly, informed by economic and societal data, advice and considerations.
- 6.18. There were some important technical decisions which were rightly made by technical experts and which did not have wider societal or economic ramifications. Decisions for example about which clinical trials to fund, which vaccines to procure or the correct clinical pathways for doctors to follow were, for practical purposes, made by experts in those fields, where all or almost all of the considerations were scientific or clinical in nature. I, along with other senior technical and clinical leaders, were involved in such decisions. If however such decisions involved major budgetary implications, they would usually be agreed by an elected leader as it involved public money. For the major decisions, including all the societal decisions, the principal decision-makers were, correctly, elected leaders.
- 6.19. From early March 2020, I and/or DCMOs or the GCSA were present at most of the main meetings I would have expected one of us to be at. For practical purposes, we were interchangeable when it came to giving scientific advice. Where a meeting took place without one of us, it was almost always for practical reasons. I did not at any point consider there were active decisions made in No 10, Cabinet Office or DHSC to exclude us from key meetings and usually the difficulty was covering all the meetings we were invited to whilst also performing other aspects of our role.
- 6.20. The Prime Minister, the Secretary of State for Health and Social Care and the Deputy Prime Minister (First Secretary of State) when the Prime Minister was too ill to take the lead all had different approaches to decision-making. I have set out above (see, for example paragraphs 2.63 and 6.4) that different political leaders have different personalities, preferences and skills and I considered my role was to provide advisory support in a way that conformed to the decision-making style of the principal or committee taking the decision.
- 6.21. The political leaders taking the major decisions were always having to balance multiple competing priorities whilst working against a very short timeline dictated by the

exponential nature of viral spread. In turn, this meant balancing the gathering of all necessary inputs so that the matter could be considered in the round, with the need frequently to take decisions very fast. I do not think it is possible to say there was a 'right' balance between these competing factors as there were risks in both directions. Moving too slowly risked being behind the exponential curve, moving too fast meant taking decisions in advance of having some of the key data and therefore making an avoidable error.

Role of advisers in decision making

- 6.22. The aim of the scientific and clinical advisers was to give as clear and balanced a technical input as possible, but without being the rate-limiting step to major decision-making. As with the political decision-making, there was a tension between providing the best possible technical appraisal with proper review and getting data and technical analysis in front of decision-makers rapidly so they could use it to inform their decisions.
- 6.23. With the benefit of hindsight, there were no doubt some issues where we would have done better to have gone earlier with less complete analysis, and others where the extra time spent to extend analysis would probably have been beneficial at the expense of a later but better informed decision. This was however quite difficult to judge at the time and also remains so subsequently, and for this reason it is difficult to provide examples where I am confident that going ahead of, or delaying until after, some specific piece of analysis would have made a material difference. It was especially difficult in the early stages of the pandemic where the political decisions were substantial but the data available were sparse but improving every day and the virus was spreading exponentially.
- 6.24. There are of course multiple scientific issues which, had we known them at the time a decision was taken, might well have led to different decisions. These include but are not limited to the relative contribution of airborne as opposed to droplet spread; the size of the asymptomatic infection pool; the proportion of transmission that was asymptomatic; the existence of the chronic and debilitating syndromes known as 'Long COVID'; the size and duration of immune protection; the speed at which the first wave was travelling in the UK; the existence of Alpha variant; how long a vaccine would take to develop; the importance of oxygen, anticoagulation and many others.

- 6.25. This is different however from important factors which were known contemporaneously and were then ignored by decision-makers. Once we got to mid-March 2020 and beyond, I do not think the principal decision-makers ignored scientific advice, although the degree of weighting they gave it compared to other inputs (e.g. economic and social) varied over time. That is not to say there were not members of Government more peripheral to the major decisions who wanted to cherry-pick their science to fit their world view, but this did not in my experience apply in general to the Prime Minister, Secretary of State for Health and Social Care, Chancellor of the Duchy of Lancaster, or Chancellor of the Exchequer among others. The Secretary of State for Health and Social Care engaged with scientific advice from the earliest stages of the pandemic (in part reflecting his role in Government). Other senior decision makers generally engaged as they realised the crisis was large enough it was going to affect their own area of responsibility.
- 6.26. The Inquiry has invited me to comment on any concerns I might have had about the performance of individual members of the Government or the wider system. I considered it was my job to have a view on, and try to support, my direct and indirect reports. I consider the performance of the DCMOs, the Director responsible for NIHR, my Private Office and others in my direct line to have been very good indeed over a prolonged period under considerable strain. I would also like to take this opportunity to say how good I thought members of the Private Offices of the Prime Minister and Secretary of State for Health and Social Care were.
- 6.27. I did not, and do not, consider it my role to judge the performance of people who I was not responsible for line managing or leading but who the elected Prime Minister had put in post. My role, and that of other technical advisers, is to work with them professionally. Where I had concerns on specific issues, I would take them up with the individual at the time and there was never an occasion they did not listen. I did consider it my role to support all people in post as best I could, mainly technically but also to boost morale of individuals when I thought that was flagging, and stabilise the emotional mood of meetings by helping provide perspective. The one general comment I would make is that, in a protracted emergency, the ability of political and other leaders to maintain a positive and kindly approach to their junior staff and other colleagues is of very great importance and often underrated; these are chronically stressful events in which some mistakes will inevitably be made by excellent people trying their best. I expressed that view to senior leaders, usually as a general point.

6.28. The Inquiry has asked if I ever considered resigning. At no point did I consider resigning or say to anyone that I was considering resigning. From time to time I was rumoured to be threatening to resign in the press but this was always wholly inaccurate. I would not have chosen to have the public exposure that came with being CMO during the pandemic, but I was in post and had a duty to perform. The only circumstances under which I would have considered resigning were if I had lost the capacity to continue; lost the confidence of the Prime Minister, Cabinet or the majority of my scientific or medical peers; thought there was a better person ready and willing to take over during the crisis; or was being made to do something I thought illegal or morally wrong. None of those in my view occurred.

Section 7: Initial Understanding and response to COVID-19

Introduction

7.1. The section that follows is not intended as a comprehensive account of every thought process, piece of advice given or decision made in respect of COVID-19 by me during the period January 2020 to March 2020. It does however attempt to address at a high level, in response to the questions posed by the Inquiry in the Rule 9 request, some of the key concerns I had at the time and the factors which influenced the UK's COVID-19 response. A more detailed account of my role in the introduction of NPIs is found separately at Section 8 of this witness statement.

1 January 2020 to 31 January 2020

Chronology of events

7.2. I have laid out much of the detailed chronology of this period at paragraphs 5.62 to 5.111 of my First Statement. As such, I will not repeat that material again here except when necessary. To provide context to the events of January 2020, it is worth keeping in mind the number of reported cases and deaths as the month progressed:

- By 16 January, 43 people worldwide were reported as infected. There was 1 reported death. There was 1 case in Thailand announced on 13 January and 1 case confirmed in Japan on 16 January.
- On 19 January, 65 people worldwide were reported as infected, 3 outside of China with 2 deaths.

- On 21 January, 282 people worldwide were reported as infected, 4 outside China. There were 6 reported deaths.
- 7.3. I first became aware of the infection subsequently known as COVID-19 on 2 January 2020. It had been reported to WHO on 31 December 2019. As laid out in my First Statement, our understanding of the importance of this particular infection steadily increased through January 2020. Multiple reports are given every month of outbreaks which could turn into a locally, regionally or internationally important infection. Most of these disappear or are controlled. In the case of COVID-19, there was a gradual increase in the probability that this would become an international problem as data accrued and the extent of geographical spread became apparent over the first few weeks.
- 7.4. Initially, the work of the OCMO was led by the DCMO for health protection, Sir Jonathan Van-Tam, with input from myself. As the international risk became more apparent and the probability this would become a significant pandemic increased, I took over the lead with Sir Jonathan in support.
- 7.5. As set out in my First Statement, I was made aware of cases of a “pneumonia of unknown aetiology” detected in Wuhan on 2 January 2020. On this date, Sir Jonathan emailed me, DHSC health protection policy and PHE colleagues and highlighted the outbreak (**CJMW4/044 - INQ000183346**).
- 7.6. The then Secretary of State for Health and Social Care has stated that he became aware from us of COVID-19 on 3 January 2020. I am not confident about whether this was the exact date but he was aware in the first week of that year that this was an outbreak. The first formal note on COVID-19 went to Ministers on 9 January 2020. This came from policy officials (**CJMW4/045 – INQ000106041**).
- 7.7. Whilst key parts of my advice and that of the wider OCMO in January 2020 have been laid out previously in my First Statement, I outline some specific points below to address the requests made in the Rule 9 request. Some of this material is also covered elsewhere in this statement, but for the Inquiry’s ease, I have duplicated it here so as to provide an account of our response in a single place.

- 7.8. On 2 January 2020, Sir Jonathan emailed international colleagues including WHO and CDC asking for further information (**CJMW4/046 - INQ000183347**).
- 7.9. On 3 January 2020, Sir Jonathan emailed Professor Sir Peter Horby (an academic colleague) to ask him to use his contacts in China to provide any intelligence on the outbreak (**CJMW4/047 - INQ000151286**).
- 7.10. On 5 January 2020, I laid out a series of triggers which, if met, would provide an indication that an epidemic of global importance was possible from the outbreak that had been described (**CJMW4/016 - INQ000047484**). These were:

“1. Healthcare workers dying. This is often the early warning that a new infection is both severe and transmissible (eg SARS, MERS, Ebola). This would be the most concerning.

2. Evidence of person-to-person spread eg in families.

3. Geographical spread implying a zoonosis is spreading (in this case we would also want to liaise with DEFRA)”

Much of the next 2 weeks were spent trying to ascertain if the triggers were met.

- 7.11. On 6 January 2020, Sir Jonathan wrote to a colleague in the WHO to ask for further information on the outbreak (**CJMW4/048 - INQ000151289**).
- 7.12. On 7 January 2020, I met with the GCSA. While the outbreak was not the purpose of the meeting, we did discuss it. Whilst I cannot recall the exact details of my discussion at this stage, our view would have been that this was something to keep a close eye on rather than something which was definitely going to turn into a pandemic.
- 7.13. In the following two days Sir Jonathan made two separate points via email. On 8 January 2020, he passed on information from the CDC that the outbreak might be a novel coronavirus. On 9 January 2020, he set out that based on the limited data we had, the hospitalisation rate was relatively high even though we did not yet have large numbers of deaths (**CJMW4/032 – INQ000151296**). At this stage, all information on the outbreak was useful and informed our thinking, but it had to be caveated due to the considerable uncertainty.

- 7.14. On 9 January 2020, I requested NERVTAG meet the following Monday, 13 January, in particular to consider port of entry screening: **(CJMW4/049 – INQ000047488)**. On 13 January 2020, Sir Jonathan attended that first meeting of NERVTAG.
- 7.15. On 17 January 2020, Sir Jonathan attended a WHO meeting on COVID-19 **(CJMW4/050 – INQ000183354, CJMW4/051 - INQ000183352)**. On this date he also set out advice on port health recommendations to DHSC health protection and PHE colleagues **(CJMW4/052 - INQ000151331)**.
- 7.16. On 19 January 2020, I had an email discussion with Sir Jeremy Farrar and subsequently Sir Jonathan based on informal information Sir Jeremy had seen from an unpublished manuscript. This provided evidence, albeit in early form, of person-to-person spread (but not of sustained community transmission). We discussed whether there was asymptomatic transmission as that had practical implications, including for screening **(CJMW4/020 - INQ000183355)**.
- 7.17. In the second half of January 2020, Sir Jonathan and I became increasingly concerned about the potential risk that COVID-19 posed to the UK. I did not at this stage think it necessarily would become a significant threat to the UK, but thought the potential was increasing. The tempo of our response therefore increased from 20 January 2020 onwards.
- 7.18. On 20 January 2020, the first DHSC Permanent Secretary led meeting on COVID-19 was held on the basis of the increased perception of risk. It was also on this date that the OCMO alerted GO-Science of my view that we should hold a pre-SAGE (a SAGE meeting in advance of a formal request from Cabinet Office to activate SAGE) **(CJMW4/053 - INQ000047510)**.
- 7.19. SAGE first met on 22nd January 2020, and reached the following assessment:
- “7. There is evidence of person-to-person transmission. It is unknown whether transmission is sustainable.*
- 8. The incubation period is unclear – but appears to be within 5 to 10 days; 14 days after contact is a sensible outer limit to use.*
- 9. It is highly probable that the reproductive number is currently above 1.*

10. *It is currently estimated that the mortality rate for WN-CoV is lower than for SARS, but it is too early to reliably quantify that rate.*
11. *There is insufficient information currently on the genetic strain to comment on WN-CoV's origin.*
12. *There is no evidence yet on whether individuals are infectious prior to showing symptoms.*
13. *There is no evidence that individuals are more infectious when symptoms are more severe, but that is likely.*
14. *There appears to be very little genetic diversity in WN-CoV based on sequences available so far.*
15. *It is reasonable to argue – based on lessons from MERS and SARS, and consistent with exported cases of WN-CoV – that individuals returning from Wuhan are no longer at risk if they show no symptoms after 14 days” (CJMW4/023 – INQ000174700).*
- 7.20. At this stage, DHSC was engaging with the potential threat with meetings as laid out in Sir Christopher Wormald's first corporate statement for Module 2 of the Inquiry (INQ000144792). The output from the first and subsequent SAGE meetings informed my advice to DHSC. It was also communicated to the Cabinet Office. Central Contingencies Secretariat and DHSC were both on the distribution list for SAGE Minutes (CJMW4/054 – INQ000236378).
- 7.21. In addition, on 22 January 2020 I also wrote to DHSC health protection policy and PHE colleagues to suggest action needed at ports of entry (CJMW4/055 - INQ000203861) and briefed the National Security Council (Officials) on COVID-19.
- 7.22. On 23 January 2020, Professor Sir Stephen Powis (NHS England National Medical Director), Professor Sharon Peacock (PHE National Infection Service Director) and I sent a Central Alert System (“CAS”) alert message to clinicians offering advice for clinical staff encountering patients with respiratory infections arriving from overseas (CJMW4/056 - INQ000047535, CJMW4/057 - INQ000047537).
- 7.23. On 24 January 2020, I attended the first Ministerial COBR meeting on COVID-19. In answer to a question from the Inquiry, I do not have a view on whether COBR should have been held before 24 January 2020. COBR is a coordination mechanism but other

means of coordination across Government exist, in particular the Civil Contingencies Secretariat (CCS) **(CJMW4/058 - INQ000047549)**.

- 7.24. On 24 January 2020, I had a first meeting on COVID-19 with the other UK CMOs. At the time these were Professor Sir Michael McBride (Northern Ireland), Sir Frank Atherton (Wales) and Dr Catherine Calderwood (Scotland).
- 7.25. On 27 January 2020, I met with the GCSA and research funders (UKRI, the Medical Research Council (“MRC”), Wellcome and NIHR) to discuss the COVID-19 research likely to be needed in the event a pandemic occurred **(CJMW4/059 - INQ000047580, CJMW4/060 - INQ000203863, CJMW4/061 - INQ000047578, CJMW4/062 - INQ000047579)**. This was also the date on which the regular internal meetings on COVID-19 with the Secretary of State for Health and Social Care began. At this time, there were 2,798 cases confirmed internationally, 2,741 of which were in China, and 80 deaths **(CJMW4/063 – INQ000236438)**. There were no deaths outside China reported at this point and no recorded cases in the UK.
- 7.26. On 28 January 2020, SAGE met a second time. On this date, I also emailed William Warr, the health Special Adviser (“SpAd”) to No 10. This was the first direct communication from the OCMO to No 10 on COVID-19. This email set out the possible scenarios that COVID-19 could take, taking account of SAGE and UK CMOs views **(CJMW4/064 - INQ000047585)**.
- 7.27. On 29 January 2020, the Secretary of State for Health and Social Care had a call with the Director-General of the WHO. Sir Jonathan and I joined the call. I also briefed the Shadow Health and Social Care Secretary on COVID-19.
- 7.28. On 30 January 2020, I had a first meeting on COVID-19 with the Presidents and/or Chairs of the Royal Colleges relating to medicine, under the auspices of the Academy of Medical Royal Colleges, at that time chaired by Professor Dame Carrie MacEwan. These are the all the major professional bodies for the medical profession and include the Royal Colleges of Physicians, General Practitioners, Surgeons, the Faculty of Public Health and others.
- 7.29. On 30 January 2020, WHO declared a PHEIC. This was communicated to core decision makers including No 10 at that time. Also on this date, the UK CMOs advised the public of an increase in the UK risk level from low to moderate **(CJMW4/065 -**

INQ000203938). This increase in the UK risk level seemed a good way of messaging that this risk was one the UK should take seriously as part of the international increase in risk.

- 7.30. On 31 January it was announced that two patients in the UK, who were members of the same family, had tested positive for COVID-19 both Chinese nationals **(CJMW4/066 – INQ000051857)**.
- 7.31. On 31 January 2020, I met with one of the Prime Minister's Private Secretaries and William Warr, health SpAd to No 10. We discussed COVID-19. On this date I also led the first press conference on COVID-19, had my first meeting on COVID-19 with the Directors of Public Health, (who work in local authorities as the lead public health official including for health emergencies) and jointly sent an updated CAS alert to the medical profession with Professors Powis and Peacock. **(CJMW4/067 – INQ000068530, CJMW4/068 – INQ000203867)**.
- 7.32. Given the passage of time, I cannot recall the details of my non-scheduled interactions with the Secretary of State for Health and Social Care regarding COVID-19 in January 2020. I had a call with the Secretary of State on 23 January ahead of his statement to the House and a COBR prebrief on 24 January. Per my diary, 27 January was the first of a series of formal meetings I had with him specifically on the topic of COVID-19. We had non-scheduled interactions before that date however, but I cannot recall the precise details.

Assessment of risk to the UK

- 7.33. NERVTAG considered COVID-19 on 13 January 2020 at my request. I was not present at this meeting, but consider its assessment that at that point the risk to the UK was very low to have been reasonable. The point of such risk assessments is not to assess the risk at some theoretical future point but rather the risk at that point in time. Given at this time China had reported 41 cases and the first case outside of China had just been reported (1 case in Thailand), this was a rational assessment. **(CJMW4/018 – INQ000023107)**.
- 7.34. I was aware, as was Sir Jonathan, of the path that had been taken by SARS and MERS, both coronaviruses. Both these viruses had caused understandable concern and led to international spread but had not developed into a full pandemic or a large

number of cases in the UK. I did however consider that SARS, MERS or a similar virus could be a significant threat if they became more transmissible, as described by the UK Vaccine Network in 2019 (**12 September 2019 - CJMW4/069 - INQ000183378**).

- 7.35. For both SARS and MERS, the great majority of transmission, and possibly almost all, was from symptomatic cases. We were however well aware that even apparently similar viruses can take very different paths and that accordingly, asymptomatic transmission was possible.
- 7.36. Virtually all of our understanding of COVID-19 in January 2020 came from China. I had, and still have, a very high respect for the scientists and clinicians in China and consider they are capable of providing clinical, epidemiological and scientific outputs to the highest international standard. I therefore had no reason to doubt the technical capacity of China to provide good international data.
- 7.37. There were however two potential reasons why data from China might not be accurate or complete. The first was the biological and practical reality that this was a fast moving new virus to which China was mounting a very major response. There was a high chance that their capacity, in common with any other country faced with this situation, would be overwhelmed. Accordingly, the data they could provide the international community would inevitably lag behind the real situation due to technical reasons and system strain. Had the UK been the first country affected by COVID-19, there would in all probability have been some delay in our reporting of data as the initial system was overwhelmed.
- 7.38. What was less clear was whether the Government of China would choose to delay or modify the information it made available internationally even if it were available domestically in China. I thought it very unlikely they would exaggerate the risk. Insofar as there was a risk therefore, whether from understandable reasons of the system being overwhelmed or from deliberate policy, it was that they would reduce or delay the reported risk, and thereby lead to an underestimate of that risk by ourselves. This was my view at the time.

Factors which influenced my response in January 2020

- 7.39. As of January 2020, I had a good awareness of the UK's capability to respond to a pandemic. I considered that it was capable of responding effectively to small outbreaks, spillover cases from major epidemics elsewhere (e.g. SARS, MERS, Ebola in West Africa) and had very strong science capabilities. I had no illusions that the UK, or for that matter any other Western nation, was well set up to meet the challenges of a major pandemic with significant mortality.
- 7.40. For reasons I have laid out in previous witness statements, my view is that every pandemic is very different to the last; for example, the last major pandemic affecting the UK was HIV, a sexually and intravenously transmitted infection of predominantly young adults with initially 100% mortality for which the interventions were completely different from those for COVID-19. I was not of the view that investment in health protection had been strong over the previous decade, nor did I think that previous pandemic plans or lessons from previous exercises would necessarily stand up to the challenges of a new pandemic from whatever source.
- 7.41. I was influenced in my thinking by my personal experience of the major pandemics, epidemics and outbreaks I had seen. The ones which influenced me most outside influenza were HIV, Ebola and malaria. I learned a number of things from the domestic UK response to H1N1 in 2009, which in general I thought was good, although personally I was more engaged on the international side. I certainly did not take from the experience of 2009 that there was merit in delaying any response. I thought the rapid standing up of the response to H1N1 in 2009 was entirely correct, but that arguably we should have stood down elements of it more rapidly once it became clear that mortality was very low by influenza standards.
- 7.42. I was clear to policymakers that there were risks to overreaction as well as underreaction. An example is my email to the health SpAd in No 10 sent on 28 January 2020 (**CJMW4/064 - INQ000047585**). On that day there were 4,593 international cases reported and 106 deaths.
- 7.43. For the first 20 days of January 2020, we were assessing the extent to which we thought an international crisis was likely to occur. From 20 January onwards, we commenced preparations in earnest to be ready for a pandemic were one to occur. In practice, this was similar in structure to the roadmap subsequently laid out: "contain,

delay, research and mitigate". These were parallel work streams and should not be seen as strictly sequential.

- 7.44. Containment was primarily intended to identify any cases in the UK that were spillover cases. It was initially a real possibility that even if this became an international emergency it might not become a pandemic, but rather something similar to the SARS epidemic. This had led to widespread infection in Asia and Canada, especially in the health services as much of the spread was in hospitals, but only spillover cases occurred in the UK, which were contained. My view at the time, expressed in public meetings as well as within Government, was that if this was a containable disease (i.e. one with limited transmission) the UK was capable of containing it, but if it was significantly more transmissible containment was very unlikely to hold for long anywhere, including the UK and wider Europe and it would spread globally. Were that to be the case, we should aim to delay the upswing of any UK pandemic wave.
- 7.45. There were several benefits to delaying the arrival of the first pandemic wave; to push it away from the winter months where the NHS is under greatest pressure and when influenza would have some syndromic similarities; to maximise the chances that the first scientific understanding would be in place before the wave; and to prepare systems across the whole of Government for what would clearly be a major public health, medical, social and economic shock. There was a further dividend in that any delay to the first wave would allow us to get our research programmes underway in advance, something for which I had both operational and advisory responsibilities due to my role as Head of NIHR.
- 7.46. The WHO's declaration of a PHEIC on 30 January received wide publicity and was therefore well known in Government. In my view, this was simply a recognition of the realities of the situation unfolding in China and eastern Asia. It was not at that stage necessarily a prelude to the declaration of a pandemic. Between 2005 and 2020, there were five PHEIC declarations: the 2009 H1N1 influenza pandemic; 2014 polio declaration; 2013–2016 outbreak of Ebola in West Africa; 2015–16 Zika virus epidemic; and the 2018–20 Kivu Ebola epidemic. Only one (influenza H1N1) was a potential significant threat to the UK. Most recently, a PHEIC was declared for Mpox, a disease which whilst certainly having significant international impact, fell well short of a pandemic and caused only limited impact in the UK. Whilst WHO did not declare a COVID-19 pandemic until March, it was helpful to have confirmation from them at this time that COVID-19 should be taken seriously internationally.

COVID-19 as an airborne high consequence infectious disease

7.47. On 13 January 2020, Sir Jonathan suggested COVID-19 should be seen as an airborne high-consequence infectious disease (“HCID”). This was in response to an email from PHE setting out that *“the 4 Nations Public Health HCID List and Definition group who have considered the rationale for Wuhan novel coronavirus (WN-Cov)... made an interim recommendation that this should be considered as an airborne HCID”*. The email went on to say: *“In material terms, this does not change our immediate public health response but will influence how the health services in the 4 nations manage patients”* (CJMW4/070 – INQ000151309).

7.48. Sir Jonathan also suggested that PHE should seek NERVTAG’s view. NERVTAG met on 13 January 2020. The minute records the following:

“NERVTAG were briefed that the novel coronavirus has been reviewed by the 4 Nations Public Health Agencies who have recommended it is designated as an interim airborne HCID, although this now has to be considered by other bodies. The group had requested that this information was provided to the Chair of NERVTAG. NERVTAG have noted this and has not raised any specific problems around this precautionary measure.” (CJMW4/018 – INQ000023107).

7.49. In my Second Statement, I laid out some points about HCIDs, and repeat them below:

“A novel emerging infectious disease is likely to be treated as an HCID whilst the characteristics of the pathogen are still becoming known. Wuhan novel coronavirus was classified as an HCID on 16 January 2020 and declassified on 19 March 2020, following advice from ACDP. These decisions took into account the available information and uncertainty about this novel disease at the beginning of the outbreak and mortality rates among other factors.

There are significant disadvantages to a disease being classified as a HCID when it is not one. At the individual patient level it makes treatment more difficult and alarming as very strict barrier care will be in place, and ill patients may have to be transported around the country to specialist units with attendant risks. At an NHS-wide level each case of a HCID is highly resource-intensive, and the specialist provision of beds is limited. At a population level contacts will be very strictly isolated and monitored. There

are therefore few advantages, and several risks, to having a HCID classification in place when it is not needed. De-classifying diseases down to a non-HCID wherever possible should therefore be seen as normal practice once initial risk assessments are in place”.

7.50. In my view and at the time and with hindsight, I consider the initial classification of COVID-19 as a HCID as prudent as part of the containment strategy, and the de-escalation sensible once it was clear we had multiple cases and the mortality in younger people was lower than most diseases which are HCIDs such as Ebola.

1 February 2020 to 28 February 2020

7.51. February 2020 saw increasing attention paid to the UK’s preparations for COVID-19, as well as aspects of our direct response e.g. the management of travellers abroad. On 31 January it was announced that two patients in the UK, who were members of the same family, had tested positive for COVID-19; both Chinese nationals, which did not lead to onward transmission. On 28 February 2020, the UK recorded the first case of COVID-19 which clearly appeared to have been contracted domestically (i.e. no international links). Time was spent in trying to work out what combination of NPIs could get R below 1 for COVID-19 whilst minimising the impact on society.

Meeting with the Prime Minister on 4 February 2020

7.52. I first briefed the Prime Minister, who was accompanied by the Cabinet Secretary and others, on 4 February 2020 (having already communicated with his health SpAd from 28 January and aware of a significant Cabinet Office briefing to the Prime Minister on 27 January). My briefing was part of a wider NHS briefing including on the potential risks of COVID-19. At that point, I expressed the view that if COVID-19 spread internationally and became a pandemic, there was a reasonable chance we would have between 100,000 and 300,000 deaths from it in the UK.

7.53. This was not intended, nor was it presented as, a formally calculated reasonable worst case scenario (“RWCS”). Rather, these figures were an indication of the seriousness of the situation if a pandemic of this new infection were to emerge. In the same meeting, it was made clear that the RWCS used for planning, based on pandemic influenza, was even higher than this. By then, the total number of reported cases internationally was 29,630. The total number of reported deaths was 425 in China and 1 outside. My

principal aim in this meeting was to ensure that the Prime Minister understood that if COVID-19 turned into a pandemic there was likely to be very significant loss of life in the UK. He heard the advice and in my view understood it; I have no way of telling whether he believed it. It was a relatively brief discussion.

- 7.54. I do not recall in that meeting the Prime Minister asking me whether flights should be banned. This does not mean he did not, simply that I do not recall it. Had I been asked, I would have likely said that banning flights just from China, were there to be a pandemic, might delay but would not prevent ingress of the disease to the UK. This was consistent with the widely held international views at the time. I cover our advice on borders and travel separately in greater detail below in Section 9.

Our understanding of COVID-19 in early February 2020

- 7.55. By late January 2020, SAGE had only just started to be operational. We did not in early February have a reliable RWCS for COVID-19 specifically. There was a pre-existing unmitigated RWCS for pandemic influenza with an upper bound of 820,000 excess deaths (**CJMW4/071 - INQ000236439**). In the absence of specific data for COVID-19, this was used for planning purposes whilst COVID-19 specific data emerged. It was of course wholly improbable that no mitigations would be undertaken.
- 7.56. Subsequently, SAGE would formally agree RWCS numbers specifically for COVID-19 which were thereafter used by myself and the GCSA in our advice and disseminated more widely across Government via the SAGE minutes (**27 February 2020 - CJMW4/043 - INQ000203874**). Influenza pandemic planning assumptions were actually more alarming in terms of the RWCS than the COVID-19 specific data, and so using these was not a brake on the potential seriousness of the situation. As always, it is better to plan for a higher RWCS and then de-escalate once better data becomes available, than to be surprised by the severity and to under-plan.
- 7.57. Various commentators have frequently made comparisons between COVID-19 and influenza. For my part, I certainly did not consider COVID-19 to be like seasonal influenza. Whilst we had adopted the RWCS for pandemic influenza, in my opinion quite reasonably in the absence of specific COVID-19 data, my view was that although it had some similarities to pandemic influenza, it also had a number of important differences.

- 7.58. The most important similarity was that it was by this stage apparent it is a highly transmissible infection passed on by the respiratory route (unlike for example MERS- much less transmissible). The route has very significant implications for potential methods of control as compared to pandemics or outbreaks passed on by sexual (HIV), touch (Ebola), vector (Zika, malaria) or oral (cholera, nvcjd) routes. Respiratory pandemics will generally be faster in their transmission and most of the countermeasures available for other routes do not work. On the other hand, there were some important differences between COVID-19 and pandemic influenza that emerged relatively early on in the pandemic, in particular the fact that in contrast to influenza children were relatively unaffected in terms of severe disease (although severe and fatal cases did occur in children). It also had a longer generation time and a number of other important technical differences.
- 7.59. The Inquiry stated in their ask of me that the SAGE meeting on 3 February 2020 considered that “*China was likely significantly underestimating its case number and fatality figures*”. This appears to be a subtle but important difference from what SAGE actually said. The minutes of the SAGE meeting dated 4 February 2020 state that “*SAGE was updated on latest case numbers and fatalities: there was agreement that figures for China likely a significant underestimate.*” (CJMW4/037 - INQ000051925). For reasons I have covered above, we were aware of the risk that data from China may have contained inaccuracies which gave rise to a risk we would underestimate the severity of their outbreak; this did not mean these were necessarily deliberate in whole or part given the speed of the epidemic and the limitations in testing. I cover this point at paragraphs 7.36 to 7.38 above.
- 7.60. The Inquiry has asked about comments in an email discussion with Neil Ferguson and others on 21 February 2020 (INQ000148969) on why it was premature to talk about ending containment at that time. It is important in answering this to recognise that containment is a global strategy. The aim is (like with SARS or with the Ebola crisis in West Africa) ideally to get back to a situation where there the disease is no longer a global threat, or at least (like MERS) where a largescale epidemic or pandemic is unlikely. Once a country has declared that containment is no longer possible that has global implications. My view was the UK on 21 February 2020, at a point 9 cases had been identified in the country and 0 deaths, was not in a position to declare that containment had failed, a statement with international implications if true (CJMW4/072 - INQ000250983). By late February 2020 I thought it highly likely we would get to that

point (so to that extent I agreed with Prof Ferguson), but it was not yet certain. Both Professor Ferguson and I thought we needed to be planning for what came after containment and that SAGE should be considering options. The Minutes of SAGE lay out the approach at the time.

Policy development in February 2020

- 7.61. In my view, the GCSA and I shared a common understanding of the need for urgent action throughout February 2020. Our positions were informed by the opinions of SAGE, of which there is a contemporaneous record. Neither of us argued against the conclusions of SAGE, nor did we disagree with them and both of us approved minutes. I do not believe there were significant differences between the GCSA and me on the policy planning approach to be adopted at this time. In this early period of the pandemic, as we had not worked so closely together by this point as we would come to, we did on occasions have different approaches to the tactics of how to get things through Government and the points at which pressing would be most effective. I do not consider these to have been significant however, and do not think they had any material impact on the UK's response.
- 7.62. The best account of policy planning undertaken in February 2020 can be found in the COVID-19 action plan published 3 March 2020 (**CJMW4/073 – INQ000087573**). This described what was ultimately referred to as the “contain, delay, research and mitigate” framework.
- 7.63. In following this approach, the UK Government implicitly rejected two alternatives which were advocated by some: either to let the virus circulate unchecked in an attempt to protect only the most vulnerable; or to pursue a so-called ‘zero COVID’ policy. This middle position was in line with that followed by the vast majority of European countries, which accepted that COVID-19 would circulate, and aimed through Government and societal actions to keep this at a lower level so as to reduce the risk of death, serious illness, or that health services would be overwhelmed. In answer to a direct question from the Inquiry, I did not at any time advise the Prime Minister that a strategy we should ‘take it on the chin’ was a sensible basis for policy planning, nor did I ever believe this was sensible policy given the likely loss of life involved.
- 7.64. I was asked by officials for my comments on multiple iterations of this four point action plan and offered my views on areas on clinical and public health matters. I also, at the

request of the Permanent Secretary at the Department of Health, undertook a high-level fact check to ensure the final version was scientifically accurate. I provided further detail on my advice at the time in a press conference on 3 March 2020 (**CJMW4/074 - INQ000047933**).

- 7.65. I considered, and still consider, the “contain, delay, research, mitigate” strategy to have been a reasonable one at the stage it was set up. As I will outline below, with the benefit of hindsight we moved too slowly in March 2020 because we thought we were further away from a significant countrywide wave in the UK than subsequently became apparent. The strategy however was not the reason for this delay. In my view, this was predominantly a product of the limited testing we had access to in the first part of the pandemic, combined with the simultaneous seeding of COVID-19 across a large part of the country due to imported infections from Europe in mid-February 2020 which we did not detect until later.
- 7.66. The Prime Minister was undoubtedly concerned early in the pandemic about the risks of overreaction given the economic and social impact this would have. Given his wide responsibilities, I do not consider this was an unreasonable thing for him to worry about. My job was to lay out as best I could the potential public health risks to assist him in taking balanced decisions.
- 7.67. The Inquiry has asked me whether the Prime Minister should have been more involved in the response to COVID-19 in February 2020. I respectfully cannot answer that since I do not know the reasons he chose not to be, the competing calls on his time and how he chose to prioritise. This is much better answered by him. Mechanistically, the Cabinet Office, CCS, and DHSC officials continued to plan and would have done so with or without the Prime Minister. COBR ministerial meetings met, chaired by the Secretary of State for Health and Social Care, who understood the brief. Clearly however, in Government if the Prime Minister gets involved in a particular matter this signals importance and urgency to the wider system.

Awareness of measures in other countries

- 7.68. I was aware of the measures being taken by other nations early in the COVID-19 response as these were widely reported in the press, available through formal reporting

(e.g. DipTels), and via informal contacts and bilateral discussions. I have set out some of our international engagement in more detail above at paragraphs 2.80 to 2.90.

- 7.69. When considering the interventions of other countries there were at least two stages in our approach. The first was one of science and public health; were they epidemiologically appropriate in the UK and could we practically enact them? Advice incapable of being enacted is of limited use in an emergency. There was then a second set of questions which were for political leaders. These concerned the legal, social and economic impacts of such measures, and balancing these against the public health impacts.
- 7.70. Quite a lot of concern with some of the measures being used elsewhere was that whilst they may prove effective, they would be unfeasible or impractical. We did not for example have the testing capacity or contact tracing infrastructure of South Korea in early 2020 due to their prior investment in this area, and so trying to emulate their approach exactly would have been unrealistic. We have a very much more integrated economy reliant on international trade for basic goods, including food, than New Zealand. It was not that we thought conceptually that the measures adopted in these countries could not work, but rather that they seemed less likely to be feasible given our own situation. The approach we observed in early 2020 in China had been demonstrated to work in their context, but depended on a particular interaction between the State and citizens. It was a political decision as to whether to follow or not, but there were good reasons for thinking UK social responses would not necessarily be the same as those in China.
- 7.71. In considering any intervention used internationally, it was always essential to think through how the interventions might work in the UK over the pandemic as a whole, rather than just over the first few weeks. Commentary that implies the commentator would have liked the results of the first few months of another country's response but not their later course misses the reality that these are linked.

Our understanding at the end of February 2020

- 7.72. On 27 February 2020, SAGE concluded that in a reasonable worse case scenario "80% of the UK population may become infected, with an overall 1% fatality rate in those infected" (CJMW4/043 - INQ000203874). This was based on the data SAGE had up to that point and is set out usefully in a table they published (CJMW4/038 -

- INQ000074896**). By this time, SAGE minutes were being widely read across Government and observers from many government departments were present at SAGE meetings. This allowed, and resulted in, wide dissemination of this information.
- 7.73. The scientific background to SAGE decisions is best judged from the contemporaneous record and the papers from the specialist groups such as SPI-M that fed into it. The figures of an approximately 1% IFR and an upper bound of 80% of the population becoming infected which were adopted for the RWCS were however reasonable both at the time based on what was known, and subsequently do not seem unreasonable based on what later transpired. These figures were in respect of the original (less infectious) Wuhan variant and applied to the pre-vaccine era.
- 7.74. The RWCS is exactly that; it is the highest figure which could occur reasonably and generally does not take account of any mitigation strategies. As a result, the expectation is that the true figure will be lower than the RWCS once Government and society have acted.
- 7.75. SAGE sent a summary of this view to the Cabinet Office by proposing edits on a note the Cabinet Office was drafting for the Prime Minister on 27 February 2020 (**CJMW4/075 - INQ000236383**). Key conclusions included in that note were that COVID-19 looked increasingly likely to become a pandemic and that the risk could be in line with the pandemic influenza RWCS. COBR met on the 28 February 2020 and both the GCSA and I attended. The assumptions from the SAGE meeting the day before were included in the papers of that meeting (**CJMW4/043 - INQ000203874**).
- 7.76. As of 28 February 2020, 20 people in the UK (eighteen in England, one in Wales and one from Northern Ireland) had tested positive for COVID-19 with no deaths. 83,351 people were confirmed as infected worldwide, 4,527 outside of China. This date saw the first confirmed domestic case being identified which could not be traced back to an infection abroad, as well as being the date on which the WHO raised the global risk level to “very high”. From about this time, community transmission was likely to have been increasingly established in the UK. Although imported spillover cases had occurred earlier in February, the widespread seeding of COVID-19 to the UK from France, Spain and Italy is currently understood to have occurred from mid-February onwards, and likely manifested itself in sustained community transmission from the end of the month onwards (**CJMW4/076 – INQ000224069**).

- 7.77. This widespread seeding was not recognised at the time but had serious implications for the speed with which the UK's first wave developed and was a key difference in our experience compared to that of many other nations. In China (Wuhan), South Korea, and Italy (Lombardy) the experience was that the national epidemic started in one place and then spread out from there. The more widespread simultaneous seeding across the UK resulted in a more rapid first wave, which to a greater extent affected the whole country simultaneously, than that which other nations had previously witnessed.
- 7.78. The Inquiry has asked to what extent the virus and disease were properly understood by me in January and February 2020. If the question is whether my and our collective understanding over that period was the same as it is now, very clearly the answer is no. I have outlined how our understanding changed in respect of many of the scientific fundamentals in Section 5 above.
- 7.79. There were very large numbers of things we did not know about the virus clinically and epidemiologically in addition to the likely responses to the pandemic of populations and Governments. If we were to re-run the advice given in Government based on what we know now, it is pretty obvious that it would have been very different. We were well aware at the time that we had a very limited understanding of this new infectious threat. If the question is whether we understood it as well as other international observers at the time based on the contemporaneous data, then I do not think we were a major outlier in terms of our understanding in the initial two months, and have not subsequently seen evidence other nations at a similar point in their epidemiology had a better understanding.

Advice in respect of mass gatherings in February – March 2020

- 7.80. Throughout the early pandemic, and in particular around the end of February and beginning of March 2020, my advice was sought on mass gatherings. In particular, I spoke to the Secretary of State for Digital, Culture, Media and Sport about sporting fixtures on 28 February 2020.
- 7.81. My advice to core decision-makers between January and March 2020 about public gatherings was entirely informed by SAGE (**4 February 2020 - CJMW4/037 - INQ000051925, 13 February 2020 - CJMW4/077 – INQ000106109, 27 February 2020 - CJMW4/043 – INQ000203874, 3 March 2020 - CJMW4/078 – INQ000061520,**

5 March 2020 - CJMW4/079 – INQ00061521, 10 March 2020 CJMW4/080 – INQ000061522, 13 March 2020 - CJMW4/081 – INQ000236391). It was fully recognised that this was a difficult issue. There was a legitimate concern in SAGE that if mass events due to be held in the open air were cancelled at short notice, then people who would have travelled to a venue and would have been watching them outdoors would instead have crowded into pubs and other indoor venues, possibly increasing risk. In retrospect, in my view this missed some important points, of which the most important was the signal it sent of normality at a time when that was not what we were trying to convey. Whilst it remains the case that outdoor events are considerably safer than indoor ones from a COVID-19 perspective (although not zero risk), pictures on television of massed crowds were very unhelpful. In hindsight, we also likely underestimated the risk involved in travel to and from venues and in getting into the venue itself. Having said that, it is of course impossible to quantify the difference in the spread of infection between those events taking place and what would have happened (taking into account, for example, the pub scenario) had they been cancelled.

Advice to the health and social care system

- 7.82. Since 2012, the responsibilities previously held by the CMO in respect of the NHS in England have instead been held by the NHS National Medical Director (in Scotland, Wales and Northern Ireland other divisions of responsibility occur). I do not therefore have a direct role in the organisation or operation of the NHS.
- 7.83. Nevertheless, I did and do work closely with the NHS National Medical Director, Professor Sir Stephen Powis, as part of my broader contribution to leadership of the medical profession in England. Sir Stephen was an excellent colleague and medical leader over the period of the pandemic, as well as a good communicator of science and clinical information to the public via the media. Largely, guidance to healthcare providers was given either by the NHS, or by PHE as it was, on matters such as infection prevention and control. For social care workers, the same advice would usually have come from PHE. This is a usual way in which the NHS and PHE (now UKHSA) interact.
- 7.84. Core political decision makers (as defined by this Module of the Inquiry) have much less of a role in advising on guidance to health and social care providers when it comes to technical matters, such as infection prevention and control. Such information was passed from technical infection prevention and control experts to those treating

patients directly, rather than via Ministers. The NHS National Medical Director, PHE National Infection Service Director and I sent a number of CAS alert messages to clinicians in January and February 2020. These are set out in my First Statement at paragraphs 5.95 to 5.127. They are also available publicly and were from the point at which they were sent. I and the other CMOs often gave technical (as opposed to operational) messages directly to the medical profession via a variety of routes where that was appropriate.

- 7.85. One technical area in which I did advise touching on the interests of the health and social care system was in relation to making COVID-19 a notifiable disease. The principal reason I was keen on COVID-19 being a notifiable disease was that this is an established mechanism to allow free treatment for people from other nations who do not otherwise have NHS entitlement. In the context of an infectious disease outbreak such as COVID-19, this helps minimise risk to the wider general population.
- 7.86. Notifiable diseases are treated for free because without this there is a risk that people with a potentially communicable disease would not come forward and seek treatment out of fear of the bills that will result. They then stay out of hospital and remain in the community where they are at risk of transmitting the disease to others. There were also some secondary gains from having COVID-19 as a notifiable disease, such as health staff being required to report domestic cases which should improve epidemiological reporting. In my view, the timing of this decision on 5 March 2020 was sensible in the overall context of the COVID-19 response, and likely made little material difference to the outcome.

Isolation and the HCID network

- 7.87. By 3 February 2020 there had been two cases of COVID-19 in the UK (announced on 31 January 2020). A third case was announced on 6 February 2020. Small numbers such as these were possible to manage in the HCID network.
- 7.88. I have been asked by the Inquiry whether it is correct that on 3 February 2020 plans for the response to COVID-19 extended to 50 specialist beds with a further 500 available for isolation. I have seen those figures provided by the Secretary of State for Health and Social Care to Parliament. However, I understand the reference to the availability of specialist isolation beds in early February to simply be a reflection of what beds were available, rather than any judgement of the scale of the COVID-19 problem.

As I told the Inquiry in my Module 1 oral evidence, the HCID network is best conceived as a series of concentric circles. There are two high consequence infection centres in London and Newcastle designed for the highest risk patients (for example Ebola, which has a mortality of up to 70% and a high risk of being transmitted in hospital). These units have a very small number of beds across the two sites. Beyond these are a group of high consequence infectious disease specialist centres arranged in a HCID network of around 50 beds. Thereafter, there are approximately 500 further specialist infection beds with isolation facilities outside the HCID network. Were these to be exhausted, the NHS would rely on negative pressure side rooms in hospitals outside of specialist infection units, then general side rooms, and then finally the use of general wards capable of cohorting infected patients together.

- 7.89. At the point that the principal aim was to contain any cases so as to contain (if possible) the spread of the disease, the HCID network would have been capable of caring for all the initial cases that required hospital admission. This was part of the contain process and would have also served to prevent onward infection of COVID-19 spillover cases to healthcare workers and the general public. Once significant domestic transmission occurred however, it was clearly not going to be possible to manage all cases in the HCID network, and the NHS would need to rely on wider isolation beds, and in time, cohorting of infected patients on the same ward. The disadvantages of having HCID classification when it is not needed are laid out above at paragraphs 7.47 to 7.50.

The first two weeks of March 2020

- 7.90. SAGE advice on 5 March 2020 was:

“There is epidemiological and modelling data to support implementation – within 1 to 2 weeks – of individual home isolation (symptomatic individuals to stay at home for 14 days) and whole family isolation (fellow household members of symptomatic individuals to stay at home for 14 days after last family member becomes unwell) to delay COVID-19 spread, modify the epidemic peak and reduce mortality rates” (CJMW4/079 - INQ000061521).

- 7.91. NERVTAG’s advice on 6 March 2020 for isolation of cases was:

“NERVTAG’s recommendation for the length of time in self-isolation is between 7 and 14 days. In the current situation NERVTAG would prefer this period to be towards the

longer end of the range. The caveat accompanying this recommendation is that those in immunocompromised groups and those on steroids (including those with lung disease) to be considered for longer periods of self-isolation due to the reports of increased shedding and vulnerability. NERVTAG would revisit this when more data is available” (CJMW4/082 – INQ000087540).

- 7.92. On 9 March 2020 there had been three deaths reported in the UK. On the same date in Italy there were 336 deaths reported (CJMW4/083 - INQ000236385). The advice from SPI-M on 9 March was that 7 days isolation of cases gave the same benefit as 14:

“From a population perspective, the difference between 7 and 14 days is negligible, but you might expect higher compliance from 7 days” (CJMW4/084 - INQ000048000).

- 7.93. On 10 March 2020, SAGE advised:

“5. Based on surveillance, including cases in intensive care units (for whom there is no travel history accounting for infection), the UK likely has thousands of cases – as many as 5,000 to 10,000 – which are geographically spread nationally.

6. Transmission is underway in community and nosocomial (i.e. hospital) settings.

7. Available data for the UK are accruing fast. Firmer estimates of infection rates will be available next week...

12. The UK is considered to be 4-5 weeks behind Italy but on a similar curve (6-8 weeks behind if interventions are applied)

14. SAGE endorsed NERVTAG’s advice that individual case isolation should last for 7 days from onset of symptoms.” (CJMW4/080 – INQ000061522).

- 7.94. On 12 March 2020, UK Chief Medical Officers raised the risk to the UK from moderate to high (CJMW4/085 – INQ000052485). This was in response to the clear increase in transmission.

- 7.95. On 13 March 2020, SAGE stated:

“1. Owing to a 5-7 day lag in data provision for modelling, SAGE now believes there are more cases in the UK than SAGE previously expected at this point, and we may

therefore be further ahead on the epidemic curve, but the UK remains on broadly the same epidemic trajectory and time to peak.

2. The science suggests that household isolation and social distancing of the elderly and vulnerable should be implemented soon, provided they can be done well and equitably. Individuals who may want to distance themselves should be advised how to do so.

3. SAGE is considering further social distancing interventions – that may best be applied intermittently, nationally or regionally, and potentially more than once – to reduce demand below NHS capacity to respond. The modelling sub-group is discussing potential interventions on Monday 16th, for review by SAGE on Tuesday 17th.

4. The behavioural science suggests openly explaining to the public where the greatest risks lie and what individuals can do to reduce their own risk and risk to others, even if this is ahead of measures announced by the Government – but SAGE recognises that taking individual measures may be more feasible for some than others. Greater transparency could enable personal agency, send useful signals about risk and build trust.

5. Measuring the impact of all interventions depends on sufficient, relevant data delivered on time: it is a priority to ensure accurate and complete data are available with minimal delay” (CJMW4/086 - INQ000109142).

7.96. The GCSA and I communicated this SAGE advice to core decision makers formally on the morning of 14 March 2020 in a 9:15am meeting with the Prime Minister, Secretary of State for Health and Social Care, Chancellor of the Duchy of Lancaster, Cabinet Secretary, Chief Adviser Dominic Cummings and Cabinet Office and No 10 officials. A summary of the SAGE advice was sent to Mr. Cummings on 14 March **(CJMW4/087 – INQ000236387)**. This advice was published that day **(CJMW4/088 – INQ000236386)**.

7.97. The minutes were distributed on 14 March and a slightly amended version followed on 16 March. This amendment followed an email exchange between Sir Jeremy Farrar and the GCSA. Sir Jeremy expressed his concern that the minute did not reflect the urgency of action needed. GCSA explained the below:

“My read out to politicians has spelled out the urgency clearly but if we haven’t reflected that in the minutes then we should” (CJMW4/089 - INQ000236389).

Accordingly, the amended version read:

*“The science suggests that household isolation and social distancing of the elderly and vulnerable should be implemented as soon **as practical** (i.e. they can be done well and equitably). Individuals who may want to distance themselves should be advised how to do so” (CJMW4/081 – INQ000236391).*

The previous version had read:

“The science suggests that household isolation and social distancing of the elderly and vulnerable should be implemented soon, provided they can be done well and equitably. Individuals who may want to distance themselves should be advised how to do so” (CJMW4/086 – INQ000109142).

- 7.98. My view is that the revised minutes provided a central assessment of the views in SAGE at that time. There were a variety of view points and this was a reasonable central summary of those views. The GCSA and I further laid out those views in the subsequent meeting with the Prime Minister. I believe it was clear to core decision makers that action was needed at speed, faster than had previously been anticipated, and this can be seen in the readout of that meeting with the Prime Minister **(14 March 2020 - CJMW4/090 – INQ000136751)**.

16 March to 23 March

16 March 2020

- 7.99. On 16 March 2020, the total number of cases known to be in the UK was 1,544 and the total number of deaths was 55 **(CJMW4/091 – INQ000203882)**. On this date, the Secretary of State for Health and Social Care advised the public against all unnecessary social contact. The Prime Minister urged people to work from home and to avoid pubs and restaurants. Isolation of households with a symptomatic case was introduced and social distancing for the moderately clinically vulnerable was announced **(CJMW4/092 – INQ000203947)**.
- 7.100. This advice was in my view a very major policy shift and a substantial move away from the personal philosophy of the Prime Minister and many members of his Government.

It was also a major departure from the assumed policy of the previous planning for an influenza pandemic. It was very important in terms of its impact on COVID-19 and the public's perception of safe ways to minimise risk. People often incorrectly remember 23 March 2020, rather than 16 March 2020 as the start of Government's efforts to make a strong push for a reduction in social interactions.

- 7.101. The Inquiry has asked about the modelling report by Imperial College on 16 March 2020. This was a useful report but it was only one amongst many other modelling inputs. The Imperial model did however have a wider impact than its input into SAGE. Because it demonstrated graphically some of the possible scenarios (with wide confidence intervals) it also helped to change the debate more widely.
- 7.102. There had always been an assumption we would need some NPIs if a pandemic occurred. These have always formed a part of response to pandemics and major epidemics, and have included self-isolation for those with symptoms, quarantine, closure of hospitality and close-contact professions and closure of schools. The real question in practical terms at this point was what was the minimum set of interventions which could realistically move R from being above 1 to below 1, and how much confidence did we have in that assessment. Nobody wanted to introduce more restrictive interventions than necessary due to the very high social and public health cost of the interventions over time. If the interventions used were insufficient however, then R would remain above 1 and the epidemic in the UK would continue to expand exponentially, albeit at a slower rate.
- 7.103. Given our relatively limited understanding of COVID-19 at this time, the considerable uncertainty as to what impact the various social interventions would have in the UK (modelling is one thing but real data is even more important) and the limited testing available, we did not think it safe to introduce only the absolute bare minimum set of interventions that might get R below 1. Were those actions to turn out to be insufficient, which we would not know until several weeks had passed following their introduction, we would have been left with a still growing epidemic, a large number of additional people infected and an NHS which would have been very exposed.
- 7.104. My advice was that of SAGE, which was strongly in favour of the above actions by Government taken on 16 March. It would certainly have been preferable from an epidemiological point of view for this action to have been taken sooner, but this is clearer after the event than it was at the time. Had the testing capacity been available

to demonstrate how fast the epidemic was moving at this stage, I think it highly likely it would have been taken earlier, although how many days earlier is difficult to say.

7.105. It was never possible before the event to be completely confident of the public's response to such a wide sweeping recommendation to restrict their professional, social and economic lives, especially as this advice against all unnecessary contact had not been used before. Concern about COVID-19 in the general public was however now high. It was also the view of SAGE, informed by SPI-B, that the public would respond provided the potential risk was large enough, the reasons for actions were laid out and it was seen as fair across society.

17 March 2020 to 23 March 2020

7.106. On 17 March 2020, there had been 57 deaths in the UK reported, and 14 more would be announced later that day. On 17 March in France there were 148 deaths reported. They would introduce their own package of restrictive NPIs that day (**CJMW4/093 - INQ000049665**).

7.107. The measures introduced in France, and prior to that in Italy, received substantial news coverage. Not only professional advisers, but wider Government, were very well aware of them. My impression at that time based on the views of modellers and SAGE was that the UK was slightly behind the epidemic curve in those two countries as of this date (but on the same exponential trajectory). We had of course introduced our own considerable measures only the day before.

7.108. My advice to the Prime Minister on the public health indications for restrictions on schools in England on 18 March 2020 was that of SAGE (**CJMW4/094 – INQ000061525**). Initially, SAGE had thought it would be possible to achieve control of COVID-19 (meaning R below 1) without school closures, but as the data on force of transmission emerged the collective view of SAGE changed.

7.109. The disadvantages of closing schools are obvious. The impact on the life chances of children, particularly in areas of deprivation, can be substantial. Schools also play an important role in allowing work and other activities by parents. There was therefore a strong preference to have school closure as one of the last options reached for, and as measures were later unwound for school attendance to be one of the first to be reinstated. There was also a practical question about schooling for children of NHS,

care and other essential workers who would not be able to go to work if their children had to be home schooled, and also the most vulnerable children. It became the view of SAGE however, informed by modelling, that given the force and speed of transmission it was unlikely we could reliably get R below 1 without school closure.

7.110. 18 March 2020 also saw the circulation of a draft paper intended for the Prime Minister and Secretary of State for Health and Social Care about further measures, in addition to those announced on 16 March, in response to the specific epidemiological situation in London (**CJMW4/095 – INQ000048119**, **CJMW4/096 – INQ000048120**). My advice on the sense of imposing a local lockdown on London specifically was that of SAGE (**CJMW4/094 – INQ000061525**).

7.111. The Inquiry has asked me about my contemporary views on the statement by the Prime Minister on 19 March 2020 that the UK could turn the tide of coronavirus in 12 weeks. I thought this statement very optimistic if it was taken to mean the path of the pandemic as a whole rather than a single wave. To the extent that the Inquiry has separately asked about various comments allegedly made by the Prime Minister, Cabinet Secretary and Deputy Cabinet Secretary in private settings where I was to my knowledge not present (references to, respectively, injecting the Prime Minister with COVID-19, chicken pox parties, or that the country was “heading for a disaster”), my knowledge of these comments comes entirely through hearsay or the media.

7.112. The Inquiry has asked about the accuracy in recording my views of what they describe as a readout of a meeting I attended with the Prime Minister on 19 March 2020. Firstly for strict accuracy the document referred to was as far as I can see an informal email between Treasury officials about a pre-meeting; it is neither an official readout, nor is it about a meeting with the Prime Minister. I consider it is an informal email version of what was probably a report by me to the pre-meeting of SAGE the day before (SAGE 17), of which there is a contemporaneous Minute which I did clear and accurately reflected my advice and views at the time. The email is accurate in part, and comments correctly that I would have said (as SAGE notes) it takes 2-3 weeks to see the effect of any action, and that high levels of adherence would be needed for a significant effect to be seen. The informal Treasury email readout also says “the CMO was strong on the fact that measures already introduced + school closures should - with 75%+ levels of compliance - reduce the levels of transmission so that R falls below 1”. Whilst I cannot recall my exact words what I would have been trying to convey which would have been what SAGE said, which is that the measures if adhered to would have a

'significant effect'. By training and temperament I would be very unlikely to state strongly that such interventions would bring R below 1 at a point there was very great uncertainty about the effects of these measures, the force of transmission, and very many other issues around the virus, its transmission and control. In the subsequent meeting with the Prime Minister I would also have conveyed the views of SAGE, as recorded in SAGE Minutes cleared by me the day before.

7.113. On 20 March 2020, the Prime Minister announced the closure of pubs, restaurants, gyms and other social venues (**CJMW4/097 - INQ000203946**).

7.114. Between 21 and 23 March 2020, I shared with various senior leaders and Government the document '*Coronavirus: summary of strategic and tactical approach to the epidemic*' (**CJMW4/005 - INQ000203890**). The purpose of this was to pull into one place a variety of points which were in my view not always joined up across the system. I was asked specifically by the Cabinet Secretary to add some comments on how the pandemic might come to an end. The document did not ask for a decision or any specific response, but I am confident it was read and understood quite widely in Government. I felt it was sensible to have a single document pulling things together in this way based on what we knew at the time, accepting there was a lot we did not know or where our scientific understanding would ultimately change. In particular, I had a concern that without a wider strategic framework, we could end up with a series of largely unrelated tactical decisions over the whole arc of the pandemic which were strategically incoherent.

7.115. The SAGE advice on 23 March 2020 was:

"1. UK case accumulation to date suggests a higher reproduction number than previously anticipated. High rates of compliance for social distancing will be needed to bring the reproduction number below one and to bring cases within NHS capacity.

2. Public polling over the weekend on behaviour indicated significant changes but room for improvement in compliance rates.

3. Estimated COVID-19 fatalities are anticipated to overlap with those who are likely to be within the final year of their lives. It is important to get an accurate excess deaths estimate, including potential deaths due to the measures taken.

...

7. *The data suggest that London is 1 to 2 weeks ahead of the rest of the UK on the epidemic curve. Case numbers in London could exceed NHS capacity within the next 10 days on the current trajectory.*

8. *The accumulation of cases over the previous two weeks suggests the reproduction number is slightly higher than previously reported. The science suggests this is now around 2.6 to 2.8. The doubling time for ICU patients is estimated to be 3 to 4 days.*

...

18. *There is significant uncertainty concerning the impact of interventions brought in thus far on numbers of cases.*

...

20. *SAGE noted that social distancing behaviours have been adopted by many but there is uncertainty whether they are being observed at the level required to bring the epidemic within NHS capacity.*

21. *Key areas for further improvement include reducing contact with friends and family outside the household, and contact in shops and other areas” (CJMW4/098 - INQ000129072).*

7.116. Thereafter, the well known restrictions announced by the Prime Minister on 23 March 2020, a full national lockdown, were brought into effect.

7.117. The Inquiry has asked whether I advised a slow, incremental and gradualist approach to the introduction of NPIs; I did not. With the benefit of hindsight, I am confident that there were measures that would have been better brought in a number of days earlier than they were. Whether an incremental approach or a sudden imposition of all the measures was preferable is however I think quite difficult to answer, even in retrospect. The timing of interventions was often not a matter of medical or scientific advice, but one of practical reality. For example, a recommendation to work from home requires much less preparation by Government than a legally binding stay at home order. Nevertheless, there would to my mind be no obvious advantage in waiting to impose any measures at all until Government was ready, politically and practically, to implement all of them. That was my view at the time and remains my view.

Limitations imposed by testing capacity

Consequences of limited testing

- 7.118. The main limitation in any form of surveillance in the first few months of 2020 was our lack of testing capacity at scale. At the point when we did not have evidence of domestic spread, what little testing capacity we did have was concentrated on surveillance of potential imported cases and contact tracing around those cases. I sent out a joint CAS alert on 23 January 2020 to the NHS asking for potentially exposed people with symptoms to be tested (**CJMW4/057 – INQ000047537**). At this time, our case definition employed a limited geographical footprint. As the initial epidemic spread to several countries, the geographical footprint on which test eligibility was based similarly expanded.
- 7.119. Once it became clear we had domestic spread of the disease, it became necessary to swing our limited testing to testing based on symptoms without any geographical basis. This clearly was inadequate as a proper surveillance mechanism but for a disease with very non-specific symptoms, where testing was therefore essential to confirm cases, it was the best that was achievable with the testing resources we had.
- 7.120. The lack of testing at scale was a problem for the UK throughout the first few months of the pandemic. It meant that the tests that were available had to be very heavily concentrated on clinical case management. By this I mean they had to be used to identify which of those patients who presented to hospital with symptoms compatible with COVID-19 were in fact suffering from the disease, and which patients had the many other conditions (both infective and non-infective) which could give rise to those same symptoms. This was particularly complex given the non-specific nature of COVID-19's symptoms, during the respiratory virus season (late winter and early spring). It was important to identify cases accurately in hospital for their optimal management, both for their own benefit and for reduction in nosocomial spread, so making them the priority for the limited testing capacity was logical and uncontroversial.
- 7.121. It was strongly my view, and that of virtually everyone involved in the COVID-19 response, that testing capacity in the early stages of the pandemic when it was expanding rapidly and exponentially in the UK was insufficient. This forced us to limit testing for surveillance and led to us underestimating how far along the upward curve of the epidemic wave we were. It made it very difficult to test in hospitals and other care settings. It was not simply that the number of tests available were too few, but

that the speed of turnaround was initially too slow because a small number of centres were having to handle all the tests, often with travel time for samples. There was therefore a realistic possibility that people would be tested, and then become infected, infectious, or deteriorate clinically in the period between being tested and getting a result.

7.122. The decision by PHE to switch from community testing to a focus on clinical testing was a practical necessity. I agreed with the logic at the time because there was no obvious viable alternative. Had we had the testing capacity, we would of course wished to have continued with both clinical testing and surveillance, but PHE and the NHS had to prioritise the limited testing capacity available. It would not have been reasonable to have people who were ill in hospital not being diagnosed with COVID-19 because the limited testing was being used in community testing. It was therefore a public health decision, but only in the narrow sense that given the very limited testing and contact tracing availability and capacity, the health system had to prioritise.

7.123. Once more testing was available, we expanded community testing again and introduced testing in a number of other settings whilst continuing with testing in clinical settings. This was where we ended up after a significant scale up effort, but it was not where we were in March 2020. The Inquiry has asked whether the decision to stop community testing and tracing in March 2020 was due to pursuing a 'herd immunity' strategy; clearly it was not. Stopping community testing was a result of the practical need rather than any wish to do so. There was never any intention to pursue a herd immunity strategy as it is normally understood, a matter I cover in greater detail at paragraphs 7.143 to 7.160 below.

7.124. There was a concern early in the pandemic, which I have discussed at paragraph 5.23 above, that asymptomatic testing may have yielded unreliable results. Of more practical importance in the first three months however was that the tests available were so limited in number that using them on asymptomatic people, when we were unable to test all the people who were symptomatic, made no practical sense. It was only once we had sufficient testing capacity to allow us to meet the demands of symptomatic people that the possibility of extending testing to those without symptoms arose. It is important therefore to separate out the theoretical considerations from the practical realities. Even if we had been confident that asymptomatic testing was as sensitive as it was for symptomatic people they would have been (and were) low down the list of priorities in this initial period of extremely constrained supply.

Difficulties in scaling up testing

- 7.125. The reasons for the UK's difficulties in scaling up testing capacity in the early stages of the pandemic response are complex, and I am not the best person to lay them out. In brief however, unlike some nations we did not have an industry capable of rapid scale up of diagnostic testing. Nor was PHE, which had been very fast to develop a prototype test, equipped to scale up testing to the extent necessary, which would have required prior investment by Government in this capacity. This weakness was exacerbated by global shortages of key materials required for testing since demand went up simultaneously everywhere. It is an area where we have much to learn, in particular from Germany and South Korea, both of which were able to achieve rapid scale up in the early stages of the pandemic relative to the UK. Some of the technical issues in this regard are laid out in the Technical Report at Chapter 6 (**CJMW4/001 - INQ000203933**).
- 7.126. I, the GCSA and SAGE all made the point about limited testing, which was well known to colleagues in PHE. I do not consider that the reason PHE were unable to scale up at speed in the first three months of the pandemic was because they did not know, or did not care, that this was a major limitation. Rather they were not set up to be able to achieve this kind of scale up in advance and this in my view is one of the major learnings from the pandemic; the ability to scale diagnostic testing is essential but requires planning and investment in advance. This capability is essential in all epidemics and cannot simply be switched on from a standing start once an emergency has begun. It takes prior investment.
- 7.127. I was not closely involved in the practical decisions about how to scale up testing since many other far better qualified people were already engaged on this operational issue. It was clear that a substantially new approach to scaling up was going to be needed for the volume and speed of expansion required. I had very high respect for the scientific capacity within PHE but this was a different, operational issue and there were a variety of ways it could have been achieved. The method to achieve this that was chosen by the Government, which I did not play any meaningful role in, was ultimately successful and given the limitations I think is a great credit to those involved. I was not involved in the setting of daily testing targets.

Specific issues at this time with regards to discharges from hospitals to care homes

- 7.128. I was not closely involved in the decisions in relation to the need to free up hospital beds by way of discharging patients to care homes. I was aware of them however, and thought that the benefits of doing so outweighed the disadvantages. To that extent, I agreed with the decision even though the impetus for it came from the NHS. It might be worth me therefore laying out why I thought at the time, and continue to think, that this was a prudent decision in which there were both risks in doing nothing and risks in acting, but where doing nothing in my view carried the greater risks.
- 7.129. The first group of people who would benefit from a swift move from hospital to care homes during a rapidly expanding wave of a new infection was the older and vulnerable people who were in medical beds in hospital but were fit for discharge (i.e. they no longer had any medical reason to be in hospital and could have received equally good care in a care or nursing home). The reason for this was that we were having an exponential rise in cases of COVID-19, and it was predictable that this would first manifest itself in hospitals where sick people come. I have already laid out how COVID-19 disproportionately affected the elderly above at paragraphs 5.59 to 5.60. Keeping such individuals in hospital unnecessarily therefore exposed them to a foreseeable risk of harm (from catching COVID-19) whilst conferring no benefit on them.
- 7.130. Given that the doubling time of COVID-19 was measured in days, every additional day that a vulnerable person unnecessarily spent in hospital increased the daily risk that they would catch COVID-19 as a result of them being in that setting, even with the best care and infection control practices available. The idea that hospitals are uniquely safe places is a complete misunderstanding; nosocomial spread of infections in hospitals has always been, and remains, a risk for multiple infections everywhere in the world. Hospitals are far from an ideal place to be for someone who is vulnerable to an infection, if they do not need to be there for clinical care. The difficulties in preventing COVID-19 spread within hospitals became clear as our understanding of the virus and testing capabilities later increased, but were not surprising for a respiratory infection. Much (probably most) of the transmission of SARS and MERS occurred in hospital or healthcare settings.
- 7.131. Whilst the risk of importation of COVID-19 from hospitals to care homes was non-trivial from the time domestic transmission became established, this risk to other care home

residents would only increase for every additional day that an elderly person from that care home remained in hospital during the exponential rise of cases in hospital before returning to their care or nursing home. I have previously commented on the scarce availability of COVID-19 tests early in the pandemic but also the slow turn around for those tests which were available. It was therefore, given the limited and slow testing, not the case that someone could have been tested prior to discharge and received the result in a timely manner, so as to allow their clinician to have confidence that the individual being discharged was not infectious.

7.132. A further group of people who benefitted from the discharge of medically fit individuals back to care or nursing homes were patients who became unwell, either from COVID-19 or another condition, and who required hospital beds. This included other people in care and nursing homes, who were at relatively high risk of needing hospital care compared to the general population. There was an obvious need to free up beds, increase hospital capacity and make staff time available for the potentially very large wave of hospitalisations which would occur due to COVID-19. This was a very important operational point for the NHS. We did not know in advance how big the wave was going to be, nor whether we would be successful in getting the epidemic first wave to turn over before the capacity of the NHS was overtopped. As was clear in Module 1 of this Inquiry, the relative lack of capacity in the NHS in terms of available beds was always going to limit our room for manoeuvre in a serious pandemic overall and compared to other nations.

7.133. Two things were obvious from mid-March 2020: that it would be ideal to test patients going from hospital (and indeed other settings) into care homes for COVID-19; and that we did not have sufficient testing capacity nor was the turnaround time quick enough to achieve this. Over time the availability of tests made it realistic - but it was not in March or early April. My advice from mid-April 2020 was therefore that testing should be undertaken (**14 April 2020 - CJMW4/099 - INQ000292608**) but this was of course dependent on having sufficient testing capacity to achieve it, and a fast enough rate that someone would not be sitting in hospital for several days with the potential of becoming infected whilst waiting for a test result. These were operational questions.

Key principles in the early pandemic

'Flattening the curve'

7.134. 'Flattening the curve' was a way of trying to express in shorthand the fact that the Government had chosen to take a middle path of three possible options. As I have stated, the first possibility was to let the peak reach its natural height. The other extreme was to go for what was subsequently called Zero COVID - suppressing the virus with an ambition to have almost zero cases for the duration of the pandemic. The UK decision, in common with the great majority of other Western nations, was to try to suppress the peaks of transmission and therefore reduce the number of people who would become infected, whilst accepting that given the transmissibility of this virus some cases were now bound to occur and that zero COVID-19 was practically unrealistic over the prolonged period of a likely pandemic. This middle way was the purpose of NPIs in the UK. Although the way in which it was described may have evolved from the original terminology of 'flattening the curve', the general concept remained constant.

7.135. The reason for not allowing the peak to reach its maximum height was twofold: it would both lead to a much high number of people being infected and therefore suffering the consequences of COVID-19, including death, serious morbidity and, although we were initially unaware of it, Long COVID; and it would have led to the NHS being overwhelmed, resulting in avoidable deaths for both COVID-19 patients and those with other non-COVID conditions. Avoiding both scenarios was therefore the aim of the policy. The overall strategic goal was to minimise deaths and avoidable disability.

7.136. The reason that we did not think that keeping COVID-19 at almost zero was realistic in the UK over the prolonged period of a pandemic was the force of transmission in the context of no prior immunity. We thought it might be possible for a short period but was very unlikely to be achievable for a prolonged period, particularly in times like winter which benefit all respiratory viruses. Most countries considered whether this option was realistic and discarded it.

7.137. Although from time to time there was talk in the UK of being able to eliminate the virus, or even eradicate it globally, this was in my view never realistic other than elimination in small geographical areas for very short periods of time. Eradication of viruses is exceptionally difficult even with highly effective tools. To date, we have only eradicated a single virus of humans: smallpox. Smallpox is a disease which is extremely easy to

diagnose and for which the vaccine is highly effective and confers usually lifelong protection. From the time COVID-19 became a pandemic, it was my view that it was with us for the indefinite future. This remains my view. Diagnosis was difficult, force of transmission was high and we had no vaccine or other highly effective countermeasure. The consequence was that on any occasion where the virus was suppressed to zero in the UK there would soon be reimportation from other countries, as has occurred multiple times globally. Preventing reimportation to the UK would be more difficult than in less networked countries.

7.138. The question therefore was the extent to which it was desirable and achievable to suppress the virus. There was a legitimate argument for trying to suppress COVID-19 to a very low level until highly effective medical countermeasures were in place, but how long that would take, if indeed it was feasible at all, was entirely uncertain. Our initial central view was that it was likely to be over a year and possibly many years before we had highly effective medical countermeasures. Further, there were, and were understood to be, both benefits and dis-benefits even from a narrow public health point of view of the widespread societal interventions which would be required even just to keep R_0 below 1.

7.139. I laid this out near the beginning of the pandemic (**21 March 2020 - CJMW4/005 - INQ000203890**). My view then was, and still is, that there would potentially be four forms of death and severe disease as a result of COVID-19. These subsequently became known in my correspondence with key decision makers in shorthand as A, B, C, D deaths (there were several variations of this and this is a summary).

7.140. The first, type 'A', and the most immediate need, were those deaths from COVID-19 directly. The second, 'B' deaths, would occur because the emergency services were overwhelmed and so treatable medical emergencies such as heart attacks, strokes, severe asthma, other infections and surgical emergencies, as well as severe COVID-19 cases could not be treated. Intensive Care Units (ICUs) would be full and urgent elective care would be stopped making management of very severely sick individuals extremely difficult. The third, 'C' deaths, would be caused by both the social measures and NHS measures taken to combat the virus. These included reductions in preventive care, postponing less urgent elective care, and also loneliness, mental health and social issues as a result of lockdown and similar measures. Fourthly, 'D' deaths, which were potentially very serious over the long run, resulted from the impact from pushing people on marginal incomes further into deprivation. This would have a very long effect

on health in all its domains given the very well-known links between deprivation and chronic or premature ill-health.

7.141. The aim of 'lockdowns' and other social measures (NPIs) was to reduce the number of deaths directly from COVID-19 (type A deaths) and those due to the NHS being overwhelmed (type B). It was clear, and this was my advice, that some of the effects of C and all the effects of D would be exacerbated by the very social measures we were using to control the virus, and the more severe or wide ranging the NPIs the greater the damage would be. There was therefore a very difficult path to walk between going too late or not hard enough, and therefore getting a larger wave leading to the problems of A and B, and going too early at a point when there was no major advantage in lockdown or other social measures, and getting all the disadvantages of C and D with relatively little benefit. The decision-making of the time has to be understood in this context. Further, this of course only looks at the public health benefits and dis-benefits of action; other social and economic consequences, both from a high pandemic wave and from the effects of lockdown, are separate and in addition to these.

7.142. At no point therefore, in my mind, was there any logic in actively allowing a wave to get anywhere near its potential peak. Rather, the whole point of policy was to prevent this. On the other hand, the damage done by prematurely going into major social measures including lockdown was non-trivial across multiple domains, including public health.

Herd Immunity

Core Concepts

7.143. The Inquiry has asked a series of questions around the concept of population immunity and herd immunity. It is helpful prior to answering these to give some detail about the concepts of immunity, population immunity, herd immunity and my understanding of this with respect to COVID-19 both at the start of the pandemic and now. In my view, it is a much more complex concept than is often understood, including by some in Government and even inside the medical profession.

7.144. By way of background, I spent much of my professional career researching and working with diseases for which full population immunity/herd immunity is never achieved. It therefore can never be part of a strategy for their control. For example,

with malaria, which I concentrated on in my research career, the entire population in high transmission areas may catch the disease multiple times a year and population immunity close to the herd immunity threshold is never approached. For malaria, repeated exposure leads to an increasing ability for that individual to avoid severe disease, but infections still occur and asymptomatic yet infected and infectious individuals can still cause severe infections in others via the mosquito vector. The example of malaria also makes an important additional point, namely that immunity to severe disease can occur even when immunity to infection and infectiousness does not. This is a feature of a high number of diseases. This immunity leads to protection for the person concerned but does not confer any significant protection to their neighbours.

- 7.145. In the case of HIV, on which I spent a lot of my clinical time, the disease destroys the immune system over time as part of its process so to talk of immunity makes no sense. In contrast, with Ebola and similar diseases, the extreme mortality (up to 70%) is too high to achieve full herd immunity by means of natural infection even if that occurs. The community as a whole therefore cannot develop anything approaching substantial population immunity absent a vaccine.
- 7.146. For many infections, immunity is too short lived for the population to achieve meaningful levels of population immunity. This should make clear that aiming for full population immunity prior to understanding a disease has serious and initially unquantifiable risks scientifically.
- 7.147. Other than a limited number of vaccine preventable diseases such as measles, the majority of important human infections do not rely on herd immunity as it is normally understood as a principal strategy for their control.
- 7.148. For herd immunity, in the sense of reaching the 'herd immunity threshold' such that the disease is controlled by population immunity alone, to be achieved by natural infection, for an infection with a R significantly above 1 an extremely high proportion of the population have to be infected, at which point the disease may naturally go into abeyance, but only if immunity is high and prolonged. All of these immune naive individuals are exposed to the clinical risks of a first infection however, and then have to remain immune to infection or at least infectiousness for a very prolonged period thereafter. If their natural immunity fades with time, as it does for the endemic human

coronaviruses, 'herd immunity' will fail to control the virus, which will continue to spread in the community.

7.149. The only situation in which I consider herd immunity to be a sensible goal of policy is therefore where there is a highly effective and safe vaccine which confers prolonged immunity without the clinical risk posed by a first infection. This was my view before COVID-19 and remains my view now. It is the situation for measles in many countries currently due to use of the MMR vaccine. As seen with measles however, if the level of population immunity slips below the herd immunity threshold (in the case of measles, due to poor vaccine uptake) then outbreaks and subsequently epidemics can occur.

Application of these principles to COVID-19

7.150. When COVID-19 began, we had no way of telling whether immunity to infection was achieved at all, if so for how long, and whether there would be a vaccine which could reproduce this. With the force of transmission of the original Wuhan strain, even had first infection conferred multi-year/lifelong immunity to infection, an extremely high proportion of the population would have had to become infected for anything near the herd immunity threshold, as commonly understood, to be approached. If the first infection did not confer long lived immunity from becoming infectious it would never be achieved.

7.151. As soon as it became clear that we had a high chance of a pandemic I assumed we would need to recommend NPIs to try to reduce transmission and aim to get R below 1 (which would have made no sense had we been aiming to increase immunity as a goal). For example, in an email of 22 February to the GCSA, I said:

"I think the key thing is for SAGE to concentrate on the possible building blocks and their scientific basis. The Chinese have done this by throwing the kitchen sink at it: we will have to be more targeted so identifying the interventions with the greatest likelihood of pulling R below 1 is the key (and ideally ruling out ones with little chance of success)"
(CJMW4/100 – INQ000236382).

7.152. My view was however that it was likely that second infections, even if they occurred, would probably be less severe than first infections allowing people to go back to some form of normality. This is the norm for the great majority, although not all, infections. This is very different from herd immunity as normally understood and is entirely to do

with the protection of the individual by their immune system from severe disease. Even this was however by no means certain when COVID-19 first emerged, nor could it be tested until a significant period of time had elapsed and we could reliably work out whether people had been reinfected. The details of this are laid out in the Technical Report.

- 7.153. Some degree of population immunity short of the herd immunity threshold is however important when considering NPIs and the modelling that was used to help provide advice. If, and it is an if, some degree of population immunity to infection (i.e. not just to severe disease) short of a herd immunity threshold is achieved, either by vaccination or natural infection so R_t is lower than R_0 as laid out in paragraph 5.47 above, this reduces the number of social distancing and other NPIs needed to achieve the same effect in terms of controlling the disease. In this situation, the population immunity is doing some of the heavy lifting needed to keep the rates of infection in the general population low, but it still depends on social interaction measures (NPIs) remaining in place albeit at a lower intensity. One of the reasons we were able gradually to reduce the number of NPIs over the first two years of the pandemic was because of the steadily building population immunity once the vaccine programme was well underway, due to a combination of immunity by vaccination and some immunity via prior infection. For this reason, population immunity was also an important thing for the modellers to consider.
- 7.154. From this follows my own view throughout the pandemic; we needed to be aware of the level of population immunity since this had practical indications for our response, but trying to achieve population immunity and certainly the herd immunity threshold by way of first infection as a matter of policy made no sense. In a disease which was able to get to all parts of the population and which carried an appreciable mortality in the elderly and medically vulnerable in particular, the aim should be to reduce rather than increase the number of infections in the population as far as practicable.
- 7.155. There was a school of thought, best characterised by the Great Barrington Declaration, that we should simply shield the most vulnerable and then let the virus achieve population immunity to the level of the herd immunity threshold in the rest by means of natural infection (**4 October 2020 - CJMW4/003 – INQ000203988**). I considered this suggestion in all its forms to be scientifically flawed, practically flawed and morally problematic. I have laid this out more fully in my First Statement, so do so in briefer form here.

- 7.156. Its scientific flaw was that achieving the herd immunity threshold by natural infection with the result that there would be prolonged immunity in the population was far from certain for the reasons I have outlined above. Indeed, we now know that Omicron can re-infect people who have previously been infected after a relatively short period of time. An exceptionally high proportion of the population would have needed to be infected, with many suffering harm including large numbers of deaths.
- 7.157. Secondly, the suggestions relied on the assumption that we could correctly identify who were the most vulnerable to getting severe disease when in fact a very high proportion of the people who were severely unwell with COVID-19 had limited risk factors (the Prime Minister being one). Therefore, reliably identifying the people who would come to harm from COVID-19 was not possible.
- 7.158. Thirdly, shielding itself is almost impossible to achieve with complete success over the prolonged period which such an approach would have required. The shielding programme in the UK was in my view a sensible approach conceptually as a way of reducing the risk to the most vulnerable. It was however by no means complete protection from infection and had some very significant downsides. These included isolation and loneliness for vulnerable and older people. Despite their and others' best efforts, people shielding still had to have some form of interactions to obtain just the basic necessities and COVID-19 is extremely transmissible from people, many of whom may not know they are infected. There are infections it is relatively easy to protect vulnerable people from, but COVID-19 is not one of them.
- 7.159. I was aware that some in central Government were discussing population immunity and herd immunity, although I was not certain that they had always fully understood it. Notwithstanding that, as far as I am aware at no point was trying to achieve herd immunity by way of infecting a high proportion of the population the policy of Government, nor was it at any point my advice or that of SAGE.
- 7.160. This is not to say that immunity is not an important part of the Government approach to COVID-19. The whole point of a vaccination programme is to achieve maximum population immunity with minimum damage from the virus. The reason that we now have an open society whilst COVID-19 is still circulating is because of immunity which is now a hybrid of vaccine induced and immunity via natural infection. Severe cases

are relatively rare compared to the pre-vaccine era. That is however a very different situation to one where we are faced with a completely immune naïve population.

Behavioural Fatigue

- 7.161. The Inquiry has asked about a comment I made in March 2020 in a press conference about 'behavioural fatigue'. Inevitably, I made quite a number of communication missteps during the pandemic, but this was my most prominent. It had two major disadvantages, both of which I realised at the time. The first was that it was read to imply, understandably, although this was actually not my intention at all, that this notion arose out of the advice we were receiving from SPI-B. It was not, and the behavioural scientists on SPI-B were understandably upset by this and said so publicly (and reasonably).
- 7.162. Secondly, it implied that this was a major part of the caution about beginning the lockdown too early. It was not. This debate had almost no relevance to scientific advice on decisions about the precise date to start the first social measures including lockdown. The public health, social and economic disadvantages of a lockdown were obvious and many, and start from the day a lockdown is imposed, and therefore starting one prematurely (i.e. before it would have a positive effect) was clearly something that no policy maker would want to do. Concerns about whether the public would over the pandemic as a whole find something as onerous as a full lockdown more difficult to maintain as time went by were not central to the decision on exactly which day to start lockdown. It therefore was a communications error by me on two fronts and whilst it did not actually change the course of decision-making it was unhelpful. My only mitigation for this is that I was wholly unused to repeated national press conferences and had not learned the message discipline that I got better at as the pandemic progressed through force of practice.
- 7.163. This is not to say that there is not some evidence that over time some populations, population groups and individuals became less enthusiastic about social measures against COVID-19 and indeed other epidemics. Whilst this had no relevance to advice on which day to start the first lockdown, it was important as a long-term consideration; maintaining public support over the whole arc of the pandemic was important to think about from the beginning and a reasonable thing to identify to decisionmakers. I thought at the time, and still think, that it was highly likely as the pandemic wore on the public would find the effects of a lockdown or other major NPIs increasingly onerous

and this was a widely held view (although not by all behavioural scientists as laid out above). For example, there was a WHO conference entirely devoted to pandemic fatigue (of which I was not a part) in October 2020 (**CJMW4/101 – INQ000236430**). When we look back to the number of cases (793) and deaths (54) that had been reported on the day of the first lockdown which the public overwhelmingly supported they were very different to the numbers on the day of the second lockdown (24,141 cases and 378 deaths) which was more debated. The experience of a number of nations with population unrest, as well as academic studies, demonstrated that a gradual waning of support did become a significant issue in several nations. The concept of people becoming less willing to adhere to highly restrictive measures over time, and planning on the basis it might occur if we did not take steps to maintain public support was therefore in my view reasonable, but it was unhelpful to highlight at this point in the pandemic as it was irrelevant to the issue of the exact timing of the first lockdown (rather than being just one part of many broader considerations), and proved an unhelpful distraction.

7.164. The Inquiry has asked me about a comment in an email of 11 March 2020 in an email to NR that “my main concern at the moment is sustainability if we go too early” (INQ000048039). In particular they ask if this was a reference to the concept of behavioural fatigue. It was not. I was concerned about issues of sustainability of social interventions for multiple reasons, and at many points during the pandemic. It was clear to me, and others, that this was going to be a very long haul; I was not certain everyone commenting had in March 2020 appreciated that or the consequences of maintaining prolonged social interventions. The costs in public health terms of many of the social interventions (including but not limited to what became lockdown) were very severe. These included the issues of loneliness for those in shielding; the economic hardship of people not able to work (at this stage Treasury support and its duration was not yet clear) with consequent impact on deprivation; impacts on schooling on children among many others. Whilst the duration of public support was a legitimate thing to consider it was only one of very many issues incorporated within sustainability.

7.165. The Inquiry has asked me to comment on some words of the GCSA in the media on 13 March 2020. Like me, he was under extraordinary pressure of work and had very limited media experience on this scale. I did not think it changed the realities of Government decision making or the population adherence to them. I would challenge almost any doctor or scientist to have to do the amount of media that the GCSA, the

DCMOs and I had to do over the first two years of the pandemic without making any missteps. I consider the GCSA was an excellent and consistent interpreter and communicator of very complex science throughout the pandemic.

Self-isolation and household isolation

7.166. Self-isolation was a mechanism by which people who were known to have COVID-19, had a very high risk of COVID-19 (e.g. because they displayed typical symptoms) or were contacts of people with COVID-19, took themselves out of society to avoid infecting others. In all the advice on self-isolation by people with COVID-19 or their contacts, we had to balance advising a long enough period that the great majority of transmission would be prevented, but not so long that we were knowingly and unreasonably leading to the isolation of people who had a very low chance of being infectious. We also were concerned that making the period of isolation longer would, or at least could, reduce people's willingness to declare they had COVID-19 or adhere to isolation. This was increasingly important as some people had to self-isolate multiple times, which became very onerous for some.

7.167. The length of this period of recommended self-isolation varied through the pandemic as we got more information on the transmission dynamics of the virus. A balance of risks however was always there; we had to assume that a small tail of people would be infectious for a longer period whereas some people would cease to be infectious after a relatively short period and before self-isolation ended. This is typical of many infections. This is laid out in more detail at paragraphs 5.33 to 5.40 above.

7.168. Household isolation, where an entire household isolated when there was one known case, was inevitably longer than isolation was for an individual because there was an assumption that there would be significant amounts of transmission within households. This meant that people would become unwell and therefore infectious sequentially rather than simultaneously. The same balance of neither having it so long that we were recommending isolation of households with a low chance of being infectious, nor so short that a significant amount of transmission would occur after release, was key to the decision-making.

The key role of trials

7.169. At various points, particularly early in the pandemic, some senior decision-makers and their senior advisers (and also some senior political figures not in Government and internationally) thought that given the seriousness of the situation, it was appropriate to deploy particular medical countermeasures (drugs in the main) then being promoted in some part of the press in advance of any trial evidence that they worked.

7.170. I was very firmly against this. All effective drugs and medical interventions come with side effects and unintended consequences. Proper trials are usually the only way to work out whether the balance of risk and benefit are favourable. An early example is chloroquine, with other examples including ivermectin and Vitamin D. So far none of the interventions that were being pushed as appropriate for immediate deployment early in the pandemic have proved to have significant efficacy in clinical trials. On the other hand, several interventions which were not widely predicted to work have proved to do so, in particular dexamethasone and other immunomodulatory drugs. Trials are the way to give the best treatment to people which properly balances risk and benefit based on evidence. I hope that a strong recommendation of the Inquiry is that clinical trials are important. It was perfectly reasonable to trial the interventions that were in vogue, and for example major trials of chloroquine, ivermectin and Vitamin D were undertaken in the UK and elsewhere, and I supported this, but there has to be a very strong justification for deploying a drug widely in advance of trial evidence. Fortunately, the UK is very effective in its ability to undertake clinical trials to a very high standard as was demonstrated during COVID-19.

Section 8: Non-Pharmaceutical Interventions

Introduction

8.1. I have outlined in Section 7 some of the events which occurred during the first three months of 2020 and the reasoning which underpinned the advice. Below, I attempt to outline the advice, as well as the reasoning behind it, given in respect of certain periods and types of NPI which I understand to be of interest to the Inquiry.

March 2020 to July 2020 'Lockdown'

Public health rationale

- 8.2. As previously laid out, the advice I gave in terms of the decision to adopt what ultimately became referred to as a national "lockdown" was confined narrowly to the advantages and disadvantages of various options from a purely public health and scientific perspective. It was not my role to consider the wide range of additional issues that senior decision-makers, and in particular political leaders, had to balance, although I acknowledged throughout their importance. My advice was where possible based on that of SAGE, which the GCSA and I tried to reflect accurately in our meetings with senior decision-makers.
- 8.3. In giving such advice, I tried to be clear on the indirect health effects, both negative and positive, of both a lockdown and other NPIs. As CMO, my role is to provide advice on the full spectrum of public health concerns. This requires an holistic consideration of the wider public health concerns, rather than a narrow focus on just the direct mortality and morbidity caused by COVID-19. Of course, in the initial months of the pandemic the direct impact of the virus was the dominant public health concern, but it was not the only one, as I outlined in my written advice dated 21 March 2020 (**CJMW4/005 - INQ000203890**). Quantifying the indirect effects was more difficult than quantifying the direct effects, although there were attempts by SAGE and others to do so (**15 July 2020 - CJMW4/102 – INQ000220213**). It was however not my role to give wider macroeconomic or social advice, and I did not do so.
- 8.4. The aim of my advice was to minimise mortality and morbidity in both the short and longer term. Relevant considerations included the number of direct COVID-19 deaths, the effects of the NHS potentially being overwhelmed, as well as the longer-term public health effects of lockdown and other NPIs.
- 8.5. Had the NHS been overwhelmed, this would have had a major effect not only on COVID-19 mortality, as COVID-19 patients would have been unable to access the care they needed, but also on the morbidity and mortality associated with wider emergency presentations from patients with diseases unrelated to COVID-19 whose needs would have gone unmet. This included for example heart attacks, strokes, other major infections, asthma attacks and surgical emergencies. The two were therefore linked.

- 8.6. NPIs therefore had a key role in preserving the ability of those with non-COVID health needs to access treatment. This applied both to emergency care, and also the ability of the health service to continue to provide as much elective care as it was able to given its limited resources and the acute need to respond to COVID-19. After the first wave, the NHS became adept at maintaining a lot of non-emergency and non-COVID activity even in the face of COVID-19 waves. The role of NPIs in preventing the health service from being overwhelmed, and thereby preserving the NHS's capacity to treat all urgent diseases as best it could - not only COVID-19 patients but also those with other health needs - is something which is frequently overlooked or misunderstood by some.
- 8.7. The Inquiry has asked whether concerns about economic factors influenced the Prime Minister's decision on the first lockdown. This is a matter on which he will be best placed to assist the Inquiry, but I would be surprised if they did not. The balancing of health, social and economic issues was one of the things that senior political leaders had to do. My role was to provide scientific and public health advice, based where possible on the advice of SAGE or other scientific committees, to inform the ultimate decisions. It was however acknowledged by many of those involved in giving economic advice including from HM Treasury that without control of the pandemic there would be severe disruptions of the economy and so the two should not be seen as simply in tension.

Timing of the first lockdown

- 8.8. With the benefit of knowing what transpired and the ability retrospectively to piece together the timeline by which seeding of infection from Europe to the UK resulted in an upswing in domestic transmission, the first lockdown, and the various steps that led up to it, should have been implemented earlier. How much earlier is more debatable, but probably at least seven days. Certainly, nobody would argue that it should have been later (except possibly those who argue it should not have happened at all). There was inevitably some delay between scientific advice being given and the implementation of the necessary measures.
- 8.9. Given the complexity and severity of their impact on both the economy and wider society, and the unprecedented legal nature of the measures introduced from 16 March through to 23 March, they clearly needed significant policy preparation. Others are better placed to lay that out in more detail. In the absence of good testing, surveillance

was limited and we were relying to a large extent on hospital admissions to inform our understanding of the number of cases. These however were a poor proxy for true case numbers, in particular because hospital admissions are a lagged indicator. Rather than showing you where you are in terms of cases at any given point, hospital admissions tell you where you were some weeks beforehand. In the context of a rapidly developing pandemic with exponential growth and a doubling time measured in days, this weakness is serious.

- 8.10. If, for the purposes of laying out the practical argument, we take the measures on 16 March and 23 March back 10 days, the total number of known UK cases was 163 on 6 March and 799 on 13 March. It is in my view an imponderable as to whether without further data political leaders would have thought it possible to impose the major and unprecedented measures later introduced to stop by law most social and economic activity, generally termed lockdown, on the basis of this evidence of quite small albeit rising numbers, given their very widespread social and economic impact. I certainly think that most of those involved in giving scientific advice (including me) would have preferred if we had advised of the need for measures earlier - I am not certain whether, and to what extent, it would have led to earlier action by Government, given the small number of cases earlier in March.
- 8.11. Although attempts have been made to assess what would have happened in theory had the various measures been introduced a week earlier, in my view it is very difficult to assume that all the features of the various interventions from 16 March onwards would have played out identically had they been introduced seven (or 10) days earlier. The level of concern in the general public, the degree of political buy-in, and above all the level of organisation of the response might well have been different. There are also further complicating factors such as trying to account for people who were infected in the first wave who, had they not been, might then have been infected in the second wave in any event, but who instead had a degree of immunity in Winter 2020 by virtue of their first exposure. I am therefore wary of putting a number to what the difference would be had major measures been introduced sooner. It would however have been a significant difference.
- 8.12. The Inquiry has asked whether the first lockdown could have been avoided. For the reasons I have covered elsewhere in this statement, I fail to see a plausible scenario in the UK context where that would have been possible whilst keeping R predictably below 1 without it for this highly transmissible disease. It is important to note that almost

all our comparators with a similar demographic, population density and international connectedness had to impose some variant of lockdowns prior to vaccination being available. Whilst there is a legitimate debate about the timing and potentially the components of the first lockdown, the fact of it seems to me to be largely inevitable if the Government's principal strategic aim was to minimise mortality, both direct and indirect. A more restricted set of NPIs would have slowed the rate of increase but not reliably got R below 1, which was the necessary tactical goal of this strategic aim.

Easing of Restrictions

- 8.13. On 16 April 2020, the First Secretary of State (The Rt. Hon. Dominic Raab MP), deputising for the Prime Minister who was himself ill with COVID-19, announced five tests to be met prior to lockdown restrictions being eased (**CJMW4/103 – INQ000086576, CJMW4/104 – INQ000203990**).
- 8.14. From the narrow perspective of a scientific and medical adviser, the fact of the Prime Minister being ill with COVID-19 was clearly a problem for decision-making. In my view however, the ability of central Government to create a structure for decision-making led by the First Secretary of State was quite impressive given there was little precedent and we were in the middle of an emergency. The severity of the illness of the Prime Minister may have brought home more forcefully to some in Government that this was not simply an issue of the very oldest and most vulnerable being at risk.
- 8.15. In general my role, and that of the GCSA, SAGE and the DCMOs did not change markedly as a result of the Prime Minister being ill. Decision-making was more formal in nature under the First Secretary of State, and the approach to press conferences was probably also more formal, but in other respects there were few practical changes. I was for a period self-isolating due to symptoms compatible with COVID-19 although I was able to work remotely through most of this.
- 8.16. On 10 May 2020, the Prime Minister announced the Government's plan for easing NPIs, which was published the following day. I was sighted on this document and in the days before offered comment. The plan contained some science and medicine but understandably covered a broad waterfront, and I did not offer views on those wider areas. It did however refer to the four broad categories of deaths which would result from the pandemic (the A, B, C, and D types of mortality I outlined above) and the need to take account of this when making decisions on the implementation of NPIs (**5 May**

2020 - CJMW4/105 – INQ000069078, 5 May 2020 - CJMW4/106 – INQ000069079, 10 May 2020 - CJMW4/107 – INQ000069180, 10 May 2020 - CJMW4/108 – INQ000069181).

8.17. It is a clear and obvious consequence of the NPIs introduced, as I have observed, that social isolation and loneliness would increase. There was a desire in Government to relieve the effects of some of these measures and my advice was sought on the matter. As with most decisions during COVID-19 it was about the balance of risk; go too fast and R would rise above 1 and the wave would re-establish itself; go too slowly and people would have unnecessary restrictions on their lives with little public health benefit. In general my advice, based on that of SAGE, was that the risks of going too fast in lifting NPIs and therefore leading to R rising above 1 whilst numbers of cases were still high were underappreciated in some parts of Government. There was in my view a real risk we would accelerate out too fast, be faced as a consequence with a rapidly rising R with a wave starting from a high base, and then be forced to slam on the brakes harder than would otherwise have been needed. An avoidable stop-start approach did not strike me as ideal for public health, or indeed maintaining public confidence.

8.18. On 14 May 2020, SAGE advised as follows:

“2. SAGE advised that further release of distancing measures should not be contemplated until effective outbreak surveillance and test and trace systems are up and running.

...

12. SAGE advised strong caution concerning the introduction of social bubbling — particularly in the short term, when other distancing measures have only just been lifted, or in conjunction with release of other measures. SAGE has advised previously against making too many changes at once.

13. While SAGE noted the impact of lockdown on wellbeing and theoretical benefits of bubbling for some people (for example those experiencing loneliness, stress, economic hardship), it cannot be regarded as a universal good; for some people bubbling is impossible, too complicated or there may be no other household for them to link to.

14. Any bubbling will increase infection risk. If introduced, bubbling should only happen when it is safe to do so from an epidemiological perspective and on a very modest basis initially.

15. Currently, incidence is too high and R close to 1. Active contact tracing should be a pre-condition of introducing bubbling.

16. Modelling of risk to date has assumed schools remain closed and that R is 0.8 or lower. Risk would be amplified if schools are open and if workplaces are busier".
(CJMW4/109 – INQ000120519).

8.19. On 21 May 2020, SAGE advice was:

"15. SAGE advised that either social bubbling or opening both primary and secondary schools had the potential to recreate significant transmission networks, which would have a large effect on the epidemic" **(CJMW4/110 – INQ00061546).**

8.20. Overall, my concern remained that the Government should not rush things and then have to do a rapid and predictable reverse. I was also consistently worried about tone - that the Government would imply 'it's all over' because we were in a lull after the first wave when this was not in fact the reality for the pandemic as a whole. It is worth quoting in full an email I, the DCMOs and the GCSA sent to Simon Case on his appointment to No 10, dated 26 May 2020:

"Dear Simon

Congratulations on your new role, we are all very pleased to see someone with your experience returning to lead and coordinate COVID-19 work at such a crucial moment.

Since the initial peak of the COVID-19 pandemic in mid-late April, there has been careful scientific and policy consideration into how we lift the lockdown without triggering a second wave. This would have the well-recognised risk of endangering lives, generating renewed pressure on the NHS and delaying many aspects of routine healthcare whilst also returning many businesses to a state of standstill.

Given the economic impact of COVID-19, it is right and inevitable that different government departments are eager to restart their industries. We are also acutely aware of the harm that economic downturns can have on the health and welfare our societies, especially the most vulnerable. The societal impact of social distancing is also significant and there are clear reasons to reduce this when it is safe to do so.

We are comfortable with small, individual releases of specific industries in a 'COVID-safe' manner as laid out by SAGE. We need to think however not only about individual decisions but about the totality of the changes, how they interact in linking households and the pace at which these are planned to occur. Multiple, small changes, appearing reasonable when examined in isolation, can easily lead to R going above 1, and we will be at severe risk of a second wave. There is always a temptation to push the risk just a little bit further on every decision; this is happening across government, often by people unaware of the other changes.

Given the time lag between the implementation of changes and the impact on disease activity (typically 3 weeks allowing for incubation period, disease progression and requirement for medical care) there is a significant risk that we will only recognise we might lose control of the disease when it has regained appreciable momentum. As we have already seen, it then takes several months to reverse.

We also need to think through how we meet the Government's commitment to evaluating the measures already announced (e.g. partial return of children to schools) to allow them to progress to the next stage.

Our biggest concern is however that the combination of multiple small decisions across government, all made in good faith and if taken in isolation, unlikely to push R above 1, do not lead in aggregate to a significant risk of a return to exponential growth. We also need to get the tone right so that the decision to release several sectors in a safe way does not inadvertently send a signal that people can relax social distancing. No individual department can see the totality of the changes made, and you and your team are central to leading in government and ensuring the whole package is coherent and safe.

We all look forward to working closely with you over the coming months.” (CJMW4/111 – INQ000069434, CJMW4/112 – INQ000069418).

8.21. On 21 June 2020, I said in an email to the Cabinet Office and No 10:

“I am concerned however that the tone of this document is far more ‘its fine, everything can open’ either than where the PM made clear he was on wanting to balance risks, or where the epidemic is. In multiple places through the document the sense of what is possible is far more excitable than it should be. I have not done a rewrite as that is not my job but Patrick [Vallance] and I both were pretty concerned about this.

This should be seen as what it is- a non-trivial calculated risk to be taken cautiously. If we encourage people to go beyond that the chances of going backwards are high” (CJMW4/113 - INQ000069760).

8.22. On 23 June 2020, SAGE advice (which I reflected) was:

“1. Releasing a significant number of measures in combination presents a material risk of accelerating transmission and the impacts will need to be carefully monitored.

2. Reintroduction of measures will need to be considered at a local level in response to outbreaks.

3. There will be trade-offs to be made when considering what measures need to be retained or reintroduced, and equity will be an important consideration in making these trade-offs given the varying impacts on different sections of society.

.....

9. Releasing a significant number of measures in combination presents a material risk of accelerating transmission and the impacts will need to be carefully monitored. An increase in local outbreaks is highly likely. Modelling indicates that, in the absence of enhanced levels of immunity provided by vaccination, contact tracing and COVID-secure measures are unlikely to be sufficiently effective to allow a return to ‘pre-COVID’ normality without increasing infections rates.

10. As previously advised measures should be considered in combination, and cannot meaningfully be assessed individually. There will be trade-offs to be made when considering what measures need to be retained or reintroduced, and equity will be an important consideration in making these trade-offs given the varying impacts on different sections of society.

11. It will take some time (one month or more) for the impact of changes to measures on transmission to become apparent, due to both the lag in people’s response, and the lag in measurement of key indicators such as hospital admissions. Some people’s responses will also occur ahead of changes being introduced, and the overall effect is one of gradual change in levels of contact (this is true both when imposing and releasing measures)

.....

16. There may be a need to change measures at the end of the summer in order to be able to keep R below 1 whilst proceeding with the planned reopening of schools.

Planning for safe full reopening should take place now and should take account of the health benefits of reopening schools as well as the educational benefits.

17. There are different risks over the summer period, from different patterns of behaviour and as people move around the country, which may link networks and place additional pressure on areas where there is an influx of people, such as rural and coastal areas.

18. The 'ready reckoners' in the endorsed SPI-M paper provide a useful way to consider the risks associated with changes in different scenarios. It will be important to measure the extent to which sectors are COVID-Secure in order to be able to understand the likely impact on R of any changes. Further work is needed to understand how COVID security can be measured" (CJMW4/114 – INQ000061551).

8.23. I provided advice in line with that from SAGE prior to the announcement of the changes in measures. SAGE's concern, and therefore my own, was that although releasing any one of the given NPI measures in isolation might be assessed as unlikely to bring R above 1, the combination of simultaneous loosening across a wide range of NPIs would potentially do so. This applied equally to the advice that individuals work from home as it did to any of the other NPIs. I emphasised both this need to consider the restrictions as a whole as well as the need to strike the correct tone. Being clear in public statements that this was not over would in my view make a significant difference to behaviours overall, and therefore the spread of the virus.

8.24. SAGE's advice also noted the important health and educational benefits of children's in person attendance at school, the need to plan in advance for the reopening of schools in the autumn, and the need to accommodate this within the broader context of the NPIs necessary to maintain control of the pandemic. I reflected this position in the advice I provided.

8.25. In Cabinet on 23 June 2020, I said:

"the measures set out in the paper took the Government to the edge of the high risk curve. If people strayed beyond the boundaries that had been set, 'R' was likely to rise. The reopening of schools and the winter period generally were also additional risks that would put the healthcare system under pressure, and could lead to a rise in 'R'" (CJMW4/115 - INQ000069806).

8.26. On 23 June 2020, the Prime Minister announced that from 4 July 2020:

- pubs, restaurants and hairdressers were able to open, providing they adhered to COVID-19 Secure guidelines;
- two households would be able to meet up in any setting with social distancing measures;
- the reopening of accommodation sites for 'staycations';
- that leisure facilities and tourist attractions could reopen - including outdoor gyms and playgrounds, cinemas, museums, galleries, theme parks and arcades, as well as libraries, social clubs, places of worship and community centres; and
- That where it was not possible to stay two metres apart, guidance would allow people to keep a social distance of 'one metre plus'. This was to mean staying one metre apart, plus mitigations which reduced the risk of transmission. **(CJMW4/116 – INQ000088026).**

Learning from the first lockdown

- 8.27. The purpose of the first lockdown was to minimise the direct mortality from COVID-19 and the indirect mortality if the NHS were overwhelmed. It aimed to do this by getting R below 1 and keeping it there for long enough that the first wave subsided without reaching anywhere near its theoretical maximum size. In my view, it achieved this aim, with the important caveat about starting later than would have been ideal as laid out above.
- 8.28. We learned a great deal from the first lockdown in the UK, as well as from the approaches to, and effects of, lockdowns in other nations. The remarkable altruism and social mindedness of the British public was on full display, with many people who felt themselves to be at limited risk taking significant social and economic hits to help ensure that collectively the risks of the virus were decreased to protect others. The combined effects of all the NPIs used in the first lockdown succeeded in getting R below 1, something which was not a given before the Government had introduced them. We lay out a lot of our learning in much greater detail in the Technical Report. There were also many operational lessons which are less for me but were extremely important.
- 8.29. The NHS also learned how to deliver many normal services during the combined effects of a wave of COVID-19, consequent staff sickness, and lockdown or other

significant NPIs. At several points I, along with the DCMOs and Sir Steve Powis emphasised that the NHS remained open for emergency care including during press conferences.

Summer 2020

- 8.30. Once there was sufficient surveillance to be able to achieve a reasonable degree of granular geographical understanding of where there were hotspots of COVID-19, which was not possible in the first six months of the pandemic due to the limitations in testing, the possibility of more geographically varied responses arose. The concept of this was that by creating local restrictions, up to near lockdown, in geographical areas where the transmission and the risk was greatest, it would be possible to minimise mortality in those areas and to slow the spread of the virus from those areas. This would thereby prevent or delay more widespread lockdowns being needed across the whole of the country.
- 8.31. This approach is commented on further in the Technical Report (**CJMW4/001 – INQ000203933**). It probably did delay the need for national measures and reduce mortality locally but in some of the cities and other areas affected it led to very prolonged periods of lockdown or near lockdown - Leicester was an example. On balance I think the evidence is that this did more good than harm at a national and local level, but it was a very far from perfect tool.
- 8.32. The Inquiry has asked if I was invited to give advice on Eat Out to Help Out in August 2020 prior to its introduction; I was not. I am not aware that other public health or scientific advice was sought, and SAGE was not consulted. Had I been consulted I would have advised it was highly likely to increase transmission. It was clear we were in a very precarious state of the pandemic. Hospitality venues are a way of bringing multiple households together, so are particularly high risk environments for transmitting a highly transmissible respiratory virus between households. I do not think Treasury officials would have needed to consult me to know what I would have said however. In common with almost all public health advisers in every country I highlighted the risks of hospitality venues from very early in the pandemic multiple times.
- 8.33. My views on reopening schools in autumn 2020 were best laid out contemporaneously in the joint letter that the four UK CMOs wrote to parents, teachers and others (**23 August 2020 - CJMW4/011 - INQ000070464**). It was an example of a balance of risk

decision, where there were some risks to children, families and school staff associated with reopening, as well as some upward pressure on transmission more generally, but in our view the disadvantages to children and their families from not having schooling outside a major wave of COVID-19 were substantial and exceeded the risks. We therefore supported the reopening of schools.

Autumn 2020

Scientific advice in the period leading up to and including the second lockdown

8.34. It may be helpful if I start by outlining the scientific advice during this time before in turn considering some of the issues that arose.

8.35. Going back as early as 3 September 2020, I sent this advice to Simon Case:

“The PM has stated his strong desire to avoid a national lockdown (I am sure shared by the rest of the population) and to protect the Christmas/New Year festive season as much as possible.

I think there are broadly three scenarios over winter.

** The residual covid secure opening, behaviours, local lockdowns, test-and-trace etc keep the national R at or below 1 through to spring, and with a bit of a squeeze and vigorous local action we get through without a major national intervention. Clearly this is the preferred option, but probability well below 100%.*

** The other extreme; we return to rapid national exponential growth, with a clear risk of a surge in mortality and/or the NHS becoming overwhelmed at a time of year it is under greater pressure than it was this April/May. We have no choice on timing and have to go for a national intervention at speed, albeit probably a bit more targeted than the last one (eg protecting schools).*

** It is clear we are going to need a national intervention because the exponential growth is national (or at least over wide regions), but we have a bit of flexibility on when because doubling time is in weeks rather than days. A 2-3 week partial or full lockdown, especially after a high risk event, would act as a fire break, and a return from a doubling to a halving of the virus. I think we should be considering this scenario quite seriously, as I think it as likely as the other two. There will be weeks of the year between now*

and Easter which would be least/most damaging economically and socially to have a lockdown of some sort, and we should identify those and plan to have them as structured firebreaks if needed. This would reduce the negative effects.

There was a signal that some of the surge in cases seen in the Pakistani British population followed the two Eid celebrations, and the Christmas celebrations are likely to be much wider in scope even if current social distancing is in place” (CJMW4/006 - INQ000070554).

8.36. On 5 September 2020, I sent this advice to Simon Case:

“I will send you a note next week, this is not a weekend issue, but here are the curves by age I mentioned. Age 17-30 are the key groups. I am most concerned by test positivity rates going up relatively rapidly; this is a depressingly reliable early indicator of trouble, and if it goes up faster than cases suggests relative under ascertainment.

This is not yet trouble, but is heading for trouble” (CJMW4/117 – INQ000070569).

8.37. On 21 September 2020, SAGE provided this advice, which I quote at length because it lays out the contemporaneous scientific advice in the early autumn of 2020:

“1. COVID-19 incidence is increasing across the country in all age groups. The effect of opening of schools, colleges and universities has only just begun to affect this increase. Even so, the latest data suggest that the doubling time for new infections could currently be as short as 7 days nationally. COVID-19 related hospitalisations and intensive care bed usage have started to rise. SPI-M has modelled the potential increases.

2. A package of interventions will need to be adopted to reverse this exponential rise in cases. Single interventions by themselves are unlikely to be able to bring R below 1 (high confidence). The shortlist of non-pharmaceutical interventions (NPIs) that should be considered for immediate introduction includes:

- a circuit-breaker (short period of lockdown) to return incidence to low levels*
- advice to work from home for all those that can*
- banning all contact within the home with members of other households (except members of a support bubble)*
- closure of all bars, restaurants, cafes, indoor gyms, and personal services (for example hairdressers)*

- *all university and college teaching to be online unless face-to-face teaching is absolutely essential*

3. This shortlist is based on assessment of the effectiveness and harms of different NPIs at a population level. Effect on R has been estimated for each intervention where possible, though these are not necessarily additive. In determining the number and scale of NPIs to be suggested, it has been assumed that there will be no other policy decisions which would lead to further increases in transmission (no lifting of any existing restrictions) when these measures are introduced.

4. There are important interventions which have a significant effect on reducing individuals' risk, which are not considered here because their population level effect would be small (for example because they address situations which occur relatively infrequently).

5. All the interventions considered have associated costs in terms of health and wellbeing and many interventions will affect the poorest members of society to a greater extent. Measures will be urgently needed to mitigate these effects and to achieve equity and social justice, some of which could be introduced relatively quickly. Policy makers will need to consider analysis of economic impacts and the associated harms alongside this epidemiological assessment. This work is underway under the auspices of the Chief Economist.

6. The more rapidly interventions are put in place, and the more stringent they are, the faster the reduction in incidence and prevalence, and the greater the reduction in COVID-related deaths (high confidence). Both local and national measures are needed; measures should not be applied in too specific a geographical area.

7. A more effective response now may reduce the length of time for which some measures are required. However, some restrictions will be necessary for a considerable time (at least throughout the winter) and therefore consideration should be given to their sustainability.

8. A consistent package of measures should be adopted which do not promote, or appear to promote, contradictory goals. This will enable clear, consistent communications that can explain the rationale for measures, which in turn will support adherence.

9. Communication should increase public understanding of risk and should explain the importance of everyone adhering to guidance and reducing contacts, as anyone can contribute to transmission (even if they have previously been infected). Adherence will

continue to be central to the effectiveness of measures, and it should not be assumed that people will respond in the same way that they have done previously.

10. The rapid rise in cases means that a raft of complementary operational response measures is even more important to reduce transmission, particularly in care homes, hospitals and other enclosed settings, such as prisons and hostels for the homeless. SAGE has previously noted the risks associated with discharged people from hospitals into the community without testing to ascertain whether they may be infectious. Specific attention to reducing spread to Care Homes and within Hospitals is critically important. This needs to be considered when assessing prioritisation within constrained testing capacity.

11. Measures such as social distancing, hand hygiene, ventilation and appropriate use of face coverings will remain important contributors to reducing transmission.

12. It is important that studies are undertaken to evaluate the risks in different settings and populations and the impact of different control policies in order to inform future decisions on which NPIs to apply. The existing evidence base for the effectiveness and harms of individual interventions is generally weak.

13. SAGE endorsed paper ‘Summary of the effectiveness and harms of different non-pharmaceutical interventions’ subject to minor changes” (CJMW4/118 – INQ000061566).

8.38. On 24 September 2020, SAGE advice was:

“1. Incidence across the UK continues to increase rapidly. The latest estimate of R for the UK is 1.2 to 1.5.

2. Unless current NPIs reduce R back below 1 soon, it is possible that infection incidence and hospital admissions will over time exceed scenario planning levels. Further measures will be needed to bring R below 1 in the event that current measures do not do so. The earlier additional measures are introduced the more effective they will be” (CJMW4/119 – INQ000061567)

8.39. On 1 October 2020, SAGE advice was:

“1. Some data streams indicate potential slowing in the growth rate of the epidemic, but it remains highly likely that infection incidence is growing overall. The latest estimate of R for the UK is 1.3 to 1.6.

2. *Unless current NPIs reduce R back below 1 soon, it is likely that infection incidence and hospital admissions will exceed scenario planning levels in the next 2 weeks” (CJMW4/120 - INQ000061568).*

8.40. On 2 October 2020, I sent this advice to Simon Case and others **(CJMW4/121 - INQ000070966)**. Its aim was to help get the tone of the communications from Government right; I was especially nervous that this would be more positive than the epidemiological situation warranted and I wanted the communications teams in particular to understand the likely situation over winter. I address the importance of the tone of communications in greater detail below but my advice (aimed at communications colleagues) at this time was:

“Getting the tone right over the next 6 months is not going to be easy but is key to getting the least bad outcome. My current working assumption is that the period of greatest pressure will be the conventional ‘flu season (see data on all UK ‘flu seasons since 1988 below) as the risks will be similar. This is a new virus so this may be wrong but it seems the way to bet at this stage. If so my view is there will be three stages til we get to spring, with many possible variants...

1) *The Gathering Storm. Oct to mid December.*

Cases will be going up overall, with a complex balance of surges and local measures meaning there are peaks and apparent troughs, both over-interpreted in the media. Because the worst is almost certainly in the future it will be difficult not to have a pretty sombre tone; anything else will get caught out by events. Only if the outlook looks consistently a lot better in continental Europe implying this is a non-seasonal peak will it be possible to deviate from a downbeat tone, and even then it’s a risk. Point to spring as the chance to be optimistic as this is both realistic, and unlikely to be caught out by events but will feel a long way off to the population and business. Til then head down into the driving rain.

2) *In the Bleak Midwinter. Mid Dec to mid Feb.*

Peak flu season as a proxy for peak COVID. In other news Christmas, New Year, dry (and possibly fire-broke) Jan. The peak of cases, but possibly not deaths, may occur in this timeframe. NHS under winter pressures. At the same time we should realistically have much better testing capacity, probably lateral flow tests in actual use albeit initially fairly low volumes, could have the first doses of vaccine(s), may

have some additional slightly effective drugs in the locker. So both bad and good news. Tone can be a bit less resolutely downbeat.

3) *Things Can Only Get Better. Mid Feb to mid April.*

Worst peak passed, even if we get a third wave (possible, but likely to be smaller if so) with still significant transmission, but falling. Probability of much better testing capacity allowing for a much more effective test-and trace for the rest of the year with demand falling and supply still rising. Probability of lateral flow saliva tests in pretty high numbers quite high (not 100%). Good weather will accelerate downswing of virus. A reasonably good chance of at least some moderately effective vaccines present, and possibly some additional drugs with small but incremental improvement in mortality. Can give some confidence to business, population, NHS, that the worst COVID-19 winter is behind us and whilst it is not going to disappear it now becomes a know entity, and a much more manageable risk with science now delivering multiple products through to winter 2021 making winter 2020/21 the nadir. Cautiously optimistic tone likely cheer rather than jar. CMO and CSA let off all press conferences for at least 9 months.

4) *Spring.*

Data below. ILI= influenza-like illness. Includes other significant respiratory viruses (eg adenovirus)."

8.41. On 8 October 2020, SAGE advice was:

"1. Incidence and prevalence across the UK continue to increase, and data show clear increases in hospital and ICU admissions, particularly in the North of England.

2. In England the number of infections and hospital admissions is exceeding the Reasonable Worst Case Scenario (RWCS) planning levels at this time. Projections also indicate the number of deaths is highly likely to exceed Reasonable Worst Case planning levels within the next 2 weeks.

3. Data show lower incidence and prevalence in London compared to some other UK cities, but there is variation within London. The reasons for apparent lower levels in London are not known but could include some degree of immunity (lower than 20%); different population behaviours because London was hard hit in the first wave;

the effects of the loss of tourism and people working from home; differences in population structure and housing densities; or differences in levels of deprivation compared to other cities.

4. As previously, a package of non-pharmaceutical interventions (NPIs) needs to be adopted to reverse the exponential rise in cases (see SAGE 58). The epidemiological impact of NPIs will depend on context and how they interact, and public behaviours in response to the measures” (CJMW4/122 – INQ000061569).

8.42. On 9 October 2020, I provided the below advice to Simon Case:

“I have had a chance to read the Tier 3 proposals, and have also discussed with Patrick (ccd), who agrees with this analysis (he may reply separately). In Tier 3 areas by definition COVID incidence rates are high, and rising fast and exponentially. The implications of this as it moves into older populations are widely accepted and do not need restating.

There were two options we thought had a reasonable chance of success of meeting the strategic goals set out by the PM, based on SAGE advice, in some combination:

- 1) A package of interventions sufficient to get areas with rapidly rising transmission back to around $R \leq 1$, stabilising the situation but not decreasing incidence below current rates. These would, by definition have to be maintained over the entire major period of risk, which probably for practical purposes means to the end of winter (ie 5-6 months). Incidence would not drop below what it is now but track along even if the package were sufficient. R may naturally rise over the respiratory virus season requiring additional measures to retain status quo.*
- 2) A firebreak period of very strong measures for a defined period of a few (2-4) weeks that have a high chance of pushing R below 1 so cases fall, resetting the clock on transmission. It should be possible to get away with fewer NPIs over the long run than 1) above if this approach is taken but some would still be needed.*

The current minimum package, which at its core is pretty limited, for only 4 weeks is likely to be neither significant enough to achieve a time limited firebreak, nor prolonged enough to maintain control albeit at a higher level. Only if Local Authorities chose to go to the top of the possible range of options which are defined as ‘subject to

engagement' across multiple domains would it be likely to have an effect in a short period, and even this is not certain. Longer periods of significant NPIs are likely to be needed in these high incidence areas.

Both 1) and 2) above need buy in from the population, and from LAs; local consent is essential.

I worry that this current approach will fall between two stools, unless all the affected LAs choose to go to the top of their licence, which is likely to be the advice of their Directors of Public Health who are faced with the stark realities of where the current exponential growth will leave their populations and local NHS, in the face of exponential growth in cases" (CJMW4/123 – INQ000071071).

8.43. On 11 October 2020, I provided this advice to the Cabinet Office:

"...I remain pretty dubious the measures will be sufficient in Tier 3 however, unless LAs choose to go to the top of their licence in virtually every sector, and it is very unlikely 4 weeks will be sufficient at this level of intervention; this is a long way from a fire-break. If they go for the minimum set as laid out it will almost certainly not be. The 2m+ rule, which they are not allowed, is one of the evidence-based things we have. Not allowing it if it is wanted locally seems odd, and removes a tool to make hospitality in high transmission areas safer, and therefore viable over winter. Even the much-quoted Sweden model depends on a 2m model in hospitality (which people stick to we are told).

In Tier 2 which covers a wide range of epidemiology, it may be sufficient in some areas, but I think we should anticipate quite a few accelerating into Tier 3 in the next 2 weeks.

So my overall concern is this is necessary, but not sufficient, unless LAs push right to the top, and the public buys in strongly" (CJMW4/124 – INQ000071080).

8.44. On 15 October 2020, SAGE advice was:

"5. Incidence and prevalence across the UK continue to increase, as shown by data from the latest ONS infection survey and modelled estimates from SPI-M.

6. The latest estimate of R for the UK is 1.3 to 1.5, while the daily growth rate estimate for new infections is +4% to +7%. The latest estimate of R for England is 1.2 to 1.4,

while the daily growth rate estimate is +4% to +7%. *R* is almost certainly above 1 in all regions of England and in Scotland, Wales and Northern Ireland. As previously, these estimates rely on lagged data, they mask wide regional variation in the number of new infections and how transmission is changing across the country. They should therefore be treated as an indication of the general trend.

7. There is no clear evidence that the epidemic's trajectory has changed in the past month. The growth rate estimates equate to a doubling time for new infections of 10 to 15 days, but it could be faster in some regions and age groups.

8. Estimates from SPI-M suggest there are between 43,000 and 74,000 new infections per day in England.

9. The latest ONS swabbing survey estimates that from 2nd to 8th October an average of 336,500 people had COVID-19 in England, with 27,900 new infections per day. However, given the current state of the epidemic, it is highly likely that incidence has continued to grow since the survey period and the current number of new infections each day is likely to be higher.

10. SAGE approved the SPI-M medium-term projections, noting data sensitivity analysis in the modelling. These are based on current trends, in the absence of additional interventions or behavioural changes. These projections cannot fully reflect changes in transmission which might have occurred over the past 2 to 3 weeks, including any impact from recent measures. Projections in the nearer term are more certain than those longer term.

11. In England the number of infections and hospital admissions is exceeding the Reasonable Worst-Case Scenario (RWCS) planning levels at this time. The number of daily deaths is now in line with RWCS planning levels and is almost certain to exceed this within the next 2 weeks" (CJMW4/125 – INQ000061570).

8.45. On 29 October 2020, SAGE advice was:

"19. SAGE considered some high-level illustrative scenarios for the coming months, which provide one way of considering the potential impact of different approaches. It is important to consider the direct COVID-19 harms, indirect COVID-19 harms, non-COVID health effects caused by interventions, and other harms. Different regions could follow different paths and combinations of the scenarios are possible.

20. *Interventions applied when prevalence is low can maintain low prevalence, whilst the same interventions when prevalence is higher may prevent further growth but result in continued high prevalence. Keeping prevalence low in low prevalence areas reduces the risk of a national large-scale epidemic.*

21. *Direct and indirect mortality and morbidity from COVID-19 is likely to be low in the event of low prevalence and a controlled epidemic, where test and trace can play a larger role in containing outbreaks, and interventions are in place to successfully control surges in cases where they occur, although economic and other harms arise from interventions.*

22. *Sustained high prevalence, even if further growth were prevented, would have significant consequences on mortality and morbidity, and place significant pressures on the health system. There would also be significant economic and other harms in these scenarios.*

23. *As the epidemic progresses, susceptibility will reduce, and therefore R will also reduce. The epidemic may plateau, possibly at a high level of infection, due to a combination of interventions, behaviour change and a degree of population immunity. Population immunity would contribute a small proportion of this effect and would be insufficient to have a significant effect if restrictions were released. The duration of immunity remains uncertain.*

24. *In this event, if interventions were relaxed or behaviours changed, R would likely quickly exceed 1 once again. This would result in prolonged periods of high incidence, and consequently high levels of hospitalisations and deaths. Trends seen in a number of US states in recent months are suggestive of this type of dynamic" (CJMW4/126 – INQ000061572).*

8.46. As is clear from the above, the advice coming from SAGE and from me over this period was that we were concerned about the increase in incidence and prevalence and advised in favour of measures to address this.

'The rule of 6'

8.47. Meanwhile, by September 2020, there was a debate within Government about how to minimise the number of households interacting, thereby reducing transmission

potential, whilst allowing for some degree of social interaction to maintain the social fabric, minimise harm to the economy, reduce loneliness and ensure the response was durable over time. In all these decisions there was no such thing as a perfect answer, with all having significant downsides against one or more of the objectives of Government. Specifically, the debate focussed on whether the best thing was to limit the number of households meeting or to minimise the number of individuals who could meet; a hybrid model was considered too complicated both to explain and, if necessary, to enforce.

- 8.48. The Rule of Six which came into force on 14 September 2020 was one of the compromise measures that came out of these debates. My own view, based on SAGE advice, was that the number of households meeting was one of the biggest determinants of spread (**CJMW4/127 – INQ000120554**). Accordingly, my advice was that Government design its own advice and regulations around the number of households who could meet. There was however no perfect way of doing this and ultimately the policy adopted was one whereby six individuals from any household could meet. I did not consider the 'Rule of 6' on its own to be sufficient to suppress COVID-19 in the long run, although it was a useful contribution as one of a suite of NPIs.

Tone of communications to the general public

- 8.49. As well as guidance and rules from Government, individuals' own behaviour, and influencing that through the tone of our messaging, was important. I have already described above some of the concerns I held around the tone of communications as of October 2020. Prior to this, on 20 September 2020, I sent the below to the Presidents of AOMRC, the Colleges most affected and the Association of Directors of Public Health ("ADPH"):

"I wanted to let you know that we are trying this week to change the narrative around COVID with the public. Patrick Vallance and I are going to do a brief presentation tomorrow morning (slides still being finalised but nothing you don't know) essentially to say: this is serious. If we, collectively, do not change behaviours to take R back below 1 this will be a really bad winter for the NHS, and could be much worse than really bad.

We need the public to take note of the changing epidemiology to the point of changing what they are doing. Ultimately government regulations go so far, but it is multiple individual behaviours which really make the difference. Having the profession row in behind the overall message that this is time for a sea change in public observance of advice would be incredibly powerful.

Obviously your call, and I am not suggesting endorsement of individual measures, but if the message that this needs a serious change in mindset over the autumn and winter does not land we are in deep trouble on health, whether COVID direct or indirect mortality and morbidity. This week will be critical to trying to get that change.”
(CJMW4/128 – INQ000070756).

- 8.50. On 21 September 2020, the GCSA and I tried to make clear this change of tone at a press conference. Again, I lay out my remarks in detail because it makes clear our contemporaneous view, as communicated to the public:

“.....But what we’ve seen is a progression where, after the remarkable efforts which got the rates right down across the country, firstly we saw very small outbreaks, [which] might be associated with a workplace or another environment. Then we’ve seen more localised outbreaks which have got larger over time, particularly in the cities, and now what we’re seeing is a rate of increase across the great majority of the country. It’s growing at different rates but it is now increasing. And what we’ve found is that as the rate, as we go through in time, anywhere which was falling is now moving over to beginning to rise, and then the rate of rise continues in an upward direction. So this is not someone else’s problem, this is all of our problem. Next slide, please.

This graph is a simple one, it simply shows the number of inpatient cases in England over the period from the first of August. And until that point in time, there had been a steady fall over a long period of time, right back from early April. And it then stabilised for a period and flattened out, but over the period since the first of September, you can see a steady, sustained rise in numbers with a doubling time, as with the cases, of probably seven or eight days. Now what that tells us is that if this carried on unabated, these numbers are relatively small, we are talking about around 200 at the moment, but if this, if this continued along the path that Patrick laid out, the number of deaths directly from Covid, I’ll come back to indirect deaths, will continue to rise, potentially on an exponential curve. That means doubling and doubling and doubling again, and you can quickly move from really quite small numbers to really very large numbers because of that exponential process. So we have, in a bad sense, literally turned a corner,

although only relatively recently. And we, I think everybody will realise that at this point the seasons are against us. We're now going into the seasons late autumn and winter which benefit respiratory viruses, and it is very likely they will benefit Covid as they do for example flu. So we should see this as a six-month problem that we have to deal with collectively. It's not indefinite and as I come on to, science will in due course come, ride to our rescue, but in this period of the next six months I think we have to realise we have to take this collectively, very seriously.

A lot of people have said 'maybe this is a milder virus than it was in April'. I'm afraid, although that would be great if that were true, we see no evidence that is the case. At the moment, because the cases started to rise most in the lowest age bands, in young adults, not in children, children the rates have really not increased, as the data Patrick showed shows, showed in young children, but in young adults, these are the group who are least likely to end up in hospital. And a point we made right from the beginning is that for many people this remains a mild infection, but as you move up the ages, if you move into people who are more vulnerable, then the mortality rates, if people get this, rise to quite significant rates. And what we've seen in other countries, and are now clearly seeing here, is that they're not staying just in the younger age groups, they're moving up the age bands and the mortality rates will be similar to, slightly lower than they were previously, but they will be similar to what we saw previously. And these are significantly greater, for example, than ordinary seasonal flu. So seasonal flu normally in the UK would on average a year would kill around 7,000 people a year tragically, and in a bad flu year, as there was for example about three years ago, it might kill upward of 20,000 a year. This virus is more virulent than flu. So the numbers people talk about are not unreasonable numbers for us to be thinking about. Treatment is better, there is no doubt about that. Doctors, nurses have learned to treat this much more effectively and we have new drugs such as dexamethasone. These will reduce the mortality rate, but they will definitely not eliminate or take it right down to trivial levels.

Two other broad points I wanted to make. The first one is that there are, as we've said from the beginning, and it really does need to be repeated, four ways in which this virus is going to have a very potential significant effect on the population's health if we let it grow out of control. The first, the easiest to, to identify, is direct Covid deaths. People who get the virus and die of the virus. The second would be if the NHS emergency services were overwhelmed by a huge spike, and that is what the extraordinary efforts of the population allowed to prevent happening in the first wave we met. The third however is very important, and I think its importance should not be understated, which

is if the NHS is having to spend a large proportion of its effort in trying to treat Covid cases because the numbers have gone up very, to a very high levels and trying to put in case, in place, large numbers of systems to try and reduce the risk of transmission in hospitals, it will lead to a reduction in treatment for other areas, in early diagnosis of disease, and in prevention programmes. And so there is an indirect effect on deaths and on illness from this impact on the NHS if we allow the numbers to rise too fast. But on the other side, we also know that some of the things we've had to do are going to cause significant problems in the economy, big social impacts, impacts on mental health, and therefore ministers making decisions, and all of society, have to walk this very difficult balance. If we do too little, this virus will go out of control and we will get significant numbers of increased direct and indirect deaths, but if we go too far the other way, then we can cause damage to the economy which can feed through to unemployment, to poverty and to deprivation, all of which have long-term health effects. So we need always to keep these two sides in mind.

My final point is that if I increase my risk, a lot of people say, 'well, can't people just be allowed to take their own risk?' The problem with a pandemic or an epidemic infection like this is if I as an individual increase my risk, I increase the risk to everyone around me and then everyone who's a contact of theirs, and sooner or later the chain will meet people who are vulnerable or elderly or have a long term problem from Covid. So you cannot in an epidemic just take your own risk. Unfortunately, you're taking a risk on behalf of everybody else.

It's important that we see this as something we have to do collectively, and there are broadly four things we can do, over the next period, to get on top of this. The first of which is reducing our individual risk, and this is around the things that we all know about, hands, face, space, washing hands, using masks, particularly in environments which are enclosed, public transport and so on, and also, in particular, having space between people whenever we can achieve it. Especially when indoors. The second group of things are things we can do to isolate the virus. So if people have symptoms they must self-isolate and we must find their contacts so that they can isolate, and in people who've travelled from high risk areas, they also should isolate, and this means that they are taking on behalf of society a big step forward to keep the virus out of circulation whilst they are still infectious. This is an absolutely critical part of the response. The third one, and in many ways the most difficult, is that we have to break unnecessary links between households, because that is the way in which this virus is transmitted, and this means reducing social contacts, whether they are at work, and this is where we have enormous gratitude to all the businesses, for example, who've

worked so hard to make their environment Covid-secure to reduce the risk, and also in social environments. And we have to try and do this in the least damaging way, but we, we all know we cannot do this without some significant downsides, and this is, this is a balance of risk between if we don't do enough the virus will take off, and we at the moment, that is the path that we are clearly on, and we, if we do not change course, then we're going to find ourselves in a very difficult problem, as Patrick has laid out. The final thing we can do is the science, is investing in drugs, vaccines, diagnostics, and Patrick is going to take us through the final section, where we've got to with the most exciting of these, which is vaccines" (CJMW4/129 – INQ000070770).

- 8.51. The scientific advice from SAGE, myself, the GCSA, the DCMOs and others was by this point in September 2020 much more solidly based on real data and a better understanding of COVID-19 than it had been in the run-up to the first lockdown. We had by this stage very good surveillance that was relatively contemporaneous, a much better understanding of the disease and the best clinical responses, and experience from around the UK as well as international experience to draw on. It therefore was important in my view to share this better understanding with the public, in addition to using it to inform our advice to Government.

'Circuit breaker' lockdowns and curfews

- 8.52. Had a "circuit breaker" lockdown been introduced, it might well have delayed or reduced the first part of the second wave that was due to the original Wuhan variant. I am doubtful whether it would have prevented all need for a lockdown in the winter of 2020/2021 but it might have shortened it. What makes the trajectory of the UK pandemic at this time much more difficult to assess is the emergence of the Alpha variant in the UK, something which was not predictable in September 2020.
- 8.53. Alpha emerged in the second half of the second wave (November 2020) and became a very serious threat both in the UK and internationally. The second wave should in reality be seen as two separate waves; a Wuhan wave and then a subsequent Alpha wave which overlap with one another. The fact that Alpha was significantly more transmissible meant that many calculations previously made which underpinned the scientific advice were potentially rendered either partly or completely redundant. It is possible that a circuit breaker would have had an impact on the emergence of Alpha (in my view it may have delayed, rather than prevented it), but this enters the realm of speculation.

- 8.54. One measure which was introduced at this time was a 10pm curfew on pubs cafes and restaurants. This was not a measure which was introduced based on specific scientific or public health advice. SAGE considered a paper on 21 September 2020 that set out the estimated impact of different NPIs at a population level. As regards limiting the opening hours of bars, pubs, cafes and restaurants, the view was that: *“Curfews likely to have a marginal impact. Low confidence” (CJMW4/130 - INQ000070907).*
- 8.55. The Inquiry has asked me to speculate on the reasons the Prime Minister and others made or did not make various decisions in the autumn of 2020, including not taking the decision to implement a circuit breaker lockdown in September 2020. I find that difficult to do reliably since only he and they can confidently lay out their own thinking. Inevitably, and rightly, economic and social factors, and indeed wider political factors, will have contributed to their thinking alongside public health concerns. The Inquiry has also asked me about some reported statements made by the Prime Minister in autumn 2020 (that he had been “gamed on the numbers” and certain comments in respect of not having any more lockdowns). I do not recall the specific statements referred to being said when I was present, and so I am unable to comment further.

The tier system

- 8.56. The three tier system introduced in mid-October 2020 was an attempt by the Government to find a balance between a full national lockdown and allowing the virus to run out of control. My view at the time was that in the context of the Wuhan variant there was a possibility that the three tier system would be sufficient, but only if quite stringent measures were in place in those areas with high transmission. The tier system was not able to hold the line once the Alpha variant became dominant.
- 8.57. In practice, there was a continuous debate within Government which in my view watered down the tier restrictions to an extent that they were unlikely to be effective. In a press conference at the time, I expressed this view:

“I am very confident that the measures that are currently in place are helping to slow the virus and these measures [the new tiers] will help to slow it further. I am not confident and nor is anybody confident that the tier three proposals for the highest rates, if we did the absolute base case and nothing more, would be enough to get on top of it and that is why there is a lot of flexibility in the tier three levels for local

authorities guided by the directors of public health, who are absolutely superb around the country, to actually go up that range so that they can do significantly more than the base, because the base will not be sufficient. I think that is very clearly the professional view but there are quite a lot more additional things that could be done within that with local guidance. And the central thing about this is these only work if people buy into them. I don't just mean the political leaders, although it is absolutely essential that they do and that there is as much consensus as possible, but also, everybody has got to buy into them because that is how it works, everybody doing their bit within this and therefore that is important, that we have local as well as national agreement this is what we need to do" (CJMW4/131 – INQ000236412).

- 8.58. I had a lot of operational exposure to the tier system as I chaired the Silver Local Action Committee meetings which provided technical advice to political leaders. Although the concept of tiers was not itself unreasonable, the system suffered from a number of faults in practice.
- 8.59. One limitation was that whilst our surveillance was by this stage good and reasonably up-to-date, it was not available in absolute real-time. The Government was therefore always imposing higher tiers slightly after the threshold for their introduction had been met.
- 8.60. In addition, in an attempt to avoid imposing unnecessary or excessive restrictions, the technical advice from the Local Action Committee as to what NPIs were necessary in order to control the pandemic in a particular area would describe a set of suggested restrictions that were considered to be sufficient, but given the obvious downsides of NPIs on long term public health not more than sufficient. These would then in turn be watered down by the economic Ministries. Individual Members of Parliament and local leaders also often then tried to ensure that 'their' area was not included in a higher tier. In my view, this represented a failure to recognise that the introduction of restrictions was motivated by a need to protect the citizens for whom they had political responsibility.
- 8.61. The net result was that the tiers were often a bit too late, not quite stringent enough to get R below 1, and too geographically circumscribed to have the effect needed. The GCSA frequently said that what we had learned was that we always need to go a bit earlier than we wanted, a bit harder and over a wider geographical area; I agree with this assessment.

- 8.62. Tiers also had some unintended (but not unexpected) consequences. Some people in higher tier areas close to a tier border might travel to lower tier areas, for example to enjoy hospitality. Generally, this was a very small number, and probably of no great epidemiological importance, but it led to very significant tensions in both directions. Lower tier areas felt that cases were being imported from their higher transmission neighbours, and hospitality venues, shops and other business in higher tier areas felt they were losing trade for no overall advantage to society. Political differences between national and local government were often played out through the negotiations around tiers.
- 8.63. Not all of the communications around the territorial limits of these NPIs were ideal, but in my view they were generally the best efforts at the time. The more granular the decision in terms of the geographical extent, the less appropriate it was that it came from a national rather than a local or regional source.
- 8.64. Despite these undoubted difficulties, the tier system arguably did delay the need for a full national lockdown and provided some control short of that achieved by a national lockdown or other major national measures. In my view, a tiered approach should not be dismissed as a method of control in any future pandemic, but people should consider their use with their eyes open; it is difficult epidemiologically, technically and politically.

5 November to 2 December 2020 'lockdown'

Scientific Advice before and during the second lockdown

- 8.65. As I set out below at paragraph 8.75, the second national lockdown was the natural implication of our advice during the autumn that further measures would be needed and the absence of sufficient measures being imposed over the preceding period. I therefore address under this heading the key pieces of advice that were provided during the course of the lockdown itself.
- 8.66. On 5 November 2020, the Government introduced the second national lockdown. I set out below some of the scientific advice in respect of NPIs from this time.
- 8.67. On 5 November 2020, SAGE advice was:

“15. It will take 2 to 3 weeks to be able to assess the impact of new measures in England. The effects of the tiering system will be seen before that. If well-adhered to, the lockdown measures starting in England on 5 November are likely to reduce R to less than 1. If this reduction in R is sustained until 2 December, the number of hospital admissions and deaths would be expected to fall until at least the second week of December.

16. The longer-term outlook depends on both the nature of non-pharmaceutical interventions that are implemented in England after 2 December and policies put in place over the festive period” (CJMW4/132 – INQ000061574).

8.68. One 12 November 2020, SAGE advice was:

“32. Overall, early analysis suggests that the tiers system in England had an impact on viral transmission during the period it was implemented, with higher tiers having a greater impact. Tier 1 measures alone are not enough to prevent the epidemic from growing rapidly.

33. Some models suggest a modest (approximately 10%) reduction in R when moving from tier 1 to tier 2. Under the right circumstances in some places, tier 2 could theoretically be enough to reduce R to below 1, however this has not yet been observed. This would only be the case if R in a given area were only slightly above 1 prior to implementation of tier 2 restrictions. This suggests that tier 2 is the minimum intervention required to maintain any degree of control on transmission, though this would not be the case in all places and there is significant uncertainty. In most cases moving from tier 1 to tier 2 would slow growth rather than reverse it.

34. The package of measures applied in tier 3 varied between places, with some areas applying more stringent restrictions than others. Evidence suggests that tier 3 restrictions reduced local transmission, particularly in the North West, and possibly North East and Yorkshire regions, however the scale of the reduction is currently hard to quantify. ONS analysis is consistent with the SPI-M analysis, though also with significant uncertainty. It is therefore unclear whether baseline tier 3 restrictions alone would be sufficient at a regional or national level to reduce R below 1.

35. It is almost certain that prevalence will remain high in some parts of the country at the end of the current national restrictions. When policymakers plan transitions from

national measures to a localised approach, or between tiers in future, consideration will need to be given to both prevalence and growth rate of new infections.

36. Basing transitions on prevalence alone leads to an outcome where growth rates are highest in the lower prevalence areas and interventions sufficient to halt growth do not take place until prevalence is very high. This eventually leads to high prevalence across the whole country and the consequent need to implement national measures. SAGE has advised that interventions need to be introduced whilst prevalence is low in order to maintain low prevalence, and should be based on growth rate as well as prevalence. Test and trace systems work best at low levels of prevalence.

37. It will also be important to consider a range of restrictions that are more stringent than those in the current tier 3 that might be required for some areas to avoid the need for further national-level interventions. This will be particularly important in the run up to the winter festive period if relaxation of measures is under consideration” (CJMW4/133 – INQ000061575).

8.69. On 15 November 2020, my advice to the Cabinet Office when discussing the proposed strategy from December onwards was as follows:

“1. I really think this needs to be situated in the context of a plan out to April. I do not expect the vaccine, if approved, to have any measurable effect in Jan, and only modest before April, and if only the Pfizer vaccine is approved before then (ie no AZ) it will reduce mortality significantly but not reduce pre-spring pressure on the NHS much. Seasonality will not help us until March and NHS normal maximum pressure starts Jan-Mar. We should try to avoid constant, predictable, tacking around. So this argues for an all-winter plan, rather than a Christmas-and-early-Jan plan.

2. Spring will not be normal- but much more normal, depending on vaccine rollout. So that can be addressed nearer the time. But I think we should signal that now. The excellent interview by Prof Ugur Sahin, BioNTech co-founder, this morning on Marr is in my view considerably more realistic and science-based than some other recent commentators on this point.

3. A lot of weight is put on testing. I really think we need to avoid stoking an excessive belief that testing alone, even if done well, is our salvation. It is not. It is a helpful adjunct, if it leads to isolation” (CJMW4/134 – INQ000236416).

8.70. On 17 November 2020, my advice to the Cabinet Office around some of the Christmas planning was:

“1. If we are going for 3 households in a bubble I think it would be prudent to shorten the time. Its about generation times: if you are meeting for long enough for a first generation of transmission, and then a second generation from those infected the first time the risk increases significantly.

2. If this is announced next Mon not only will deaths still be rising (inevitable), but there is a reasonable chance that NHS admissions will still be rising following the announcement. We will have only the first indications of where the lockdown has had a major effect, and where only a minor one. I therefore think there is a strong argument for pushing this back to the Thurs by which time there is a reasonable chance that both incidence data from ONS, and NHS admissions, will be falling in most of the country. This will make it easier to land as well as giving us much better data on which to fine tune decisions.

3. I remain of the view that we should be making mention of other religious traditions, and also in announcements. This is more than a courtesy; some of the most affected communities are from other religious traditions” (CJMW4/135 – INQ000062904).

And then:

“Patrick [Vallance] has made the point, with which I completely agree, that sequential bubbles are the worst possible outcome, and worse than a longer period of a single bubble of 3 households.

Obviously your call on 23rd, but the optics will be tricky, and the ability for Patrick and me to say ‘this is heading the right way’ based on data will be constrained” (CJMW4/136 – INQ000071682).

8.71. On 18 November 2020, I provided further comment to the Cabinet Office on the document that would become the “Winter Plan”, including this point:

“A few comments, and some more detailed ones attached. I have stuck to the science/medicine.

1. The old Tier 2, whilst a reasonable try, did not work, with all the areas we put in Tier 2 currently rising in incidence and hospitalisations. Recreating new Tier 2 as

basically old Tier 2 as we go into winter will fail predictably, with the result those areas will have to move to Tier 3. It is a false economy, and will do more damage. And Tier 1 did not work at all (jn the sense all places in Tier 1 are growing rapidly now), so trying to turn Tier 2 into Tier 1 is a mistake” (CJMW4/137 – INQ000071730).

8.72. On 19 November 2020, SAGE advice was:

“2. As previously noted, evidence shows that the earlier and more rapidly interventions are put in place, and the more stringent they are, the faster the observed reduction in incidence and prevalence. Recent data show uniformly shrinking epidemics as a result of the implementation of tier 3 restrictions in England, and national restrictions in Northern Ireland, although this is more mixed for the Welsh firebreak and Scotland central belt restrictions. Tier 3 restrictions in England were heterogeneous, with most areas having additional restrictions above the minimum set for this tier.

...

5. Relaxation of interventions over the festive period presents a significant risk of increased transmission and increased prevalence, potentially by a large amount (high confidence). Keeping prevalence low before the festive season would reduce transmission during any relaxation period (high confidence).

...

9. It is highly likely that the national restrictions introduced in England have reduced R from the levels currently estimated

...

21. In England, in tier 1, many Lower Tier Local Authorities (LTLAs) had positive growth rates both before and after the introduction of tiers. In tier 2, the epidemic in some but not all LTLAs was shrinking after the introduction of tiers, with almost all of these areas having a reduction in growth rate as a result of the intervention but with many nonetheless remaining positive. All tier 3 LTLAs (where prevalence was generally highest) had negative growth rates after the introduction of tiers, and in all these areas the growth rate had decreased as a result of the intervention. SAGE noted that tier 3 restrictions in England were heterogeneous, with most having additional restrictions above the minimum set for this tier.

...

23. If measures are relaxed there is a risk growth rates will return to previous levels. It will be important to monitor growth rates and implement interventions to prevent areas of low prevalence from becoming areas of high prevalence, as well as reducing

prevalence where it is high. As soon as rising prevalence is detected, measures should be strengthened in order to manage the overall epidemic, irrespective of the absolute prevalence.

...

31. Keeping prevalence low before the festive season would reduce transmission during any relaxation period (high confidence). The duration of any such period is also critical. The period of new networks should be shorter than 1 generation time (which is around 1 week), so that transmission occurs in events, rather than outbreaks. This may limit the increase to 1 doubling in prevalence" (CJMW4/138 – INQ000071857).

8.73. On 20 November 2020, my advice to the Cabinet Office was:

"I remain a bit cautious about the mass events in Tier 3. It is a very odd message to send, even if it is relatively safe. Indoor events in particular.

Tier 2 is also a real worry. Basically if it is not strong enough it is going to land all or many of the Tier 2 areas in Tier 3 over the winter period- exactly what we are trying to avoid" (CJMW4/139 – INQ000071784).

8.74. On 21 November 2020, the OCMO shared the UK CMOs joint view on Christmas measures with Cabinet Office:

"UK CMOs view on the proposals for Christmas only.

- *In line with SAGE guidance, we should aim for the lowest possible prevalence in the build up to Christmas to reduce the risk. However, any changes over the festive season will very likely increase transmission and the risk to the public. There may be a need for further restrictions following the relaxations in some areas in order to suppress the increased viral transmission which is anticipated.*
- *If the Ministerial decision is to relax measures for the winter festivities, to keep this risk as low as possible we should maintain NPIs other than those below to mitigate the increased risks that this period introduces.*
- *If people plan to join other households they should:*
 - *Have a maximum bubble of 3 households and people should not have multiple bubbles over the festive period.*

- *Ideally meet for no more than five days around/over Christmas Day. Individual nations may decide to reintroduce bubbling over the New Year period.*
- *Bubbles could be able to attend COVID-secure religious ceremonies together if socially distanced from other bubbles. The implementation of this guidance will be very important as religious buildings full of people singing loudly is a known risk for outbreaks.*
- *Bubbles attending hospitality venues will increase the chance of bubbles of multiple households crossing and larger outbreaks so Ministers should factor this additional concern into an already enhanced period of risk. We would encourage a four nation approach on these policy decisions.*
- *These rules should be applied to all religious festivals – not just Christian ones” (CJMW4/140 – INQ000071794).*

Approach to the second national lockdown

- 8.75. In so far as I can comment, the Prime Minister and Cabinet imposed the second national lockdown because it was not obvious there was any choice if the epidemic wave that had been building in autumn 2020 was to be controlled (in the absence of earlier action, such as a circuit breaker). The second lockdown was the only intervention which remained at this time in order to have R fall below 1.
- 8.76. From a purely public health technical point of view, I consider this to have been the correct decision, as always accepting there were many non-public health considerations which decision makers took into account. It was no secret that the Prime Minister was not temperamentally or politically in favour of socially restrictive measures such as lockdowns if they could by other means be avoided. This does not strike me as a particularly controversial stance for him to have taken given the obvious downsides. He was persuaded of the need for a second lockdown by the remorseless logic of an exponentially increasing epidemic in a still largely immune naïve population with significant mortality and morbidity, particularly in the most vulnerable and consequent pressure on the NHS.
- 8.77. The purpose of the second lockdown was to bring R below 1 and thereby reduce morbidity, mortality and pressure on the NHS by reducing the height of the peak of the second wave significantly. I consider this was achieved by the lockdown.

- 8.78. Quite a number of important technical lessons were learned from the first lockdown which were carried forward. The confidence we had in the stage, speed and spread of the epidemic was considerably greater than had been the case in March as a result of better testing, the establishing of Test and Trace and improved modelling.
- 8.79. We had also learnt some very painful and tragic lessons from our experiences with care homes in the first wave, both in the UK and internationally. With the benefit of much wider testing being available and applied, the management of care homes was better.
- 8.80. The NHS had learned how to balance better the need to maintain non-COVID services with the need to expand intensive care and wider COVID capacity in hospitals. Clinical care of moderate and severe COVID-19 cases had improved, through trials such as RECOVERY and clinicians getting experienced in management and so the mortality from those who were admitted to hospital was reduced, albeit not to the point where lockdown was unnecessary.
- 8.81. In addition, business and society had learned ways of coping which made the lockdown less onerous for many, although by no means for all. We had greater confidence going into the second lockdown that, if adhered to, it would bring R below 1 for the Wuhan variant since it had achieved this before. At the same time however, the political debate became more fragmented with some relatively mainstream politicians opposing the lockdown which had not happened previously. The fact that a vaccine was on the horizon however made one part of the societal and political debate easier as an exit was in view, albeit some way off.
- 8.82. The main thing we learned from the second lockdown in my view was that we could have a form of lockdown which was capable of pushing R for the original Wuhan variant of COVID-19 below 1 with fewer negative impacts on society than in the first lockdown. This was because we had a better understanding of the virus and the countermeasures required. Unfortunately, the subsequent advent of the more transmissible Alpha and then even more transmissible Delta variants rendered some, although not all, of the lessons learnt less relevant.

December 2020 to April 2021 'lockdown'

Scientific Advice to the end of 2020

8.83. At the conclusion of the second national lockdown on 2 December 2020, England returned to a three-tier system of restrictions. Again, prior to discussing the events which occurred later in December 2020, it may be helpful if I outline some of the scientific advice provided around this time. I have already set out the advice up to and including 21 November 2020 at paragraphs 8.65 to 8.74 above. Much of the discussion focussed on the NPIs which would be in place around the upcoming Christmas period.

8.84. On 24 November 2020, the OCMO shared joint comments from the four UK CMOs with the Cabinet Office on their (the Cabinet Office's) proposals for Christmas (my comments in the original email appear below in red) (CJMW4/141 - INQ000071853):

“UK CMOs view on the Cabinet Office paper.

- *Between 23 and 27 December, you can meet in an exclusive Christmas bubble composed of three households. Existing support bubbles in England count as one household. There is agreement that bubbles can be a maximum of three households. Given the different starting points on the definitions of bubbles, it may be prudent that the decision on the definition of households in relation to bubbles can be adjusted nationally. The CMO for England is content for a single support bubble to be considered one household for this period in the English context.*
- *During this time you can travel between tiers and UK nations for the purposes of meeting your Christmas bubble. (Agree)*
- *You should travel to meet your Christmas bubble and return home within the designated window (23-27 December), unless travelling to/from Northern Ireland. (Agree but with the change outlined below)*
- *You can meet your Christmas bubble in your home, a place of worship or essential retail (in other settings you should continue to follow rules applicable in your nation). (Agree)*
- *When outside your home with your Christmas bubble, you should follow national gathering limits. (Agree)*
- *You can continue to meet people outside your bubble, subject to your area's gathering limits. (Agree)*

Duration

Duration: we propose to apply these rules between 23-27 December based on advice that extending the window further will likely increase transmission and enforcement risks, particularly on New Years' Eve. While we would encourage people to travel within that window, we intend to enable people to travel a day early (and stay in a hotel) if **reasonably necessary**.

The UK CMOs believe this should be by exceptional circumstances only.

CEV guidance

You are still able to form a Christmas bubble if you are clinically extremely vulnerable but it does involve greater risks for you. You will minimise your risk of infection if you limit social contact with people that you do not live with.

Forming a Christmas bubble is a personal choice and should be balanced against the increased risk of infection. If you do decide to form a Christmas bubble you can take extra precautions set out in Guidance for the Clinically Extremely Vulnerable at Christmas. Others in your bubble should be mindful of your increased risks and be extra vigilant in the days before you get together.

The CMOs agree to the principle that CEV individuals can form bubbles in the same way as the wider population, but that there should be strong wording on how increasing social contact increases risk, and CEV people need to weigh up that risk when deciding how to spend Christmas. The CMOs were generally content with the language in the guidance but this should be finalised between officials”

- 8.85. On 8 December 2020, I set out in Cabinet my view on the risks associated with winter, and Christmas in particular:

“the vaccine was a triumph for medical science and the NHS’ ability to deliver. The end was in sight, but was still quite a long way off. Common sense and scientific modelling showed that the second wave of coronavirus in the UK was not yet over. If the virus took off again from this point, its prevalence in the country was already high. Looking at what was happening to case numbers in the US following Thanksgiving (a shorter holiday period than Christmas) showed what could happen in the UK. The situation could still go badly wrong between now and the start of March, despite the fact that this was predictable, preventable and the end was in sight. It was important in messaging out we make clear it is too early to lower our guard. Science would rescue

the nation from the hole it was in by the spring, but not before then” (CJMW4/142 - INQ000072078).

8.86. On 11 December 2020, NERVTAG said:

“The new SARS-CoV-2 variant emerging in Kent was discussed and the developments were considered a matter for concern. The actions proposed by PHE were endorsed and in addition NERVTAG proposed enhanced sequencing of PCR products from Lighthouse laboratories and urged DHSC to consider whether there is a need to intensify control in affected areas” (CJMW4/143 - INQ000120390).

8.87. On 12 December 2020, I spoke to the Prime Minister and Cabinet Secretary and discussed the new variant (CJMW4/144 – INQ000072127).

8.88. On 16 December 2020, I sent the following advice to James Bowler, now responsible for the COVID Taskforce:

“I have always seen the difficult challenge of Christmas for Ministers, a really important tradition for most families and one where the government runs the serious risk of overreach if we do not get the balance right.

I am however much less conflicted on the question of Boxing Day / New Year physical sales in an era of internet shopping. Basically they are a public health disaster waiting to happen (the same applies to new year celebrations in pubs etc)” (CJMW4/145 - INQ000072162).

8.89. On 18 December 2020, NERVTAG said:

“In summary, NERVTAG has moderate confidence that VUI-202012/01 demonstrates a substantial increase in transmissibility compared to other variants” (CJMW4/146 - INQ000120454).

8.90. On 21 December 2020, NERVTAG said:

“The committee therefore has high confidence that B.1.1.7 [Alpha] can spread faster than other SARS-CoV-2 virus variants currently circulating in the UK” (CJMW4/147 – INQ000212114).

8.91. On 22 December 2020, SAGE advice was:

“3. NERVTAG and PHE have assessed the currently available evidence on the new variant and have published their assessments and evidence. There is high confidence that this variant is spreading faster than other SARS-CoV-2 virus variants currently circulating in the UK, based on several different analyses. The cause (or causes) of that faster spread are unclear, but evidence is consistent with an increase in transmissibility being a factor. This includes some evidence of lower Ct values in those infected with this variant, which is consistent with some increase in viral load (though there are possible confounding factors). There is also some evidence that the variant is more likely to transmit within households.

...

10. Existing mitigation measures (for example, social distancing, ventilation, hand hygiene and mask usage) remain important, but given the increase in risk associated with the new variant, a commensurate strengthening in the measures taken (rather than a need for different measures) may be needed (that is greater use of all these mitigations). There is no evidence for differences in routes of transmission or different survival on surfaces.

11. It is highly unlikely that measures with stringency and adherence in line with the measures in England in November (meaning with schools open) would be sufficient to maintain R below 1 in the presence of the new variant. R would be lower with schools closed, with closure of secondary schools likely to have a greater effect than closure of primary schools. It remains difficult to distinguish where transmission between children takes place, and it is important to consider contacts made outside of schools.

12. It is not known whether measures with similar stringency and adherence as Spring, with both primary and secondary schools closed, would be sufficient to bring R below 1 in the presence of the new variant. The introduction of Tier 4 measures in England combined with the school holidays will be informative of the strength of measures required to control the new variant but analysis of this will not be possible until mid-January” (CJMW4/148 – INQ000061582).

8.92. On 28 December 2020, I commented on a Cabinet Office document:

“1. I think the pros and especially cons of the current DfE case are not fully laid out in a way that Ministers can make an informed choice. It’s obviously a bit of a shot in the dark, with limited but worrying data. The current DfE proposal in response to this substantial new threat is absolutely minimalist; delay by 1 week some secondary school pupils returning- that’s it, everything else steady as she goes. Which if we get control is fine and will look sensible. But if in 4 weeks we find that we have lost control in the sense cases are rising significantly despite Tier 4 + school opening, and we may well find that (modelling suggests we will), and the NHS is under significant pressure / deaths are rising fast we will have to pull the emergency brake. At short notice this is likely to mean close all of education (primary, secondary, uni, FE), as that’s the only thing we have left with a significant impact on R. This would obviously be very disruptive to all education. This is not reflected in the advice, and Ministers need to be aware that would have to be Plan B if the current Plan A does not have sufficient bite. At that stage stopping education for a selection of secondary students would not be likely to work, so the price of chancing it on some bits of education now in a planned way may be disrupting all education subsequently as an emergency measure. May, not will- we don’t know yet- but it’s a realistic non-trivial possibility.

2. In contrast to wave 1 the current situation is regional, although the pattern will shift over time. Currently the south, especially SE, London, east of England are under greatest pressure and rising due to the new variant. Closing schools in part of the north and midlands because of this will seem surprising. Not closing schools in the rapidly rising new variant areas because the north is not seeing rises, with consequent significant loss of life, may in retrospect also seem surprising. It is likely in areas which currently have low proportions of new variant will peak later, and may need more vigorous measures later in time (depending on vaccine rollout), starting later but ending later. A regional approach has not been laid before Ministers, and I wonder if it should be. This is a policy question, but to dismiss it before Ministers have had a chance to discuss it because generally educational decisions are taken nationally may not be ideal” (CJMW4/149 – INQ000072272).

Decision making in December 2020

8.93. The emergence of Alpha over this period posed novel and difficult challenges. New variants in the sense of genetic changes to SARS-CoV-2 were emerging the whole time. It was not possible to tell from the fact they had emerged and were gaining some

- slight advantage which if any were going to turn into serious public health and clinical problems. Alpha, which emerged in the UK, was the first variant globally that was demonstrably significantly different from the Wuhan strain in its transmission ability, and therefore its public health and clinical importance.
- 8.94. Knowing there were laboratory variants, even ones that were increasing in frequency but from a low base, does not translate into clinically or public health actionable information. Although much was made subsequently of the fact that Alpha had been detected genetically by PHE some weeks before its epidemiological importance was clear, without the epidemiological data showing an actual and meaningful increase in cases this was almost impossible to translate into practical action. The advice and subsequent actions taken in December 2020 were in response to the epidemiological picture changing, not the genetic makeup of the virus. I considered, and consider, this was the correct technical decision by PHE.
- 8.95. Decision-making by core decision-makers in December 2020, and the advice that fed into this, was confused by two factors, the interaction between which was particularly unhelpful.
- 8.96. The first, an epidemiological and clinical reality, was that Alpha emerged in the UK (i.e. without prior information from overseas) in the period of the year which is most favourable to respiratory infections and when the NHS is under greatest pressure. The second was the political and economic preference to try to 'protect' Christmas, for both economic and social reasons.
- 8.97. The spending in the run up to Christmas and the period around the New Year were economically seen as especially important because this was seen as one of the key periods for many businesses, particularly hospitality. Families from many traditions also build Christmas into their year as a major event of great social importance. There were therefore also strong political disadvantages to being portrayed as Grinch-like on Christmas. From a purely public health point of view however, crowded shops and hospitality venues, and younger people in whom the incidence of COVID-19 was relatively high meeting all their relatives, including older and more vulnerable ones, indoors was concerning.
- 8.98. The initial instincts of senior political decision-makers were unsurprisingly and understandably to protect Christmas and other major religious festivals as far as

possible, and to be seen to do so. This meant that some decisions were in my view epidemiologically more advantageous to the virus than would have been ideal, and when core decision-makers rowed back from that somewhat it was at almost the last possible moment. Even without Alpha, this would have been problematic; the emergence of Alpha made a subsequent lockdown virtually inevitable, particularly at this time of year.

- 8.99. The decision to say that households in Tiers 1 to 3 would only be able to form a bubble on 25 December rather than for longer periods was as far as political decision-makers felt they could go given the previous relatively liberal communications on the festive period. There were occasions when, bluntly, my view was that those pushing for liberalisation for economic reasons were choosing to ignore the reality that the multigenerational mixing of Christmas for a disease which particularly affects the elderly in terms of mortality but was more prevalent in terms of infectiousness in younger citizens was not a sensible idea.

Introduction of the third lockdown

- 8.100. At this stage the protocol was that the four UK CMOs made the recommendation on the COVID Alert Level, based on advice from JBC. We considered that the risk to the four nations of the UK was sufficiently high as of 4 January 2021 that we recommended raising the Alert level from 4 to 5 (**CJMW4/150 – INQ000236431**). In my view, this helped the system to come to a decision rapidly. I made James Bowler (then leading the COVID Taskforce) aware that this change was likely before the meeting so that the Cabinet Office could prepare their response:

“Last week JBC recommended that we were likely to be in Alert Level 5 (the NHS is at risk of being overwhelmed within 21 days). The 4 CMOs decided that whilst there were very considerable regional pressures, it made sense to wait to see the initial effects of Tier 4 decisions and Christmas. The situation has however deteriorated significantly across wide areas of all 4 nations, and the CMOs are meeting again this morning. I think it highly likely the recommendation will be that we move to Alert Level 5 in all 4 nations. Simon Stevens and Steve Powis agree this is probably sensible for the NHS in England.

In its initial incarnation that was the end of the process (the CMOs changed the Alert level), allowing for a coordinated move between the 4 nations. CO subsequently decided to make this a JBC+CMO recommendation to Ministers, who would then

decide whether to change the Alert level, which allows for actions to flow but makes the coordination between the 4 nations a bit harder. I am pretty confident based on conversations over the weekend that the other CMOs will want alert level 5 in their nations and that this advice will immediately be accepted by their ministers. Scotland in particular is likely to move very quickly, but I expect rapid action from Wales and NI”
(4 January 2021 – CJMW4/151 – INQ000072313).

8.101. The Prime Minister and Cabinet decided to impose the third lockdown because it was clear that the Alpha wave was not likely to be held in check by existing measures. The tiering policy, which might have held the Wuhan variant and similar closely related variants for a time if vigorously pursued, was unable to restrain transmission of the significantly more transmissible Alpha variant. Cases of the new variant were expanding at a rapid rate. SAGE was very concerned and this was communicated by the GCSA and me to key decision makers.

8.102. It is difficult to know how effectively the tier system including Tier 4 would have been after the second lockdown had Alpha not emerged. They certainly were not sufficient to hold Alpha in its first wave (the second half of the second wave from a national perspective).

Closure of schools in January 2021 and subsequent reopening

8.103. On 22 December 2020, SAGE considered the Children’s Task and Finish Group paper which stated:

“Overall, accumulating evidence is consistent with increased transmission occurring amongst school children when schools are open, particularly in children of secondary school age (high confidence): multiple data sources show a reduction in transmission in children following schools closing for half term, and transmission rates increasing again following the post-half term return to school (medium confidence). It is difficult to quantify the size of this effect, and it remains difficult to quantify the level of transmission taking place specifically within schools compared to other settings.”
(17 December 2020 - CJMW4/152 - INQ000074951).

8.104. On 4 January 2021 the Prime Minister announced that schools would be closed from 5 January 2021 except for vulnerable children and children of key workers **(CJMW4/153 – INQ000236451).**

- 8.105. The reintroduction of attendance restrictions at schools in early 2021 was a hard decision because everybody recognised the importance that face-to-face education plays. There was however clear epidemiological evidence that for Alpha a significant proportion of transmission was occurring among children, which was not the case with the original Wuhan-variant wave. Given this, it did not look possible to be confident we could get on top of the Alpha wave while schools remained fully open. Modelling was fed through SAGE and supported this position. Since this was occurring at the point of the year when the NHS is always under the most serious pressure, the margin of error was narrow **(CJMW4/154 – INQ000236418)**.
- 8.106. On 8 March 2021 schools reopened as part of Step One of the Government's Roadmap **(CJMW4/155 – INQ000236452, CJMW4/156 – INQ000236453)**. Staff and students in secondary schools and colleges were advised by the Department for Education to wear face coverings in all areas, including classrooms, where social distancing could not be maintained, in addition to testing **(CJMW4/157 – INQ000236463)**.
- 8.107. Face coverings were introduced in school classrooms because the evidence of schools being a place of transmission was clearer in this wave than the previous waves. It was seen as a way of helping schools to open, and stay open, when they could not otherwise have been. There were a number of practical reasons why face coverings amongst children in schools were considered to be more difficult than among adults. These ranged from younger children finding them difficult to use through to interfering with the educational experience for all children (and their teachers). As with many decisions, this was a balance of risk and benefit, but the benefits of face coverings in the school setting were seen by this stage to outweigh the risks, particularly if they allowed schools to restart at an earlier stage.
- 8.108. On 6 April 2021 the Department for Education announced that face coverings in secondary schools would continue to be advised after the Easter break **(CJMW4/158 – INQ000236460)**. On 10 May 2021 it was announced that face coverings would no longer be required in schools from 17 May 2021 as part of Step 3 of the Roadmap **(CJMW4/159 – INQ000236462)**.
- 8.109. Face coverings were advised in some local areas throughout the year and then nationally in response to the Omicron wave in communal areas from 29 November

2021 for secondary schools and in classrooms in January 2022 (**CJMW4/160 – INQ000236464, CJMW4/161 – INQ000236461**). It was announced that face coverings were no longer required in classrooms from Thursday 20 January 2022, or in communal areas of schools from Thursday 27 January 2022 (**CJMW4/162 – INQ000236465**).

8.110. The 'Steps' in the Spring 2021 Roadmap that gradually eased restrictions from the third lockdown had the benefit of being based on data rather than dates. This was one of the things which I thought was most important. It allowed for an orderly and steady exit from restrictions that did not threaten the gains from lockdown for a population where there was the beginning of significant vaccine-induced immunity, particularly in older and more vulnerable citizens, on top of some immunity in younger adults from prior infection.

8.111. Although the beginning of the third lockdown was arguably rather more precipitate than would be ideal, a lot had been learned from the previous two lockdowns about how to minimise the impact on individuals, the NHS, the care sector and the wider economy. The steady step down was made a lot easier by knowing that vaccines would take a lot of the heavy lifting as time went by. After the first lockdown, political leaders had worried, understandably, that it would potentially be lockdown after lockdown without any obvious end in sight. Having medical countermeasures to provide a clear exit strategy, with a reasonable timeline to their deployment, changed the tone of the debate in a useful way.

Autumn/winter 2021: Omicron

8.112. After the end of the third lockdown in March 2021, the next significant phase came in the autumn and winter 2021. The arrival of Omicron posed a dilemma in policy-making terms, and the technical advice that was given in relation to it. South African scientists were exemplary in identifying and flagging the new variant to the world, and very generously gave considerable bilateral assistance to us by sharing and explaining their own internal data before it was published. At the start of the first UK Omicron wave, we had confidence in only two things based on the data; that Omicron was substantially more transmissible even than Delta (clear epidemiological evidence), and that there were multiple genetic variations which might have been associated either with vaccine escape or other features which would be beneficial to the virus (based on genetic data).

- 8.113. Although there were media reports of the virus being less severe in South Africa, which were strongly pushed by some South African commentators, the technical advice we were getting from the highly competent South African authorities was considerably more cautious than this. They had also just had a major Beta wave (inducing Beta immunity widely in their population) which made interpreting the epidemiology from South Africa in the UK context, where we had not had such a Beta wave, more difficult. They were also initially less certain that it was less severe, and if so by how much.
- 8.114. The advice that the GCSA and I gave to senior political decision-makers was therefore cautious. A significant new more transmissible virus, which is slightly less likely to cause severe disease, can still lead to very high numbers of severe cases, and especially if there was some degree of immune escape to vaccination. My view was that senior decision-makers should hold open the possibility of restricting hospitality after the Christmas period if necessary. I also thought that the general public should be warned not to overdo it that Christmas (2021) since the risk of a very sharp wave of this highly transmissible virus affecting the NHS and causing direct COVID-19 mortality in older citizens was nontrivial. Slowing the spread of the virus by some degree of social measures whilst widening access to and accelerating boosters for the vaccine seemed a prudent course of action. At no point was a lockdown (in the correct sense of the term) to my knowledge proposed, nor were any new mandatory restrictions over Christmas as far as I am aware.
- 8.115. A strong narrative developed among some that this was just a trivial infection and nothing to worry about. This struck me as being based more on expediency and hope rather than hard data. The subsequent surge of hospitalisations into the NHS as the Omicron wave pushed through the UK, despite widespread vaccination of the at risk population backs up that interpretation.
- 8.116. Had Omicron been only slightly more severe, or the vaccine slightly less effective against the significantly genetically diverse new variant, the situation would have been potentially quite serious. Neither or these were known in late 2021. In my view, had we not given quite cautious assessments to the general public to be careful over the Christmas period the Omicron wave could, and probably would, have been considerably worse even than that which we did have. It helped in my view slow the wave and bought time for the NHS rollout of the vaccine booster. Even with significant restraint by the general public in terms of social mixing, 16,537 people were in hospital with COVID-19 on 14 January 2022, most of which were Omicron cases. It was not a

trivial infection for many people, especially for the elderly (CJMW4/163 – INQ000236456, CJMW4/164 – INQ000236457).

Facemasks

8.117. My initial advice to the public on face coverings, unless they had COVID-19, was that outside healthcare settings, they were unlikely to be effective and were not recommended. This was in common with most other experts at this stage, including the WHO. It was a position based in part because there was (and is) limited trial evidence. Subsequently, the consensus view shifted and so the advice I gave also shifted. I outline a summary of that advice below.

8.118. On 3 February 2020, NERVTAG said:

“Wearing a facemask by symptomatic people is recommended, if tolerated. Wearing of facemasks by well-people living with symptomatic people is not recommended.

Wearing facemasks by well people interacting with well member of the public (either occupationally or otherwise) is not recommended” (CJMW4/165 - INQ000047818).

8.119. On 4 February 2020, SAGE said:

“40. SAGE heard that NERVTAG advises that there is limited to no evidence of the benefits of the general public wearing facemasks as a preventative measure.

41. Facemasks and other personal protective equipment in the community is only advised for health and social care workers visiting individuals who may be infectious.

42. There is some evidence that wearing of face masks by symptomatic individuals may reduce transmission to other people, and therefore NERVTAG also recommends that symptomatic people should be encouraged to wear a surgical face mask, providing that it can be tolerated.” (CJMW4/037 - INQ000051925).

8.120. This advice changed in the months after February and March 2020, the detail of which is set out in the Technical Report at page 244 (CJMW4/001 – INQ000203933). This reflected a change in the midpoint of scientific opinion on the wearing of facemasks. Accordingly, policy changes followed that shift. I lay out below the evolution of this position because it was one of the areas in which the scientific advice on a specific intervention by the public shifted most significantly over the period of the pandemic.

8.121. On 9 April 2020, SAGE minutes said:

“12. WHO has concluded there is currently no conclusive evidence that facemasks are beneficial for community use.

13. SAGE will review a NERVTAG paper on facemasks at its next meeting, covering their value in limiting spread from pre-symptomatic and asymptomatic cases and what potential research studies might be commissioned” (CJMW4/166 - INQ000068781).

8.122. On 14 April 2020, SAGE said:

“15. Evidence does not currently support use of face masks to protect the wearer in the general population.

16. There is mechanistic evidence for efficacy of face masks in reducing transmission when used by someone who is infected with (a source of) the virus. Direct trial evidence does not support effectiveness in practice in other diseases. The fundamental difference with COVID-19 is the shedding of virus during asymptomatic and presymptomatic infection.

17. There are theoretical drawbacks to increased use of masks in the population. However, the evidence on these drawbacks may not be applicable to the current situation, particularly evidence around compliance.

18. Overall, the evidence that masks could prevent spread is weak, but probably marginally in favour of a small effect. If there are benefits, these are only likely in specific circumstances.

19. Circumstances where there may be benefits included enclosed environments with poor ventilation, and around vulnerable people. Conversely, there are unlikely to be any significant benefits in use of masks outdoors.

20. There are communication considerations around any change in advice on masks. Communications are likely to be required around fitting and usage as well as on the importance of maintaining the other, more effective, measures in place.

21. Other operational considerations include supply chain and distribution impacts but these were not considered as part of this review.

22. SAGE agreed that the existing advice on self-isolation remains the most important action for anyone with infection” (CJMW4/167 – INQ000061533).

8.123. On 16 April 2020, SAGE said:

“23. SAGE agreed that any additional advice on community face mask use is for the purposes of consideration as part of releasing social distancing measures and not relevant to the current situation where strong social distancing measures are still in place.

24. SAGE remained of the view that mask supply should be prioritised for high-risk environments, where they are clearly necessary. Beyond healthcare settings, evidence of effectiveness is weak but as noted at the last meeting, marginally positive. If increasing community use were to threaten stocks of masks for medical, nursing, social care or other high-risk environments this would be a net increase in risk in public health terms.

25. Symptomatic individuals should self-isolate. Masks cannot be used to allow such individuals to leave their homes.

26. SAGE advised that if there is ultimately a policy decision in favour of mask use in certain situations and for vulnerable groups, this should not be linked to or confused with lifting or modification of other measures (masks will not substitute for other measures)” (CJMW4/168 - INQ000075780) (CJMW4/169 - INQ000074918).

8.124. On 21 April 2020, SAGE said:

“9. The evidence on effectiveness of masks for source control (for example stopping infectious people — pre-symptomatic/asymptomatic — from infecting others) is weak. Evidence for protecting the mask wearer from becoming infected is also weak. The unusual situation for COVID is the relatively high infectiousness before symptoms appear.

10. Overall, the evidence that exists is marginally positive for the use of masks.

11. The effect of wearing a mask is likely to be small but not zero. The RCT evidence is weak and it would be unreasonable to claim a large benefit from wearing a mask.

12. Any policy decision taken must not jeopardise supply of masks to those settings where the evidence for use of masks is stronger and the effect size important (for example Health and Social Care settings).

13. SAGE advice below refers to cloth masks — specifically in the context of releasing lockdown measures.

14. On balance, there is evidence to recommend the use of cloth masks in certain higher-risk settings as a precautionary measure where masks could be at least partially effective.

15. The common denominator is that these settings are enclosed spaces where social distancing is not possible consistently, creating a risk of close social contact with multiple parties the person does not usually meet.

16. Public transport and some shops (if crowded) are examples of such settings. Distancing remains the preferred option where possible.

17. In such settings, evidence would support a policy where cloth masks could be used for short durations where unavoidable closer interactions with others are occurring or likely.

18. By contrast, SAGE does not think there is good evidence for use for long periods where people regularly mix with the same people.

19. Working environments vary in many respects and where there is a risk of close social contact with multiple parties the person does not usually meet, use of masks may offer some benefit.

20. The evidence does not support a recommendation to wear masks outdoors in either urban or non-urban environments, unless in an unavoidable crowded situation.

21. This advice does not replace or change existing advice on other measures — such as hand washing, 2-metre distancing and self-isolation — which remain more important (because of stronger evidence and larger effects).

22. Negative behavioural impacts cannot be ruled out, for example those with symptoms who should isolate instead choose to break quarantine wearing a mask or repeated handling of the mask could increase hand to face contact

23. Equally, wearing masks in the context of lifting NPIs could reduce anxiety about release of measures, or reinforce the need for distancing measures.

24. Clear public guidance would be needed on mask design or construction, wearing, handling, cleaning and disposal” (CJMW4/170 – INQ000062295).

8.125. On 23 April 2020, the OCMO sent a document from me summarising the advice on facemasks to the Secretary of State for Health and Social Care which stated the following:

“Policy implications of SAGE advice on facemasks worn by the general public.

1) *Attached (Appendix 1) is SAGE’s advice in facemasks, worn by the general public to reduce onward transmission. This is for asymptomatic people who might be pre-symptomatic, or asymptotically infected. In practice this means the general public. Symptomatic people should still stay at home.*

2) *The strength of evidence is weak, and the size of any effect is small in SAGE’s view. However, on balance they come to the view that there probably is an effect, and if so it is positive.*

3) *They are clear that any competition with masks for NHS or care workers, or other high risk settings would be entirely counterproductive. This must be avoided. Their advice relates to cloth or other non-medical masks, to reduce droplet spread to others. This is not a recommendation based on any evidence that facemasks protect the wearer.*

4) *The size of effect is small enough that it cannot be seen as a substitute for any other, more effective, interventions.*

5) *Any absolute reduction in transmission will be greatest in high risk environments. In practice this means crowded areas with mixing of people where maintaining social distancing (more effective) is not practical. There would for example be a greater absolute effect indoors in a crowded environment than outdoors.*

6) *The strength of evidence and probably size of effect is not sufficient to justify mandating (the State insists by way of law with sanction). It is in some settings sufficient to recommend wearing masks to protect others.*

7) *High risk environments where crowding makes social distancing impossible should be minimised wherever possible. Facemasks do not reduce the need for this. There will however be settings where this is not possible and where the addition of facemasks may help reduce onward transmission from asymptomatic people.*

Policy questions that need to be resolved or exposed in advice to Ministers.

8) *Advice could be based on settings ('do wear in public transport, but no need to wear outside except personal preference'), or on general principles ('wear if you are unavoidably likely to come into contact with people outside your household at less than 2 meters distance').*

9) *In my opinion may be most practical to have a hybrid, with a few specific settings you should wear/ not advised, and the rest left to general advice. Either is compatible with the SAGE view, and this is a matter of clarity of communication.*

10) *SAGE advice, and the NHS and social care setting are both strongly of the view that competing with medical / social care supply of facemasks would be counterproductive in public health terms. For this reason recommending people use cloth or other non-medical masks will be essential.*

11) *There is a policy question about whether the expectation is households will source their own facemasks, or the state will provide. In most countries this has been left to individuals, but not all (eg Taiwan). A table of which countries do what would be helpful to Ministers and those communicating.*

12) *CDC, the French Government and others have communicated similar policies, not always successfully. Looking at the successful and less successful examples would be helpful.*

13) *SAGE did not consider age, but there is likely to be a lower age limit where facemasks are simply impractical, and saying that explicitly would be helpful.*

Setting.

14) *In terms of setting, SAGE identified two settings where the benefits may be worth laying out explicitly, and one where they did not see benefit. The ones they saw benefit were public transport and shops where it was impossible to maintain social distancing rules.*

15) *They did not see benefit in wearing facemasks outside (except possibly in very crowded areas and even here the likely effect will be small).*

16) *Facemasks worn for prolonged periods when mixing with the same people (eg work) are unlikely to be as effective (or not effective at all) as ones for short periods for mixing with people they otherwise do not come into contact with. Workplaces should be aiming for social distancing rather than facemasks as countermeasures.*

17) SAGE explicitly did not consider schools, which are a case apart. We should say advice on schools will be available at the time of opening (and SAGE should be asked to give a view well before that). That advice should be to DFE” (CJMW4/171 - INQ000068922).

8.126. On 5 June 2020 the WHO advice was updated to say:

“At the present time, the widespread use of masks by healthy people in the community setting is not yet supported by high quality or direct scientific evidence and there are potential benefits and harms to consider (see below).

However, taking into account the available studies evaluating pre- and asymptomatic transmission, a growing compendium of observational evidence on the use of masks by the general public in several countries, individual values and preferences, as well as the difficulty of physical distancing in many contexts, WHO has updated its guidance to advise that to prevent COVID-19 transmission effectively in areas of community transmission, governments should encourage the general public to wear masks in specific situations and settings as part of a comprehensive approach to suppress SARS-CoV-2 transmission” (CJMW4/172 – INQ000229307).

8.127. On 4 July 2020, in response to an email from the Cabinet Office I said:

“I am in favour of increasing the use of face coverings where social distancing cannot be maintained for short periods, which would include public transport as the evidence is relatively weak but positive (as per SAGE). But I have no professional view on whether mandating is a good way to achieve this, which is a policy matter with several practical factors to consider” (CJMW4/173 – INQ000069553).

8.128. The Inquiry has asked, reasonably, whether we could have recommended facemasks on a precautionary basis for the general public even though we did not think they worked. This has two problems, one conceptual and one practical. Conceptually, giving advice to the public which we thought at the time to be incorrect, on the basis that it might subsequently prove to be correct, is not a good approach and is inherently somewhat illogical; professional advisers should give professional advice according to their best understanding at the time.

8.129. Practically, we had concerns that surgical masks and other respiratory protection needed in the NHS and other care settings were in very short supply. We were worried

that if the general public were asked to wear facemasks, for which we had no evidence of benefit, they might well purchase them in high numbers and thereby cause shortages for healthcare workers and others who were at particularly high risk, and in whom there was an evidence base for their use.

8.130. As I have stated, the advice on face coverings changed as the midpoint of scientific opinion changed. The efficacy of face coverings still remains a surprisingly controversial issue (as of mid-2023), but relative to other NPIs their negative impact is small. It was therefore prudent ultimately to recommend them, even with only moderate evidence in support, particularly in indoor crowded spaces on a risk-benefit basis.

2 metre rule

8.131. The "2 metre rule" was a shorthand way of referring to a policy of social distancing which recommended a 2 metre distance be maintained between individuals for the purposes of reducing COVID-19 transmission. This measure was likely to be most effective at reducing transmission via droplet spread. The initial decision to opt for a distance of 2 metres reflected the scientific understanding of how transmission occurred by droplets and was the view of SAGE as set out on 4 June 2020:

"3. SAGE continues to advise at least 2 metre separation where possible, given the significant reduction in risk compared to shorter distances. Mitigations are available in some situations, and the principles of mitigation have been clearly identified.

...

32. Risk of transmission varies in a continuous non-linear way with distance of separation and with duration of contact. Physical distancing is an important mitigation measure.

33. SAGE continues to advise at least 2m separation where possible, given the significant reduction in risk compared to shorter distances. Current evidence suggests that 1m separation carries 2 to 10 times the risk of 2m separation, though there remains significant uncertainty.

34. Given the continuum in risk, 2m separation should not be treated as an absolute rule, with greater distances presenting lower risk, and shorter distances presenting higher risk.

35. *Other mitigations can reduce risk and should particularly be considered where it is necessary for people to be closer than 2m for a prolonged period, or where someone has multiple, frequent interactions with others at a shorter distance. Selection of measures should be tailored to the environment and activities.*

36. *SAGE endorsed the paper on transmission and mitigation measures” (CJMW4/174 – INQ000120526).*

8.132. The paper endorsed by SAGE said:

“Physical distancing is an important mitigation measure (high confidence). Where a situation means that 2m face-to-face distancing cannot be achieved it is strongly recommended that additional mitigation measures including (but not limited to) face coverings and minimising duration of exposure are adopted (medium confidence).

...

There is a non-linear relation between the risk of transmission and distance of separation for face-to-face contact. Duration of this contact is also important with risk proportional to time. Given the uncertainties about transmission and dose-response it is not possible to say with certainty what a safe distance of separation is, but best current evidence suggests that 1m carries between 2 and 10 times the risk of 2m of separation.

Where it is necessary for people to be closer than 2m face-to-face for a prolonged period or where someone has multiple frequent interactions with others at shorter distance, additional measures will be required to disrupt close-range transmission. In most cases this is likely to be based on limiting duration of contact, using face coverings and orientation of people” (CJMW4/175 – INQ000192101).

8.133. In July 2020, there was a Cabinet Office review of the 2 metre rule. There was a clear economic benefit to having a distance that was shorter than 2 metres to allow a number of businesses to operate more effectively, or indeed at all. This was the principal driver for Government wanting to have a smaller distance. The GCSA and I were well aware of the difficulties of having a pragmatic response which was durable over very long periods versus one which was optimised in the short term to prevent transmission. Our job was to put the public health and scientific information in front of policymakers who then had to balance it against these other, important, considerations.

- 8.134. The findings of the Cabinet Office review were that where 2 metres was not 'viable', then 1 metre distancing with additional risk mitigations could be used. With extensive mitigations, such as ensuring seating was not opposite one another, or had physical barriers in place, it would be possible to have a similar risk at 1 metre as at 2 metres. One of the potential risks of implementation, and any lack of clarity in communication, was that the importance of those mitigations could be lost. What would then happen would be that 2 metres simply became 1 metre, without any additional effective mitigation measures.
- 8.135. My understanding at the time was that the review applied to businesses, as the driver was the stated economic impact of the 2 metre rule. However, the review came to be seen mistakenly to apply to scenarios outside of business as well. When socialising it is entirely possible to stay at 2 metres in most settings.
- 8.136. The 2 metre review was done in summer 2020 at a point of low transmission (**CJMW4/176 - INQ000072007**). It should not have been seen as necessarily applying at a later stage when transmission rates were higher and accordingly the risk associated with close proximity was greater. The review was however used by departments, representing the interests of the sectors they were responsible for, to push for less social distancing at a different point in the epidemic. In response, the OCMO reiterated the public health advice and its scientific underpinnings and tried to make clear that a decision going beyond that was being done for economic reasons (**3 December 2020 - CJMW4/177 - INQ000072001, 4 December 2020 - CJMW4/178 - INQ000072026, CJMW4/179 – INQ000072027**).

Self-isolation

- 8.137. Throughout the pandemic, we had concerns about potential levels of adherence to self-isolation, although the great majority of the population intended to do so. Two things helped this. The first was the advent of lateral flow tests meaning that people could respond only to a positive test rather than whenever they had symptoms that might be compatible with COVID-19; this both reduced the number of people who needed to self-isolate and made it much more clear to them, their contacts and their families that they were doing so for a purpose. The second in my opinion was keeping the period of self-isolation as short as was reasonable on the grounds of what we knew about transmission.

8.138. There was a significant debate in Government about the role of financial support for people who are self-isolating. My opinion was that for workers who are paid if they are off sick, or who could work from home, the financial risk from self-isolation was usually a relatively unimportant factor. For people who had employment which meant that if they did not work they did not get paid however, there was a strong financial incentive not to self-isolate. Compounding this was the fact that in general, these jobs tended to be lower paid or the self-employed, for whom the loss of over a week's wages was highly problematic in terms of their disposable income. The evidence of this was most clear in care homes. Care homes which paid members of staff when off sick or self-isolating had lower rates of transmission than those which did not. There was also clear evidence that COVID-19 transmission was highest in areas of deprivation, where such jobs were more common, although this association might not be causal. The Treasury were generally not convinced by these arguments in favour of payments for working people who were self-isolating and who were not otherwise paid for that time.

School restrictions

8.139. I reflected both at the time and subsequently quite heavily on whether school restrictions were needed. Education is a key public health intervention. In my view, in the first lockdown the evidence was that we needed to do absolutely everything in order to control the pandemic, and there was so much uncertainty that school closures were the prudent approach. Without school restrictions, it is likely the first wave would have been larger and longer. Additionally, and practically, teachers and other school staff were understandably concerned about the risks, as were parents given that at this time the risk to children was much less well understood. Many had already started to take their children out of school. I therefore do not think there was much choice in the school term which coincided with the first wave. School closures, whether targeted or general have often been used in epidemics and indeed were used in the much milder 2009 H1N1 influenza pandemic so this was not a novel intervention.

8.140. I and the other CMOs were however very supportive of opening schools as soon as it was reasonable to do so given their wider importance to children and their families (for example see the letter of 23 August 2020 (**CJMW4/011 – INQ000070464**); this was not the view of all scientists at the time.

8.141. For the Alpha wave which commenced in December 2020, there was evidence that spread amongst children was driving the wave to a much greater degree than had

been the case with previous waves. Controlling it without school interventions would therefore have been extremely difficult.

8.142. I would like to pay tribute to teachers and other school staff who despite their very understandable concerns maintained an at school education for vulnerable children and the children of key workers who could not do their jobs without this throughout the pandemic, whilst trying as best they could to provide support for children at home by way of education out of classes. Maintaining education is a very important public health priority for short and long-term reasons and wherever possible I and the other CMOs tried to support this. Examples included setting out the view of UK CMOs on schools quoted above, advising vaccination in 12-15 year olds (**CJMW4/180 – INQ000203916, CJMW4/181 – INQ000203917, CJMW4/182 – INQ000203918, CJMW4/183 – INQ000203920, CJMW4/184 – INQ000066870, CJMW4/185 – INQ000066878**) and taking part in briefings organised by the Department for Education to explain the science to those working in the education sector.

Advice and decision-making about NPIs in general

8.143. There are a number of issues where with hindsight and the knowledge we now have, we would have given different advice on NPIs. Some of these are laid out in this statement and there are multiple examples from the Technical Report. Some important ones include: i) earlier advice (by a number of days) on the first lockdown; ii) greater emphasis on aerosolised transmission, including the critical role of ventilation; iii) earlier encouragements of facemasks, albeit noting the difficulties this would have created right at the beginning of the pandemic for supply; and iv) a simpler approach to tiering.

8.144. It would of course have been easier to give strategic advice had we known when an effective vaccine would be available at scale, the effectiveness of other medical countermeasures, the duration of immunity and the likely emergence of variants. Many things which look obvious with the benefit of hindsight were far from obvious at the time.

8.145. In general, my view is that in the first six months, most of the problems stemmed from either a lack of understanding of the virus, for example the relative importance of asymptomatic infection, aerosolised spread and “Long COVID” among others, but

above all a lack of testing and surveillance capacity. From the second half of 2020 onwards, our scientific advice had a much firmer foundation as a lot more was known from the UK and internationally about COVID-19, and the testing and surveillance capacity in the UK had become strong by international standards. The SAGE mechanism was operating effectively and smoothly in my view under the principal chairmanship of the GCSA, so the limitations on effective action derived less from insufficient technical advice and more from the inevitable political, social and operational issues imposed by such a major emergency over such an extended time period.

- 8.146. After the initial period when limitations in testing significantly constrained our ability to provide real-time data, scientific data was used extensively to monitor the trajectory of the pandemic via a variety of means including the ONS survey, NHS data, test and trace data from JBC, the SIREN and VIVALDI studies and others. This provided near real-time assessment as to whether inflection points occurred at the stage that would be predicted as a result of the imposition of NPIs. These could not prove causality, and certainly could not tease apart the individual components of the NPIs, but provided strong indirect evidence of the effect of the package as a whole. There were also studies of adherence, but these were often less easy to interpret. The Cabinet Office produced data on adherence, ranging from travel data through credit card use through focus groups.
- 8.147. Once the first vaccine clinical trials showed a positive signal, implying that a vaccine would become available which conferred very strong protection, the whole outlook for how NPIs could be viewed changed. The first vaccine efficacy data was sufficiently great that we were reasonably confident that further vaccines against the spike protein would also work (as indeed occurred). This, and the immunological protection it afforded, therefore provided a long-term exit strategy from NPIs, assuming no new variant emerged which demonstrated substantial vaccine escape and that vaccine efficacy was reasonable in duration. Discussions around NPIs became much easier from both a technical point of view, and from a political perspective. Until we were confident a vaccine was likely, it was difficult to answer the question about what the final exit strategy would be and how long into the future this would occur. Core decision-makers understandably had concerns about repeated lockdowns with all the disruption they caused to society and the economy without any apparent end.

- 8.148. I was always confident that the exit from the need for NPIs would almost certainly be via scientific advances, probably either drugs or vaccines. I, and I think pretty well everyone else, was surprised and delighted by both the speed and the effectiveness of the first generation of vaccines. For our last major pandemic, HIV, the drugs which finally resulted in a solid medical countermeasure being available took many years to develop and we never developed an effective vaccine.
- 8.149. The fact vaccines for COVID-19 were so rapidly produced, and employed vaccine platforms which had not previously been used at scale in this way (mRNA and viral vectored), should not however give us a false sense that this will necessarily be repeated for the next pandemic. The heavy lifting in controlling the pandemic, and the consequent reduction of severe disease, Long COVID and above all mortality, gradually shifted from mass social interventions (NPIs), through to a hybrid model of social interventions supported by the mass use of rapid diagnostic tests and case finding with isolation, through to mass use of vaccines and almost entirely medical management. For COVID-19, the only likelihood we will have to consider using widespread NPIs again is if a variant with significant vaccine escape evolves which also causes severe disease. Even then, these would almost certainly only be for the period of time needed to reformulate, remanufacture and distribute the vaccine (i.e. finite).
- 8.150. It was in my view part of my role, based on the advice of SAGE where they had given an opinion, and alongside additional information from others including the Directors of Public Health and my fellow CMOs and DCMOs, to give advice both on the direct impact of NPIs on COVID-19, and also on the wider indirect effects on public health and the health service. This included advising as to the impact of NPIs on some elements of education (which is a major driver of good or poor health in children and young people), loneliness and mental health risks, and issues related to deprivation. As CMO, my job was and is to take a wide public health view as well as a narrow COVID-19 view. These are not in my view in conflict but rather help give better balanced and more informed technical advice to core decision-makers.
- 8.151. On the other hand, I did not and do not consider it my role to advise on, or take account of in giving my advice, the wider economic, fiscal, social, diplomatic or political issues. It is not that I did not consider these issues important (I did and do) but rather that my role is a technical one around science, medicine and public health. That was understood by the core decision-makers. Advice to them on these wider issues came

from other sources, for example experts in HM Treasury, the business department, FCDO and others. Ultimately, democratically elected political leaders had to balance all the advice they received, and employ their own judgement on social issues to come to a final decision into which my advice, usually channelling that of SAGE, was one of a number of inputs.

8.152. Public health advice is only useful if it is practical and can be adhered to. I did not make a judgement about how long I felt that people would adhere to NPI restrictions, although my own experience, very much supported by what we saw in the magnificent public response to this pandemic, is that the UK public is incredibly altruistic and social minded. The advice of behavioural scientists on SPI-B also supported this position (**25 February 2020 - CJMW4/186 – INQ000137961**, **CJMW4/187 – INQ000052171**). Both of these meant that I thought it likely that provided people understood the reasons for social interventions, and that there was underlying them a strategy which had some chance of an end, they would support and try to adhere to them especially in the initial period the pandemic. It seemed likely to me and others however that at some point the amount of support for social measures would decrease, and that this decrease would be accelerated if either there was a perception of unfairness, or a perception that the Government and those advising them were unaware of, or indifferent to, the real hardships NPIs were causing and were extending them without thought.

Section 9: Borders and Travel

Initial measures in January to March 2020

Scientific Rationale

- 9.1. To answer the questions posed by the Inquiry on borders, it is important to make a few framing comments which help orientation.
- 9.2. Possibly more than any other area of the pandemic, decisions on borders, in particular when it came to cancelling flights or even more so closing borders, had to be political decisions. The economic, trade, diplomatic, consular and legal implications of closing borders are very profound. What to do for vulnerable British citizens stranded overseas, the consequences on the validity of health insurance policies, the substantial impact on the availability of food and medicines when a large amount of trade stops very suddenly and issues around compensation are just some of the very complicated calculations. The public health input on disease transmission is therefore only a part

- of the complex decision-making process. This is potentially complicated further by the fact that people often project their political persona through their approach to borders, whether it be as a free trade liberal, a nationalist or other political identities.
- 9.3. Debates between the four nations of the UK on border measures were one of the few areas which proved quite difficult even at a technical level. The starting point for political leaders in the four nations on border issues was different, perhaps unsurprisingly as attitudes to borders are essentially a political issue. Since there are no hard borders between the four nations of the UK, maintaining a position which took account of the various positions of the Governments of the four nations (i.e. Conservative (England), Labour (Wales), Scottish Nationalist Party/Green (Scotland), and Democratic Unionist Party/Sinn Féin (Northern Ireland)) was not always straightforward. This was both inevitable and unsurprising.
- 9.4. Secondly, it is important to recall that the great majority of the seeding of COVID-19 which caused the first major wave in the four nations of the UK was from Europe, in particular Spain, France and Italy. Temporally, this occurred to the greatest extent in mid-February 2020 (**CMJW4/076 – INQ000224069**). Even had we prevented every case entering the UK from East Asia, which the genetic evidence suggests we were quite effective at, the first wave would still have occurred and been driven by this spread from mainland Europe.
- 9.5. To have had a meaningful effect on delaying the first UK wave we would therefore have had to close our borders to Europe. We knew from the extensive work preparing for a no deal Brexit that the UK was and is critically dependent on continual imports from Europe, for among another other things food and medicines, especially through the short straits at Dover. The UK economy is different in this regard to New Zealand, Australia or China. Further, had for example the UK closed our borders to European nations, we could not have guaranteed that they would have reopened their borders when it suited us. This was not a medical issue, although the availability of food and medicines for the population ultimately is.
- 9.6. Thirdly, when COVID-19 first arose there were broadly speaking two paths the epidemic could have taken, as previously laid out. The first was a relatively localised epidemic similar to SARS with spillover cases arriving in the UK but of a disease which was relatively non-transmissible and therefore low risk for a substantial outbreak. Such a disease should have been possible to contain by existing PHE structures.

- 9.7. The alternative possibility was of a disease which was much more highly transmissible and which would turn into a pandemic that no public health system would cope with easily. In these circumstances, the strong scientific view (bordering on a consensus) is that closing borders only serves to delay the arrival of a pandemic, but does not prevent it.
- 9.8. This scientific opinion that border closures delay but do not prevent pandemics was and still is widely accepted in the technical literature, including internationally, and the lived experience of COVID-19 does nothing to undermine this view; no country escaped, however closed its economy (e.g. North Korea). Once COVID-19 had left China and spread widely it was going to get to the UK eventually by one route or another. People often hope that a pandemic is going to pass them by if they only close the borders; inevitably this proves to be incorrect.
- 9.9. Ministers often started from the reasonable and popularly assumed position that closing the borders might mean that the risk passed the UK by, and that to achieve this border closures would only need to be temporary when in fact they would have to continue for the rest of the pandemic or at least until medical countermeasures were available (years). The assumption that border measures are more effective than they are is natural and widespread around the world.
- 9.10. This does not mean that border measures have no role even in a highly transmissible pandemic; they can be very useful for delaying the first cases, or the first cases of a new and concerning variant, and in identifying cases or new variants and ensuring that people who arrive in the UK are aware of the relevant rules and how to go about seeking medical care. An example where I recommended that border measures should be instituted very rapidly was when a COVID-19 outbreak in mink in Denmark raised the possibility of a new zoonotic variant (**CJMW4/188 – INQ000236414, CJMW4/189 – INQ000071515**). The Danes were themselves taking active steps to control this by culling the farmed mink population and it seemed prudent given the risk of a new variant to cease trade and travel with Denmark until the cull was over and no new variant had emerged.
- 9.11. The Prime Minister and other Ministers wrestled with border issues throughout the pandemic. I understood that their aim was to balance public opinion, trade, diplomatic

and public health considerations. My advice and that of SAGE was considerably easier since I only had to consider the public health indications.

- 9.12. The Inquiry has asked whether I witnessed the Prime Minister saying words to the effect of 'aren't people going to think we are mad for not closing the borders?'. Reframing that slightly, it certainly was a concern of the Prime Minister and other Ministers to maintain public confidence through border measures where necessary. In my view, this is a legitimate political objective which falls outside the public health advice. It might very well be that Ministers decided the public would demand border closures, and choose to close them on that basis; that does not mean the public health advice from me or others should be that this had to be undertaken because it would be effective as a public health measure. In previous epidemics, I had witnessed Ministers taking perfectly reasonable political decisions on border measures because they might help maintain public confidence, rather than because they had any strict public health rationale.

Scientific Advice

- 9.13. SAGE reviewed the issue of border measures several times, and repeatedly came to the same conclusion. At best, once COVID-19 had left China, closing the borders would likely only delay the arrival of cases by some weeks (**3 February 2020 - CJMW4/033 – INQ000203939**). The WHO advice was also that border closures were not an effective tool against COVID-19. The UK CMOs jointly laid out some general principles on border measures which I set out below:

“1) Imported cases matter most when the UK has a low level of infection. When domestic transmission is very high imported cases are such a small amount of total that they are make no significant difference to the epidemic. As the UK moves to situation where local incidence and prevalence is much lower, imported cases could become a higher proportion of the overall number of infections and so preventing them can have some benefit. This is a gradual process, so there is not a ‘threshold’. It is however the case that once rates of domestic transmission are low it is potentially a material issue.

2) That benefit only exists to a significant degree when people are coming in from a country with a higher rate of infection (chance of being infected) than the UK, and so the person being asked to self-isolate has a higher probability that they have the disease than the UK population, therefore adding to the risk. Quarantining for 14 days

those people who come from a country with a higher rate than the UK may have a useful impact on the epidemic once the UK is at low levels, but quarantining those from countries with a lower rate than the UK will not.

3) However, quarantining is not only, or even mostly, about the epidemiology at this stage of the COVID-19 epidemic. Wider public confidence in the response, impact on travel and trade among other issues should be considered when making policy on quarantining at the border and may be more important in policy terms. This is not for the UK CMO's to offer advice on, as it is not where their expertise lies. Points 1) and 2) they are agreed on" (9 May 2020 - CJMW4/007 – INQ000203899).

9.14. NERVTAG's view on 13 January 2020 was that:

"the body of scientific evidence and previous experiences indicate that port entry screening, whilst not having zero effect, has low efficacy and the benefit is very unlikely to outweigh the substantial effort, cost and disruption" (CJMW4/018 – INQ000023107).

9.15. On 27 January 2020, I met the Secretary of State for Health and Social Care. The readout from this meeting states:

"SofS asked whether we should be implementing a travel ban for the whole of China under the understanding that the virus is no longer contained to Wuhan. CMO commented that this is not straightforward and would not stop the illness coming to this country if it is highly transmissible" (CJMW4/190 – INQ000106067).

9.16. On 3 February 2020, SAGE considered travel restrictions. They noted the following:

"1. On the expected impact of travel restrictions, SAGE estimates – with limited data – that if the UK reduces imported infections by 50%, this would maybe delay the onset of any epidemic in the UK by about 5 days; 75% would maybe buy 10 additional days; 90% maybe buys 15 additional days; 95%+ maybe buys a month.

...

17. Gaining 5 to 10 days of extra time for the NHS and wider HMG to prepare for a WN-CoV epidemic would be of limited value.

...

- 20. Ongoing transmission of WN-CoV in other countries would negate the effectiveness of travel restrictions on passengers coming directly from China – as might other international travel restrictions which force travellers from China to use alternative means or routes to travel” (CJMW4/033 - INQ000203939).*
- 9.17. On 3 February 2020, a SPI-M-O paper to SAGE estimated that based on current information from China, the average delay expected to result from a 90% reduction of travel from China might be up to two weeks (CJMW4/191 – INQ000051882). Travel restrictions served only to modify the estimated epidemic onset dates, rather than prevent the importation of cases.
- 9.18. By 23 March 2020, once there was widespread domestic transmission, SAGE concluded that the numbers of cases arriving from other countries were estimated to be insignificant in comparison with domestic cases, comprising approximately 0.5% of the total (CJMW4/098 – INQ000129072).
- 9.19. Following consideration of a paper from the Home Office commissioned by their CSA Professor Sir John Aston, which contained questions on borders, on 28 April 2020 SAGE advised:
- “30. As the number of cases in the UK decreases, the potential proportion of imported cases may increase. It is possible to estimate the number of cases which may be imported and their proportion of the total.*
- 31. Determining a tolerable level of risk from imported cases requires consideration of a number of non-science factors and is a policy question.*
- 32. Measures implemented at the border may change the level of risk and these will be reviewed” (CJMW4/192 - INQ000053212).*

Border measures from January to March 2020

- 9.20. The Inquiry has asked whether on reflection I think that a decision should have been taken to close the UK borders in January to March 2020. For the reasons outlined, I consider this to be a political question not principally a public-health one. From the narrow public health perspective, unless we closed borders to all nations for a prolonged period we would at best have delayed by a short period the onset of COVID-19. Selectively closing borders only to those countries we knew had COVID-19 would

have had little impact since the majority of importation came from countries in Europe which, at the time, had extensive COVID-19 transmission of which (excepting Italy) we were unaware. Those arguing for a complete closure of the border to all countries would have needed at the time of giving that advice to be clear for how long they considered this an appropriate step, what their exit strategy would be, and what actions would be taken to mitigate the public health harms from, for example, interruptions of food and drug supplies.

- 9.21. Arguably, enhanced monitoring of passengers and the handing out of information for those arriving from Wuhan should have occurred some days before it did. As things turned out, this would have made little difference to the initial path of the pandemic in the UK since the great majority of the seeding occurred from Europe.
- 9.22. This is one area however where we should not allow hindsight to give a favourable gloss. Were we running things again earlier intervention would have in my view been prudent and I would have advised measures more rapidly. Enhanced monitoring does not confer any of the significant downsides associated with stopping flights or closing borders. Set against this however is that enhanced monitoring in the absence of a proven test obviously has much less utility than had effective testing been available. It is also very labour intensive if it is to avoid blocking up airport flow, taking many public health staff to operate it.
- 9.23. There was a lot of discussion about the best approach to flights from China. Had I been asked whether there was merit in banning these, I would have likely reflected the advice from SAGE, the WHO and others, and advised that banning flights solely from China, were there to be a pandemic, might delay but would not prevent ingress of the disease to the UK. There was an appreciation that the Chinese New Year on 25 January 2020 might accelerate spread of the disease throughout China were human to human transmission occurring (at that point not certain). To some extent, this would also have been an issue for the international Chinese diaspora and the Chinese heritage British population visiting relatives in China. The issues outlined above about the difficulties of stopping flights were also considered. It was very unlikely that COVID-19 would have been exported solely to the UK, but not to any other international destination with links to the UK. The impact of bilateral flight closures therefore should not be exaggerated.

FCO advice

9.24. A separate issue arises in respect of FCO advice against all but essential travel, or all travel, to mainland China. Here it is important to be clear what FCO (FCDO) travel advice is for. It is not meant to be a proxy for public health advice to protect the UK, and in my view it would be wrong to use it as a surrogate for domestic public health measures. These should be openly declared based on public health advice and democratic political oversight. Instead, FCO advice is there specifically to advise travellers on their individual risk when visiting a country abroad. This may for example be for reasons of political instability, terrorism or disease outbreak. It has significant implications, for example for many forms of travel health insurance which may be invalidated if a travel advisory is in place.

9.25. There are two ways in which the risk to a traveller to China was increased at this time from a public health point of view. The first was due to the probability of travellers catching COVID-19 and suffering one of the severe outcomes of it. The second was the collapse, serious limitations on, or significant impairment of the Chinese medical system such that travellers from the UK with urgent or emergency healthcare needs were unlikely to have these met when travelling in China. I am not aware of data implying that significant numbers of travellers to China from the UK who left over this period came to medical harm for these reasons.

9.26. I set out this logic on 25 January 2020 in advice concerning the evacuation of British nationals from Wuhan:

“I think there are two reasons we should be considering evacuating people who are older or have pre-existing health conditions from Wuhan and the surrounding area if they request it, and if this is practical:

- a. This seems to be the group most affected by the novel coronavirus, and it is very difficult to determine level of risk as inevitably the data coming out is going to be behind the reality.*
- b. My principle (sic) reason however is that it is clear that the current health services in Wuhan and surrounds are overwhelmed and also may well be a risk area for acquiring the novel virus. Therefore if they need medical services for other conditions (which is almost certainly more likely than for the novel virus) they may not be able to get them” (CJMW4/193 - INQ000047557).*

9.27. As laid out above, FCO travel advice is about individual risk, not the public health risk to the UK. From mid-March 2020, by which stage we were giving very strong public health advice in the UK, the global risk from COVID-19 in virtually every country to which UK travellers go in significant numbers was clearly either substantial or would predictably become so in the short-term future. The individual risk was therefore significant. On 17 March 2020, the FCO advised against all but essential travel to other countries. I see no strong reason why this advice from the FCO should not have been given then, or should have been given later. Exactly when the advice should have commenced is ultimately a matter of judgement based on the facts at the time rather than those known subsequently. Acknowledging that the extent of COVID-19 spread globally was at that stage underestimated due to widespread limitations in testing, I cannot confidently point to a date where it was obvious that FCO should have introduced measures earlier.

Screening at ports of entry

9.28. Screening passengers for a disease for which we did not have tests, and where the known symptoms were extremely non-specific (e.g. fever, cough), carries significant difficulties. Furthermore, this was compounded by the fact that as we subsequently discovered, many cases would be missed because they did not have those symptoms yet (in the incubation period) or were asymptomatic entirely.

9.29. Those countries which tried it by and large did not sustain their attempts for very long as it led to a very large number of false positive cases who had to be isolated or otherwise processed at airports for no benefit, whilst simultaneously failing to detect all the cases who arrived since they did not at that stage have symptoms. The key things necessary to make such an approach work are either a rapid test or very typical symptoms. I am not aware of any country which attempted screening in the era before rapid tests were available which felt this was an effective public-health manoeuvre for controlling their pandemic response.

9.30. On 17 January 2020, DHSC shared advice from myself and Sir Jonathan Van-Tam with PHE (our comments are those added in red to a document asking for our views):

“Thank you very much for sharing IMT and SRG recommendations on port health. The CMO and DCMO have now considered these and their feedback follows in red:”

Rec 1 – For direct flights between Wuhan and Heathrow, implement an announcement during the flight asking passengers to report symptoms to cabin crew combined with the requirement for a General Aviation Declaration (radioed by the pilot to the airport prior to landing) that there is nobody unwell on the aircraft. If an individual is declared unwell, the flight will be dealt with according to existing operational plans.

This is NOT supported. NERVTAG has not recommended entry screening and this recommendation would, in effect, be self-reported entry screening for symptoms that might identify some NcoV19 cases but also lots of other things. Also, some passengers might hide symptoms for fear of consequences. If the aircrew detect a clearly unwell passenger its BAU for them to issue a GAD.

Rec 2 – For terminals receiving direct flights (i.e. at London Heathrow), ensure isolation capability is available for the immediate management of suspected cases

This is appropriate for interception and safe management of people who self-report having seen arrival notices (see below i.e. if used) and/or who are picked out by aircrew or customs as looking very ill in some way which would be BAU.

Rec 3 – For all ports in England, prioritising those known to receive higher volumes of travellers from Wuhan via indirect routes:

i. Accelerate the roll out of the RING card (an aide memoire which highlights key symptoms of infectious diseases) to frontline Border Force staff in conjunction with supporting training. This is to support early recognition of compatible illness in passengers entering the UK.

This is a potential option but NOT YET as it will be hard to recognise anything that distinguishes NcoV19 from ARI in general and support BF staff.

ii. Add WN-CoV-specific information to the existing operational support information used by all airport ground staff. This is to support early recognition of compatible illness in passengers.

Agreed but NOT YET

iii. Public information posters displayed in English and Chinese. It is suggested that includes information about NHS 111 should they be unwell after leaving the airport, but discussion with NHSE is underway to agree this. Posters can either be targeted to those airports known to receive direct flights and higher volumes of indirect

travellers, or across all airports. This is to ensure that arriving passengers know about the symptoms to be aware of should they develop, and actions to take.

Potentially OK but NOT YET

CMO is content for preparation work for options 2 and 3 to be done 'quietly' so they could be implemented quickly if deemed necessary in the future.

In summary, CMO/DCMO advise that it would be TOO SOON to do any additional measures on the basis of one case in Japan and one in Thailand (places with high Wuhan traffic and China generally). If by Monday we have two cases who have been in the UK (one fleetingly) and maybe a couple more 'pop-up' cases elsewhere in the world e.g. HK or Australia for example, then it might be the time to consider acting.

CMO is also conscious that there have been no new case declarations in China itself since 06JAN20 which could mean the outbreak is over and we are picking up tail ends or there will be a second round of reporting. (CJMW4/052 - INQ000151331).

- 9.31. On 21 January 2020, NERVTAG provided advice on port health, including entry screening and a range of other port health measures. Amongst its detailed conclusions, the group's view was:

"4.8. NERVTAG summarised that the changing epidemiology did not change the fact that port of entry screening has low efficiency and could only detect a proportion of all cases entering the country. The Chair summarised that NERVTAG still supported the position that port of entry screening for those travelling from Wuhan was not advised.

4.9 NERVTAG felt that providing information to travellers and providing effective means for screening febrile travellers attending healthcare settings was likely to be a better option." (CJMW4/194 - INQ000023119).

- 9.32. On 22 January 2020, I sent the below to DHSC and PHE:

*"I think given the cases overnight we need to be ready
A) to put up posters everywhere in airports
B) to hand out leaflets to all returning flights from China
In pretty short order.*

I think we need to have a fallback plan for temperature screening” (CJMW4/195 - INQ00047518).

Measures in place for travellers

9.33. On 26 January 2020, Sir Jonathan Van-Tam sent this to CCS in relation to repatriation flights arranged by the Government for British nationals in Wuhan:

“On arrival at LHR or wherever, the usual enhanced port measures (invite disclosure of anyone unwell + travel leaflets), no thermal screening and no testing. Makes no sense as Maria [Zambon] very clear with SAGE that she is unsure of sensitivity of coronavirus PCR in early stages of symptomatic illness (likely to be lower) – sensitivity will be even lower in the asymptomatic and might be close to zero if asymptomatic but infected people do not shed virus before symptom onset (a current unknown). No quarantine for arrivals” (CJMW4/196 – INQ000236381).

9.34. At this time, our advice to the public was: *“If you develop respiratory symptoms within 14 days of travel to Wuhan, and are now in the UK, please stay indoors and avoid contact with others where possible, call your GP or ring 111 informing them of your symptoms and your recent travel to the city”*

9.35. In respect of those on repatriation flights, the Secretary of State for Health and Social Care ultimately decided to arrange for these individuals to be quarantined at Arrowe Park Hospital upon their return.

9.36. Over the period January to March 2020, there was an evolution in our advice to both the public and the medical profession in respect of how we defined suspected cases of COVID-19. At first, this advice was heavily based on symptoms combined with geography, firstly Wuhan, then expanding to China, then wider Asia and eventually including European countries. The geographical element of CAS alerts was gradually expanded from late January to mid-March, and the emphasis on geographical elements of the medical history was steadily decreased, especially in severe cases.

9.37. On 12 March 2020, we sent the first CAS alert that removed the geographic element completely, and from then on geographical elements were not deemed relevant because domestic transmission was clearly the dominant driver of the infection in the UK. The 12 March CAS alert stated:

“We are now in the delay phase of our response to COVID-19. This entails significant changes to how we identify and manage potential cases of COVID-19. Advice for NHS organisations is now as follows:

1. From today the public are being advised to stay at home (self-isolate) without any testing for COVID-19, regardless of travel history or contact with confirmed cases, if they have: a. A new continuous cough OR b. High temperature (of 37.8 degrees centigrade or higher)

2. The geographic element of the case definition has now been removed. Travel and contact history are no longer important for diagnosis, which is on the basis of symptoms alone. If people who have travelled do not have symptoms they do not need to stay at home, regardless of their travel history” (CJMW4/197 – INQ000048070).

- 9.38. Previous iterations of this advice had some geographic element, initially a very major one, but this was gradually reduced with greater emphasis given to symptoms irrespective of geography. The last CAS Alert prior to this change was on 10 March and said (CJMW4/198 – INQ000068943):

“This letter updates the advice sent on 5th March 2020. Major changes are highlighted in blue font. The key changes are to expand the case definition to include those presenting in hospital with certain symptoms, regardless of travel history. Advice for NHS organisations is as follows:

Individuals presenting at hospital.

*To improve case detection in those with no geographic link, patients who require admission to hospital should be tested **regardless of travel history** if they present with*

• Clinical or radiological evidence of pneumonia or acute respiratory distress syndrome

OR

• Influenza-like illness

Infection prevention and control measures whilst awaiting test results, including isolation and cohorting of patients, should be implemented in line with your Trust seasonal influenza operational plan.

Individuals with relevant travel history.

If someone has returned from these specific areas in the last 14 days, they should self-isolate even if they do not have symptoms. If they do develop symptoms, they should use NHS111 online at 111.nhs.uk (if they have no internet access, they should call NHS111). The areas are:

- *Iran*
- *Italy**
- *Special care zones in South Korea as designated by the Government of the Republic of South Korea*
- *Hubei province*

** This applies to the whole of Italy if the individual has returned **after 9th March**, when the Italian government extended the lockdown to the entire country.*

*If the individual returned **before 9th March** and has symptoms, they should use NHS111 online at 111.nhs.uk (if they have no internet access, they should call NHS111).*

*If the individual returned **before 9th March** and does not have symptoms, they should only self-isolate if they have been in the original locked-down region of Lombardy and provinces of Modena, Parma, Piacenza, Reggio Emilia, Rimini, Pesaro and Urbino, Alessandria, Asti, Novara, Verbania, Vercelli, Padua, Treviso and Venice in the preceding 2 weeks.*

If someone has returned from the following areas in the last 14 days and develops symptoms, however mild, of acute respiratory infection including at least one of:

- *shortness of breath or cough (with or without fever);*
- *OR fever with no other symptoms;*

they should self-isolate at home immediately and use NHS111 online at 111.nhs.uk (if they have no internet access, they should call NHS111). They do not need to self-isolate if they have no symptoms. These areas are:

- *China (except Hubei province which is listed above)*
- *Hong Kong*
- *Macau*
- *Taiwan*

- *Japan*
- *Malaysia*
- *Republic of Korea (except areas which are listed above)*
- *Singapore*
- *Thailand*
- *Vietnam*
- *Cambodia*
- *Laos*
- *Myanmar*

Border measures from June 2020 onwards

- 9.39. My advice and the advice of the other UK CMO's on travel restrictions once there was significant domestic transmission are laid out in our joint note to the Cabinet Office of 9 May 2020 (**CJMW4/007 – INQ000203899**). This was provided in order to assist Ministers who were considering whether to introduce a 14-day period of self-isolation and the collection of contact details for incoming travellers to the UK.
- 9.40. Our advice was that imported cases mattered most when the UK has a low level of infection relative to the levels abroad. Conversely, when domestic transmission was very high, the contribution of imported cases to the total was usually so small that it made no significant difference to the course of the pandemic in the UK. There was therefore some potential benefit in preventing imported cases from summer 2020 onwards, once the effect of the first lockdown had been to reduce the UK domestic incidence of COVID-19 to very low levels. This reflected advice from SAGE.
- 9.41. Any benefit to reducing the UK epidemic only existed to a significant degree if people were arriving from a country where their chance of being infected exceeded that in the UK. In those circumstances, a traveller arriving from a higher incidence country added to the overall UK risk because their chance of having the infection was greater than for an individual in the UK. For these individuals, there was some merit in requiring them to isolate for 14 days (i.e. the incubation period of COVID) upon arrival. The same was not however true of individuals arriving from countries with an incidence lower than the

UK. Those individuals would have a lower risk of having COVID-19 than someone already in the UK, and so statistically as a group they posed no risk of worsening the UK domestic COVID-19 pandemic.

9.42. As had been the case in respect of border measures in January to March 2020, the ongoing arrangements from summer 2020 onwards were not only about the epidemiology. Wider public confidence in Government's handling of the pandemic, the impact on travel, trade and other issues needed to be taken into account. This was a matter for political decision makers guided by advice from many fields, and was not something where the public health advice could be considered in isolation.

9.43. A policy of travel corridors was introduced from early June 2020. JBC led on this policy and took the lead on the technical aspects and thresholds for countries to be categorised on what became a "red", "amber" or "green" basis. The broad principles underlying the system had however been agreed by all four UK CMOs prior to this. The position of JBC is summarised well in their June 2020 paper, which I quote below:

"The current blanket approach to mandatory self-isolation is currently justified on the basis that (a) it is difficult to ascertain with confidence the risk levels in certain countries; for example a country with high levels of disease will in fact report low incidence and prevalence if there inadequate testing capacity or limited access to testing; (b) risk levels may vary as incidence/prevalence changes within a country, but reporting may be lagged by several weeks; and (c) international travellers may have visited higher risk countries during the incubation period, before or after travelling from a low risk country in which they are ordinarily resident. As requested by the PM, we are now developing an approach stratified by the public health risks posed. However implementation risks, particularly linked to confidence in incidence/prevalence reporting and compliance, remain inherent in any risk-stratified approach.

The CMO has advised that there is limited public health rationale to require people to self-isolate when they arrive from countries which have a lower incidence of coronavirus than the UK.

We would also need to have confidence in their testing capacity, accessibility and the credibility of incidence reporting. The DCMO has advised that once UK incidence is low, there is a clear public health rationale to require international arrivals from countries with a higher incidence of coronavirus than the UK to self-isolate on arrival, including where the reported incidence is low but we have little confidence in the

reliability of reporting or the country's disease trajectory is rapidly escalating. This is especially true if traveller arrival volumes from those countries is high" (CJMW4/199 - INQ000236410).

- 9.44. When significant new variants arose (e.g. Delta, Omicron) the important question was not the overall risk of COVID-19 but the risk of importing that variant. Therefore, if the UK had a low incidence of, say, Omicron, and another country had a high rate, border measures could be considered on the basis that delaying the establishment of that variant would have some public health benefit. Once UK domestic transmission of that variant was established, the advantages fell away.
- 9.45. The mechanism by which travel advice was given, certainly after the first few weeks of the pandemic, involved multiple government departments. As I have identified, it is an area of policy which cuts across multiple areas of Government and the national interest, and so this was appropriate. I therefore consider that the various measures introduced after this time were considered with care. This does not necessarily mean they were the 'right' outcome, but it does mean that the decision taken took account of several facets of the problem. Determining whether the measures ultimately arrived at were proportionate overall is something which should be assessed against the political aims they were meant to achieve, and the weighing by politicians of the public-health, diplomatic, commercial, security of essential goods, consumer or other major priorities.
- 9.46. One important technical detail is the difference between screening before travel and screening at airports on arrival. Screening prior to travel has some significant advantages to fellow travellers and aircraft staff by reducing the probability a currently infectious person is in an enclosed space for often prolonged periods with many others.

Section 10: Testing and contact tracing: Testing and Care Homes

Introduction

- 10.1 The advice I and other technical experts gave core decision-makers about community testing for COVID-19 and its significance to the response to the disease varied over the period of the pandemic. This depended on amongst other things the availability of testing, the availability of contact tracing, the known epidemiology and the arrival of rapid diagnostic tests which people can use at home. It was therefore not static advice.

- 10.2 It is important to draw a distinction between the various ways in which testing may be employed. I have addressed at some length community testing, in so far it relates to the availability of tests in the community for those whom we had reason to suspect might have COVID-19, at various points elsewhere in this statement.
- 10.3 Targeted community testing had at least five advantages, provided the test identified those who were infectious with a good degree of accuracy. It meant that people with symptoms of COVID-19 could test themselves and if positive self-isolate, thereby reducing chains of transmission. Conversely, if they tested negative it meant they could resume their normal family, social and economic life in line with restrictions in place at the time. It allowed people who were visiting a vulnerable person, or about to go to a social event, to check they were not infectious irrespective of symptoms. It allowed high risk venues (e.g. care homes and hospitals) to reduce their risk by getting people to test before they entered and not enter if positive. It also allowed some venues such as theatres to open earlier than they would otherwise have done with testing to reduce the risk of transmission. All of this depended on having a large scale testing capacity, and was made possible by point-of-care tests which were accurate at determining if people were, at the time they took their test, infectious.
- 10.4 I thought the evidence was in favour of such targeted community testing, once widespread point-of-care tests were available. I was in favour of community testing with PCR but accepted that it had significant practical limitations due to the delay in time between a test being taken and a result being returned. This was an inherent consequence of it being based on a system where tests were mailed in to a laboratory and the results then communicated back. There were therefore several circumstances, for instance admissions to sports events, where lateral flow tests were beneficial due to their speed of results.
- 10.5 Overall, I consider the expansion of testing into the community as one of the more effective innovations that occurred during COVID-19 and one which may well be carried forward to some, although not necessarily all, future pandemics. More technical details on testing and the steps that led to the ability to achieve it are laid out in the Technical Report. It did depend on having lateral flow tests where being test positive had a high correlation with infectiousness.

Mass Testing

10.6. A separate form of community testing, which I shall refer to as mass testing, related to the widespread non-targeted testing of populations in the community who we had no particular reason to suspect had COVID-19 (i.e. they were not displaying symptoms, or had been in contact with someone who was) and were not going to a high-risk venue. Mass testing, which had enthusiastic support from some, posed a separate set of issues from the targeted community testing outlined above. It was less clear that it would be useful, especially in an era when testing was based on PCR, as I outlined in my advice to the Cabinet Office and Permanent Secretary at DHSC on 8 November 2020:

“1) The empirical evidence this [mass testing] will actually have a useful impact is weak. The mathematical theory is fine- but the theory for a lot of things is fine, but is no substitute for empiric data. I am confident a lot of people will want to be tested, and a lot of people will have COVID- the question is to what extent the two circles of the Venn diagram overlap. The reports from medical colleagues in Liverpool and elsewhere is that those most at risk are least enthusiastic to be tested (one gave a disruption [sic] of being chased out of a housing estate by a man in his underwear he was so angry). And testing without isolation is pointless- we don't know what it will lead to. Or whether it will lead to people taking risky behaviours if they are negative, cancelling out any positive benefits. Etc.

2) There are clear and major opportunity costs. My biggest worry is this will lead to diversion of tests from areas we really [sic] need them including symptomatic people, healthcare workers, social care workers, those isolating etc. Or lead time to test result extending, which has the same effect; a delayed test result is of minimal use. This would definitely lead to a net loss for public health. We must guard against it at all costs, and the risks here need to be explicit.

3) I am nervous of the Christmas theme. Many of the highest risk groups (eg British people of Pakistani heritage- the highest incidence group) do not celebrate Christmas, and feel we did everything we could to make celebrating Eid al-Adha difficult. We put lockdown over Diwali (other British south Asians being another major risk group). It will need careful messaging if we are not to lose further support among groups we need to be bought in” (CJMW4/200 - INQ000071531).

- 10.7. Some expressed a hope that mass testing alone could serve to control the pandemic in and of itself. I considered this to be optimistic without clear data to support its effectiveness. Mass testing performed on or around any given point in time would at best identify a portion of those people with COVID-19. It would not identify those who might have been exposed prior to this point who would test negative but then go to develop the disease in the following days. Nor could mass testing feasibly identify everyone with COVID-19 on that date, on the basis that some sections of the population would not come forward to be tested and of those who did, there would be a portion of false negative results.
- 10.8. Whilst mass testing would identify cases and, if they then self-isolated, put some temporary downward pressure on the incidence and prevalence of the disease, it would not in my view be so successful as to allow the widespread relaxation of NPIs unless it was repeated frequently over time. Other countries did attempt the approach. In respect of mass testing in Slovakia, which was seen by some as a model to follow, I advised the Cabinet Office on 19 November 2020:

"I think it is a bit early to say R has been reduced in Slovakia by mass testing alone and I would be a bit surprised if it had. Reducing prevalence is more likely, if people adhere, and on the background of a falling R this is useful" (CJMW4/201 – INQ000071738).

It is not obvious the experiment with mass testing in Slovakia had the prolonged impact on transmission some in the UK hoped it might have.

- 10.9. These limitations were reflected in our own (UK) experiences in the pilots we undertook. For instance, when we attempted this in Liverpool, I was of the view that mass testing resulted in us identifying more of those who were positive (a good thing). There was however limited evidence that it had in and of itself contributed to a sustained slowing in rates of transmission (CJMW4/202 - INQ000071945).

Testing and care homes

- 10.10. I have already addressed at paragraphs 7.128 to 7.133 above some of the specific issues which arose in respect of discharges from hospitals to care homes early on the pandemic. It is important however to consider some of the broader issues which arose

in respect of social care and nursing homes in the context of COVID-19, both insofar as they relate to testing, and also wider issues in the social care sector.

- 10.11. My preference from an early stage in the pandemic was that people entering care homes as residents from either hospital or the community should be tested. This was not a controversial stance and I am not aware of anybody who argued against it. The practical reality at the time however was that the availability of testing, and the prioritisation of those tests which were available against the many other potential uses, made this very difficult. My advice that testing should be undertaken as soon as possible was given in advance of testing being available at the scale needed to achieve it for all care home residents (**14 April 2020 - CJMW4/203 – INQ000068798**).
- 10.12. As an adviser to Government, I do not ask for, nor do I receive, assurances from the Secretary of State for Health and Social Care on any specific issue. This was as true for testing as it was anything else. It simply is not my role. As I have laid out, I thought there were risks to discharging people to care homes without them having been tested, but also risks to vulnerable individuals and their subsequent care homes if they were kept in hospitals at a time where their risk of exposure to COVID-19 was high and rising. There were insufficient tests to test everybody, and those test results could not be returned rapidly. The balance between these risks shifted with the epidemiology of the disease and the availability of testing.
- 10.13. As far as I am aware, this lack of available tests was the principal reason testing was not performed prior to people's arrival at care homes. Insofar as advice was received that someone who had had a negative test in hospital could subsequently become infectious, that was correct technical advice. The incubation period of COVID-19 means that someone could be discharged negative (with the test having been performed correctly) and subsequently become positive, so a negative test did not exclude subsequent risk. This however was not a reason not to test, whereas the lack of testing was. It would however have been incorrect to imply to care homes that a negative test in someone arriving, whether from hospital or the community, guaranteed they would not subsequently become infectious to fellow residents, staff and visitors in the next few days due to an infection acquired prior to arrival.
- 10.14. How we could best protect individuals in care homes was a significant worry from very early in the pandemic, for obvious reasons; it was certainly a worry to me but also to very many others. COVID-19 is a disease which particularly affects elderly and more

medically vulnerable citizens and in particular is passed on by close contact and in enclosed indoor spaces. It was bound therefore to be a major risk in care homes where close contact is essential in order to provide proper care, almost all of which is provided indoors. Multiple countries faced this serious problem.

- 10.15. Several factors were found to be significantly exacerbating the difficulties with COVID-19 transmission in care homes. These included the need for high numbers of staff in order to provide effective care, a reliance on agency staff or the movement of staff between several care settings, and a failure to pay staff sickness rates when they were self-isolating.
- 10.16. Several studies were undertaken using genetic methods to track where infections came from into care homes. In general and unsurprisingly, introduction via staff, entirely unwittingly, looks to have been the most common route. The prevalence of infection in staff was probably typical for the communities in which they lived. Care staff have to give very close physical care to their residents and a relatively large number of staff are needed to provide care needs for the most dependent residents. This resulted in multiple opportunities for the virus to be transmitted over a working week.
- 10.17. The consequence was that those in care homes who were particularly vulnerable were in close contact with a large number of individuals at a time when, had they still been living in the community, they would probably have been advised to shield. This should in no way be seen as a criticism of the outstanding work care staff did in often very difficult and emotionally exhausting circumstances, but simply a reflection of the extreme difficulty of providing close physical care to highly vulnerable adults during a major pandemic of an extremely transmissible respiratory infection (CJMW4/204 – INQ000107084, CJMW4/205 – INQ000234332, CJMW4/206 – INQ000101020, CJMW4/207 – INQ000236448, CJMW4/208 – INQ000228240, CJMW4/209 – INQ000213185). How best to minimise these risks in the period before testing was available on a widespread basis, and in circumstances where staff shortages were a significant issue and so restricting staff further carried a major risk to both the wider health and dignity of those being cared for, was not straightforward.
- 10.18. A further tension existed between allowing access for families to their elderly loved ones, who were often in the last months of life, the reassurance and support to the residents this gave, and the risk of introducing COVID-19 into the care home affecting

other residents and staff. I am aware that a future Module will look at these issues in more detail. Insofar as they do not relate to testing, I have therefore touched only briefly on these important issues. It is an area where in my view, there is much to learn. The care home subcommittee of SAGE and the papers which informed it, along with the Technical Report, identifies some of the many lessons. This was an area all countries with a significant elderly population in care homes struggled with.

- 10.19. The UK put in place research to track the impact of, and reasons for, COVID-19 in care homes very rapidly by international standards. These included the VIVALDI 1 and VIVALDI 2 study, the Easter 6 (later named the London Care Homes Network) and others. To interpret study outputs and provide science advice informing social care policy decisions, the Social Care Working Group (“SCWG”) complemented work conducted by SPI-M-O to understand the impact of COVID-19 on vulnerable populations and in settings such as care homes. Modelling approaches were used to understand the key determinants of ingress and transmission of COVID-19 in high-risk adult social care settings. A key focus was ongoing assessment of effective options for the most appropriate testing and isolation regimens for care home staff and residents to mitigate the risk of transmission of COVID-19. Work was also undertaken to reduce the number of admissions to hospital of care home residents, so as to protect them from nosocomial infection if they were admitted.
- 10.20. The Inquiry has asked me about an exchange of letters between Professor Sir Peter Horby, in his role as Chair of NERVTAG, and me. On 11 May 2020, Professor Horby wrote to me (INQ000069368) requesting a laying out of how advice provided by NERVTAG relating to care homes had been acted upon in policy. This was in one sense a slightly atypical request, as the CMO is not responsible for policy in social care and SACs are not responsible for how their advice is used; I was however a reasonable conduit for NERVTAG to ask this question to the Department as the CMO is the main link for NERVTAG. I responded on 21 May 2020 (INQ000069366). His request was not in reality to me as a medical or scientific adviser, but to the Department wanting to know the social care policy response, and so I sent a policy response back (ie it was written as a Departmental response, rather than a response from me). Professor Horby, who was (and is) an excellent chair of NERVTAG as well as his remarkable contributions through the RECOVERY trial, was perfectly aware of this and was using the best route he could to flag concerns in an area we were all very concerned. Subsequently the science advice on care homes was mainly led through the work of the Care Home subgroup of SAGE, as my letter to Professor Horby lays out.

10.21. Further details of these measures are laid out in the Technical Report. As we said in that publication, the value of reliable and comprehensive routine population and health data describing the population living and working in residential care to inform policy decisions and evaluate the impact of interventions cannot be overstated.

Contact Tracing

10.22. The principles of contact tracing are straightforward, although the practical delivery often is not. People with an infectious disease are identified and self-isolate. A list of all their contacts in the period between when they might have become infectious and their self-isolation are identified; these people are contacted wherever possible and asked to isolate to break the chain of transmission. In some cases, the contacts of the contacts may be asked to isolate (depending on speed of transmission and of contact tracing resources). This is a well established method of infectious disease control, which is easiest in diseases such as sexually transmitted infections and to a lesser extent touch diseases such as Ebola, where there is a high chance the person infected knows all their recent contacts.

10.23. I was involved at a strategic and technical level in the discussions about the potential uses and limitations of contact tracing in the context of COVID-19. SAGE gave views on this at several points during the pandemic and these are laid out in the Minutes of those meetings. This advice was reflected in the advice I gave key decision makers. I was not however involved in the practical or operational delivery of contact tracing in this pandemic.

10.24. A distinction should be drawn between contact tracing with the aim of improving epidemiological understanding (i.e. data collection), and contact tracing for the purpose of identifying and potentially isolating infectious people so as to reduce transmission (disease control). Whilst there is some overlap, they have different aims and may employ different techniques. Contact tracing for both purposes was considered early in the pandemic, and certainly from January 2020. Many people involved in the response to COVID-19, including me, had for example been involved in the response in Sierra Leone to the 2014-16 Ebola epidemic. We therefore had very recent experience of using contact tracing at scale for both these purposes since this was the principal means of control for community transmission in that epidemic.

- 10.25. The PHE system of contact tracing was well developed and well integrated with local authorities and their Directors of Public Health, provided the number of cases were small. In the case of COVID-19, two major limitations put very heavy constraints on this in practice in the first few months.
- 10.26. The first, and practically the most important, was the lack of testing at scale for a disease which had very non-specific symptoms in people who were infectious (subsequently found to be no symptoms at all in some cases) and rapid transmission. Secondly, the contact tracing system once a diagnosis was made had some scaling capacity, but it was relatively limited given the very large numbers of cases, and the even larger numbers of potential contacts. These case numbers rose rapidly and exponentially in COVID-19 and exponential scaling in response is not an easy task. This issue of scale up of contact tracing capacity would have been a limitation even had the testing been available to target the contact tracing more accurately; without it it was a serious practical problem.
- 10.27. In other countries, such as South Korea and Germany, greater prior investment in this capacity to rapidly scale up contact tracing arguably led to a greater ability to undertake and maintain it until a later stage of the epidemic (i.e. when they had larger numbers). This required prior investment. If you cannot accurately and rapidly identify the disease in the majority of cases then contact tracing soon ceases to have much public health effect, although it may continue to serve some epidemiological purposes for tracking the disease. In a disease where the doubling time is days, identifying a small percentage of cases after the event and only isolating their known contacts will obviously have limited impact. At this point, using very limited testing capacity for this purpose instead of for clinical management of sick patients ceases to make public health sense. This was one of the reasons community testing in the UK was stopped once domestic transmission was widespread; we did not have the capacity both to use testing for clinical management and for contact tracing, and contact tracing was the lower priority given this forced choice.
- 10.28. My technical views on the public health impact of NHS Test and Trace are accurately reflected in the Technical Report at Chapter 7. In respect of the operational strengths and weaknesses of the model chosen, I am not the correct person to ask since I was not closely involved in operational issues on this subject. I would note however that the epidemiological output from the Test and Trace system was essential to subsequent decision-making. Those who criticised Test and Trace did not always lay

out what alternative model they would have used against the very short timescales involved, and more importantly the trade-offs this will have included and where the people who were to undertake it were to come from.

Section 11: COVID-19 Disparities

Identifying disparities

- 11.1. Once an epidemic or pandemic begins, it is likely to lead to some groups living in disparity or discrimination being affected disproportionately. This has been true for almost all infections through history, although the mechanism by which this occurs, and the groups it affects, vary depending on the infection. I made this point in my Second Statement for Module 1 but repeat it here for Module 2:

“The importance of identifying and mitigating as far as possible inequalities and disparities in health is one of the aims of all public health. Communicable as well as non-communicable diseases tend to be most likely centred in areas of deprivation. The mechanism by which this occurs and can be countered is however different between different pandemics and epidemics. In cholera where this was first studied systematically it was by exposure to unsafe water; in epidemic typhus by exposure to lice; in HIV through intravenous drug use; and in tuberculosis (TB) through overcrowding, poor housing and malnutrition, among other factors. Expecting pandemics to be more severe in deprived areas is therefore generic to most infections, but why, and therefore how to combat this depends on the pandemic and its transmission and biological characteristics, and in particular route of transmission.

....

The most important way in which public health measures reduce the risk to areas of deprivation is to control the pandemic or epidemic in society as a whole. There may also be specific measures which reduce the risks to the most vulnerable populations (which are almost inevitable) but they depend on the infection involved.”

- 11.2. The earliest disparity that became apparent in respect of COVID-19 was by age, and specifically older age: this was first indicated by data from Chinese scientists and clinicians and was subsequently repeated in Italy, the UK and globally. Various subsequent risk factors appeared early in the data and included gender (this varied over the pandemic's first years), obesity, diabetes, immunosuppression, neurodisability, several other medical comorbidities, disabilities and ethnicity.

Deprivation remained a risk factor of its own even when other factors were controlled for. Older age remained however the greatest risk factor at a population level.

- 11.3. The aim of identifying these disparities was not merely to observe, but to act to try to minimise preventable harm. I was involved in putting in place at a relatively early stage of the pandemic studies to try and identify medical conditions associated with poor outcomes, and to examine the causes of, and potential solutions to, the observed differences by ethnicity, outlined below.
- 11.4. In considering the various groups at risk, it is important to differentiate between an increased risk of acquiring COVID-19, and an increased risk of having severe disease or dying from COVID-19 once it was acquired. These have very different practical implications. For example, obesity or older age do not increase the risk of infection (in fact in the case of age it is probably the reverse due to relatively fewer different social contacts compared to younger adults on average) but they do increase the risk of severe outcomes once infection has occurred.
- 11.5. On the other hand, living in a multigenerational household, being employed in a high contact role such as social care or taxi driving, or living in densely populated areas do not in themselves increase the risk of severe outcomes. They do however significantly increase the risk of a vulnerable individual acquiring the infection. In practice, deprivation often simultaneously increased the risk both of infection, including through housing and employment, and the risk of severe disease, for example through higher pre-existing rates of diabetes, obesity or multi-morbidity. Deprivation also often served to reduce the speed with which individuals sought care and their level of engagement with health services in addition frequently to having worse pre-existing health and greater risk of acquiring disease.
- 11.6. Exacerbating this, many of the key social measures taken to combat COVID-19 had greater negative impacts in areas of deprivation than in more affluent areas. Greater proportions of the population in these areas depended on work paid only for the time spent working, meaning that time off for self-isolation was more financially damaging than for salaried work; families were often less equipped to be able to support home schooling for children; outdoor spaces were often less available for relatively safe social mixing; and so forth.

- 11.7. This led to an extremely difficult combination whereby the probability of someone in an area of deprivation acquiring, having severe disease from, and being harmed by the countermeasures to COVID-19 were all greater in areas of deprivation than in more affluent areas. Many of these households were also least able to home-school as parents were not able to work from home. Later in the pandemic, disparity also manifested itself in differential uptake of vaccination, with inevitable consequences. I gave advice on issues around deprivation and different groups of at-risk individuals throughout the pandemic as evidence emerged, rather than at one specific point in time.
- 11.8. It was in my view predictable that there would be significant structural inequalities in the health outcomes for COVID-19. It was not in my view entirely predictable which groups these would be other than that broadly people living in deprivation tend to have less good outcomes from most infections and indeed most public health problems. To give an example of this, in my early medical career the last major pandemic was HIV/AIDS. There was in the UK very heavy inequality in HIV centred around gay men (then highly discriminated against), people of both genders with a heritage from southern Africa, intravenous drug users and commercial sex workers - all groups who suffered from discrimination and often deprivation. This is a completely different group from those affected disproportionately by COVID-19, although the issues of segregated risk into marginalised and vulnerable communities were equally severe.

Response to the disparity in outcomes

- 11.9. Given this, we felt it was important to undertake the collection of data and research studies to identify the key vulnerable groups, and in turn identify any possible countermeasures. It is important here to recognise the difficulties involved in confounding and bias in epidemiological studies of this kind. In the first wave of COVID-19, people of African and Afro-Caribbean heritage were sadly very highly overrepresented in those who acquired and died from the disease. Identifying the proportion of that excess risk which was as a direct result of ethnicity, and that which was due to the fact that a higher than average proportion of people living in densely populated areas or in high contact professions (and who therefore could not work from home) came from these communities, was not straightforward. It did however have important practical implications. In the second wave, UK citizens of South Asian heritage had a much higher risk than in the first wave. This reflected the fact that the first wave had a particularly big impact in London, which has a very high proportion of

UK citizens of African and Afro-Caribbean heritage, and the second wave initially had a particularly high impact in the Midlands, where there is a very high proportion of the UK's population with South Asian heritage.

11.10. Accordingly, I was involved in the commissioning of several relevant studies. This included setting up CO-CIN, commissioning NERVTAG and Professor Hippisley-Cox to do detailed work on the risk for different groups (Q-COVID) (**CJMW4/210 – INQ000236458**), and directing the NIHR to do a themed call on ethnicity. The latter of these funded 10 studies including:

- UK-REACH: United Kingdom Research Study into Ethnicity And COVID-19 outcomes in healthcare workers; (**CJMW4/211 – INQ000236443**)
- Ensuring that COVID-19 trials consider ethnicity: the INCLUDE Ethnicity Framework for randomised trials (**CJMW4/212 – INQ000236444**); and
- Quantifying the association between COVID-19, ethnicity, and mortality: A cohort study across three UK national databases (**CJMW4/213 – INQ000236445**).

11.11 Further examples are the report on the impact of COVID-19 on BAME communities (**CJMW4/214 – INQ000203982**), the NERVTAG sub-group work on stratifying by risk (**CJMW4/215 – INQ000236454**), an evidence call for research on ethnicity by NIHR in April 2020 (**CJMW4/216 – INQ000236455**) and the CO-CIN study, which reviewed a range of risk factors including ethnicity (**CJMW4/217 – INQ000074906**).

11.12 I was also involved in discussions with healthcare colleagues from multiple ethnic minority and other cultural groups to get their insights into the experience of the communities they had closest links with, and to identify possible countermeasures to COVID-19 in those communities. Later in the pandemic, this included supporting those groups to maximise vaccine uptake. The importance of healthcare worker volunteers from different communities engaging with their communities whilst continuing to maintain their very hard main jobs was both very inspiring, and based on external evidence, very important (**CJMW4/218 – INQ000236421**, **CJMW4/219 – INQ000236420**).

11.13 As I have identified, there was a particular issue with occupational safety as a consequence of those from minority communities being commonly employed in public facing key worker roles which could not be undertaken from home. In my view, the key

to improving the safety of these individuals, which included health and social care workers, was principally to optimise safety for all rather than to trying to differentiate by every at risk group in the work place. It very rapidly became apparent that trying to have different safety regimes for workers from different ethnicities (for example) who were otherwise well and undertaking the same work would be impractical. There was a judgement that there needed to be some extra protection for those at the greatest risk, but this was often double edged. Shielding for example reduced the risk of COVID-19, but increased the risk of loneliness. Reducing the risk to all by reducing COVID-19 transmission in the community, and reducing the risk to all in workplaces were generally the most effective ways to reduce the risk in particular at-risk groups.

11.14 Notwithstanding the efforts described above, whilst I did my best to reflect the importance of disparities and inequalities in the advice I gave to key decision-makers, and I am also confident this was true for the DCMOs, nobody looking back at COVID-19 can claim this was sufficient. The scale of the difference by deprivation and ethnicity is clear; what would have been effective countermeasures is less so. The biggest difference numerically was, and remained throughout the pandemic, older age.

Limitations of our response

11.15. One weakness in data capture is that ethnicity is often poorly or confusingly captured, or not captured at all. Ethnicity was for example not a part of death certification. NHS data on ethnicity is often patchy and does not always rely on self-identified ethnicity, although this is arguably improving. In fairness to those who try to do this, it is not a straightforward endeavour. Many people, entirely reasonably, have multiple simultaneous cultural identities, combinations of ethnicities by biological heritage and cultural choice. Even in research studies, classification by ethnicity is often crude and lumps together groups of individuals who are culturally or genetically very distinct.

11.16. It is essential that in any pandemic or epidemic there is an assumption and recognition that some particular groups will be particularly badly affected. It should also be assumed that there is a very high chance these will be in deprived groups or those living with social stigma or other forms of inequality. Identifying these in advance is however often difficult. It was in COVID-19; many of the disparities identified were obvious in retrospect but were not clear before they became apparent, and some which we were expecting fortunately did not occur (for example high mortality in children).

Looking for disparities in outcomes with the expectation they will be found in marginalised groups but without preconceptions as to which, and then responding to these differences where that is practical, is key.

- 11.17. Even more important than identifying that there are disparities in risk is identifying differences in response to countermeasures. In the case of COVID-19, these included a differential ability to take time off work, to isolate within homes, varying levels of trust in health services and public health messaging, and the response to the vaccine being available. Identifying and addressing these was of great importance.
- 11.18. A few of the errors made early in COVID-19 were both predictable and simple to fix. Accordingly, they should not have occurred. An example was the delay in getting proper translation of key public health material into the common languages spoken in the UK by those whose first language is not English. A slightly more subtle one was recognising that some important groups were getting their public health advice not from UK-based outlets such as the BBC, ITV or major UK papers, but mainly from foreign language channels, or indeed English language channels from other nations. Repeating key messages from Downing Street press conferences was unlikely to address this.
- 11.19. The aim of the COVID-19 pandemic strategy was principally to protect the most vulnerable. This was explicit in the advice given. It took some time for every vulnerability to become clear and this changed as science progressed and clinical data emerged. The first high risk group identified, and numerically the largest by some distance, were older citizens. Some of the risk factors other than age for which evidence emerged were largely predictable, for example immunosuppression, whereas some such as obesity were less obvious until the data appeared.

Section 12: Long COVID

The nature of 'Long COVID'

- 12.1. Our initial planning for COVID-19 took no account of the group of chronic (prolonged) syndromes which have subsequently become known as Long COVID. It was not that the possibility of some chronic sequelae was not accepted, but rather that the nature and scale of it was not foreseen.

- 12.2. The fact that post viral syndromes occur, and indeed postinfectious syndromes more widely, does not however mean that Long COVID as it manifested was predictable. Different infections and different situations leading to different syndromes are common. Some very severe diseases rarely have post infection syndromes whilst other relatively trivial infections can have quite common and prolonged ones. It is therefore both true, but also largely unhelpful, to say 'there might be a postinfectious syndrome'. In itself this would not obviously have helped us respond in the initial period.
- 12.3. Within what we currently call Long COVID, there are clearly several syndromes, and they have not yet been fully elucidated. In those who were admitted to intensive care these include an overlap with the well documented post-ICU syndromes. For example, a group of symptoms is associated with chronic scarring of the lung visible on CT scan, something frequently observed in other patients treated by mechanical ventilation.
- 12.4. Separately, there is in some patients an overlap with the post-infectious chronic fatigue syndromes, for example that which may occur after Epstein-Barr virus or dengue fever among other infections. There is certainly another group of symptoms which occur after COVID-19 which seem relatively specific to this infection and have some similarity to PoTS syndrome (Postural orthostatic tachycardia syndrome), caused by autonomic dysfunction amongst other factors. Within all these there is a range in the severity and longevity of symptoms. There may also be overlap between them. I make these points because lumping all the syndromes covered by the term Long COVID together as a single entity may do a disservice to those affected who will have a very wide range of outcomes both functionally and over time. It also makes identifying treatments less easy.
- 12.5. Although rarer, there are also chronic post COVID-19 syndromes in children. These overlap with, but are not always the same as, adult Long COVID - for example the syndrome PIMS-Ts (Paediatric Inflammatory Multisystem Syndrome) is a post-COVID-19 immune syndrome.
- 12.6. It follows that it is very unlikely that the same interventions will treat all of the syndromes currently referred to as Long COVID.
- 12.7. The fact we did not recognise that Long COVID would be a significant part of the disease burden of COVID-19 early in the pandemic has however had important practical implications. Broadly, our initial assumption was that if people caught COVID-

19 they might have severe disease, but if they survived in the great majority of cases they would not have long-term symptoms of functional importance. This is the case for the majority of respiratory infections of epidemic potential. In this the UK was not in any way an outlier - it was a reasonably common assumption. Recognising that the syndromes that make up Long COVID were something which could occur at any age (although not distributed randomly across ages), including in people who neither had acute severe disease nor obvious risk factors, made us more cautious of the effects of COVID-19 in young and otherwise healthy adults as the pandemic progressed.

Research response to 'Long COVID' syndromes

- 12.8. Once the group of syndromes that make up Long COVID were recognised, there developed a major international research effort to delineate the syndromes, determine their incidence, prevalence and outcomes, and most importantly identify potential treatments for trials. The UK remains one of the major contributors to this research effort, and the NIHR which I headed for the early part of the pandemic was a major part of this. Some of the early work is outlined below, but research continues and is likely to do so for some time.
- 12.9. On 25 June 2020, the OCMO asked the Health Protection Research Units (part of NIHR) to undertake a literature review of the longer term health impacts of COVID-19 (**CJMW4/220 - INQ00069876**). This was published in October 2020 (**CJMW4/221 – INQ000236442**).
- 12.10. In July 2020, NIHR and UKRI funded the Post-HOSPitalisation COVID-19 study – a national consortium to understand and improve long-term health outcomes (PHOSP-COVID). This made available £8.4 million to assess the impact of COVID-19 on hospitalised patients' health and recovery. The study established working groups across multiple clinical areas including renal, cardiac and metabolic, pulmonary, lung fibrosis, mental health and neurology, intensive care, immunology, airways disease, and rehabilitation and inflammation.
- 12.11. In November 2020, NIHR and UKRI launched a Long COVID research call focused on understanding Long COVID in the community. This funded four studies at a cost of £18.5m and included:

- REACT: this study aimed to better understand the genetic, biological, social and environmental signatures and pathways of Long COVID;
- TLC: this aims to identify treatments for Long COVID; and
- CloCk: a study intended to characterise symptoms typical of Long COVID in non-hospitalised children and young people. It also aims to assess risk factors, prevalence and how long the disease may last.

12.12. On 25 March 2021, NIHR launched a second call for research into Long COVID. This funded a further fifteen studies at a cost of £19.6m, including:

- STIMULATE-ICP (Symptoms, Trajectory, Inequalities and Management: Understanding Long COVID to Address and Transform Existing Integrated Care Pathways): the study aims to assess the efficacy of drugs to treat Long COVID;
- LOCOMOTION (Long COVID multidisciplinary consortium: optimising treatments and services across the NHS): intended to identify and promote the most effective care for Long COVID patients, ranging from accurate assessments in specialist clinics, best practice in surgeries, and home monitoring methods to show flare-ups of symptoms; and
- CICERO (Cognitive Impairment in Long COVID: PhEnotyping and RehabilitatiOn): a project to determine which elements of brain function are most affected in people with Long COVID.

12.13. In addition, the Long COVID Research Group was formed by researchers leading Long COVID studies in the UK to share key findings and promote rapid knowledge exchange. The PHOSP-COVID consortium was formed by the researchers who came together to run the Post-hospitalisation COVID-19 (“PHOSP”) study.

12.14. In total, over £50m of Government funding has been invested in Long COVID research projects, much of which was undertaken under the auspices of the NIHR

Non-research measures for Long COVID

12.15. Separate to the research commissioned into Long COVID, the Government and NHS responded broadly to its emergence in three ways. The first was to move even more sharply away from the concept that it was possible to identify those at risk from COVID-19, protect them and then allow everyone else to be infected as recommended by

adherents of the Great Barrington Declaration and similar schools of thought. Shielding those identifiably most at risk would have done very little to reduce the risk of Long COVID syndromes as most were younger; reducing community transmission did reduce the risk. The second was the establishment by the NHS of specialist Long COVID clinics to concentrate expertise, mainly for the benefits of the patients affected, but also to learn as much as possible in a clinical setting. Finally, we discussed the phenomenon with other nations, in particular the USA where significant research was also, and is also, being undertaken.

- 12.16. Various structures were involved in this effort, although I was much less involved directly in these. These included the Long COVID Oversight Board- an official-led meeting, which provided a forum for a whole-system overview of activity to address the challenges posed by Long COVID. This was attended by DHSC, NHS England and Improvement, relevant arms length bodies and other government departments such as the Department for Education and Department for Work and Pensions.
- 12.17. Lastly, I was involved in trying to assess whether data coming from studies implied that countermeasures, and in particular vaccines, reduced the incidence or severity of Long COVID. If so, it was also necessary to identify what proportion of this was due to reduced infection incidence, and what proportion was a result of disease modification. This is still not a fully settled question. The evidence currently available is that vaccines do reduce both the incidence and severity of Long COVID, although not to zero (**CJMW4/222 – INQ000236459**). This is, if it is needed, a further argument in favour of vaccination, but given that we were already giving liberal vaccination advice it did not in practical terms change our approach.

Section 13: Reporting COVID-19 deaths

- 13.1. To make sense of any discussion of mortality reporting, it is important to lay out a few of the key principles around the reporting of deaths. This is explored in greater detail in the Technical Report. I was not ultimately responsible for decisions around the reporting of deaths, but I did contribute to them and agree with them. I was not involved in operational matters around the reporting of deaths, or the route by which these figures were reported in to DHSC.

- 13.2. There is no ideal way of reporting COVID-19 deaths within the UK, and the difficulties are considerably greater when it comes to comparing COVID-19 deaths between different nations. This is a product of the completely different testing regimes used across different countries, as well as the different testing capacity, different criteria for ascribing a death to COVID-19 and their different demographic structures. For instance, given its disparate impact on older individuals, countries with on average older populations often saw more deaths on a per capita basis than those with relatively young populations; those countries (including the UK from mid 2020) that tested more inevitably identified more COVID-19 cases and consequently ascribed more COVID-19 deaths.
- 13.3. A very high proportion of those who died following COVID-19 infection were older patients with multiple pre-existing significant medical problems, and some were very frail. In the great majority of cases, COVID-19 probably contributed to the death, but its contribution could be anywhere between being the sole cause, through to being a subsidiary contributory factor. The closer in time the death was to a diagnosis of COVID-19 the more likely it was that the infection was a significant reason why the death occurred at that point in time. On the other hand, some causes of death from COVID-19, in the sense they would not have occurred if the infection had not occurred, could be delayed by many weeks; these might include people recovering from an ICU stay but who had a cardiovascular event such as a stroke or heart attack in the weeks following an infection, which was itself made much more likely by the infection. In some cases, it was therefore obvious that someone had died of COVID-19, and in others it was not clear at all even to the attending doctors how important a factor COVID-19 had been. There was therefore a debate about whether the best way to classify a death as due to COVID-19 was based on death certification data, any death within 30 days of a proven infection, or any death within 60 days of COVID-19 diagnosis.
- 13.4. My own view, expressed at the time, was that at a population level (as opposed to at an individual level) the best measure was age adjusted all cause excess mortality (**CJMW4/223 – INQ000068985**). This has a number of advantages, including picking up indirect mortality due to COVID-19 and its impact on the health system, even if the individual person did not themselves even contract COVID-19. It also picked up deaths caused by COVID-19 (both directly or indirectly) in the first wave of the pandemic when testing was not widely available, and so in many cases the diagnosis will have been missed.

- 13.5. All cause excess mortality also made international data more comparable provided it was age-adjusted, as nations varied considerably in their case definitions and testing capabilities and strategies. Even this is however not straightforward. The easier part of all-cause mortality is determining the number of deaths; in a system with good death registration and transparency about reporting this is simply a question of fact. Working out what the 'normal' mortality rate would be absent COVID-19 is however more difficult than many expect as changes in demography can have powerful effects. Different years also have different mortality rates depending on meteorological (cold, heat) and infections (bad 'flu years for example) and the baseline can therefore depend on which years are chosen as comparators. Therefore, what is 'excess' still has a fair degree of variability depending on the methods used.
- 13.6. Despite these limitations, I still consider that age-adjusted all cause excess mortality is the least bad option for looking at COVID-19 mortality over time in the UK at a population level, and with even greater caution, between countries. What it could obviously not help with was identifying the cause of death at an individual level.
- 13.7. The decision to move to classifying a death as having been from COVID-19 where it occurred within 28 days of a positive COVID-19 test represented a compromise choice. It reflected the reality that in any very frail population, someone might naturally have died in any event over a month after having had a positive COVID-19 test from an unrelated illness. I was not the driver of this technical decision, but I thought it was a reasonable compromise between the various possibilities based on rational decision-making.

Section 14: COVID-19 public health communications

Role of the CMO in communications

- 14.1 I was involved in providing scientific, clinical and public health communications throughout the pandemic to the general public. This was most visibly done by televised live press conferences, usually with the Prime Minister or other Ministers and the GCSA. I also undertook some individual press conferences out of DHSC, joint press conferences with the GCSA and some background press conferences to inform journalists which were not directly quoted. I used meetings open to both the public and the press to lay out some scientific thinking and public health messages, in particular

appearances before Select Committees in Parliament which often received wide media coverage.

- 14.2 My role in these was technical, as in my view it should be. Where I had a choice, I confined myself to information or advice that in my view the public would find useful in their response to the pandemic. This was typically the questions they would normally ask of a doctor, public health specialist or scientist. It was not my role to explain, defend or attack Government thinking or actions when these were not technical. The Prime Minister or Minister leading the press conferences rightly expected to take the role of explaining Government thinking.
- 14.3 There was much misinformation and disinformation during COVID-19. Here I would differentiate very sharply between a significant number of citizens with entirely legitimate concerns and questions during a very frightening period, and a small number of sometimes malign actors whose principal aim was to persuade others not to take COVID-19 seriously or to fear medical or other countermeasures, including vaccines. In respect of the first group (concerned citizens), I considered it very firmly my job to understand people's concerns as best I could, and to address these concerns as directly, clearly and honestly as I was able. This is normal medical practice.
- 14.4 The task was more complex in respect of those deliberately seeking to place misinformation. Repeating their false myths with the aim of knocking them down was more likely to alert people not previously aware of their deliberately provocative and inaccurate (or dishonest) narrative, amplify its content and in doing so, potentially cause further confusion. My approach therefore was to simply provide accurate information and not engage directly with deliberate misinformation.
- 14.5 I do not recall a situation where the Prime Minister put pressure on me not to express a view in public. The rules of engagement were essentially clear, whilst not explicit. I did not talk to the media or publicly unless I was asked to by Ministers or exceptionally with clearance from relevant senior communications officials. In return, I never had any pressure to modify what I did say in answer to any public question. Occasionally my answers to questions were uncomfortable for the Government, but I was never criticised subsequently by the Prime Minister, other Ministers or communication leads for this.

14.6 In part this reflects the independent nature of the CMO role within Government. More importantly however, the Prime Minister and wider Government accepted that the main benefit of me giving advice and opinions in public was that I was obviously free to say what I thought was technically correct. The public could therefore trust that the advice was a professional opinion rather than the Government line. In my view, professional advice from any profession, including medical, scientific, legal, military or economic is only useful to the extent that it is an accurate reflection of the professional view of the person giving it. This does not mean the advice is right, but it is at least independent, and known to be so.

Communications by others

14.7. I considered the decision by individual scientists on SAGE to contribute to media, often on repeated occasions, to be an overall positive. There were however some significant risks. Several of the scientists involved were extremely good and articulate communicators of science. The reason they were on SAGE was because they were seen to be some of the best scientists with relevant experience in the UK and having them explain the science as then understood directly to the UK population was a good thing. Many non-SAGE scientists were also very good and accurate communicators of science and the general public benefitted substantially from their insights. Some of the non-SAGE talking heads commentating in public, including people with academic positions, did not in my view always have a full grasp of the technical details or had relatively minority (or even fringe) opinions. Having the best scientists also in the public sphere avoided the less mainstream opinions having a monopoly at a point when the public was extremely keen on accurate information.

14.8. SAGE was, rightly, made up of major scientists with varying opinions, especially when the data were ambiguous or absent. As a result, there was not always unanimity in SAGE, nor would that have been desirable. On some occasions, scientists who were part of the SAGE system chose to argue their own position on a contested issue in public, either by direct briefings or indirectly as an anonymous source. I was not always convinced this was a sensible thing to do; there is always a spread of opinion (indeed avoiding group think is important) and the point of the system is to try and find a midpoint of contemporary scientific opinion. It was however their right as independent academics provided they did not express their view as the opinion of SAGE.

- 14.9. It is important to remember that there were from the very beginning of the pandemic broadly two outlier opinions in the scientific mainstream: that we were doing far too much as this was going to burn its way out, probably by immunity; and that we were doing far too little and should be aiming for zero COVID (**CJMW4/224 – INQ000203964, CJMW4/225 – INQ000064527**). The central position in science, both in my own personal view and the one put forward by SAGE, was between those two extremes. Had SAGE scientists not engaged in the media, I think these two outlier positions would have achieved even greater prominence, leading to confusion in the public mind.
- 14.10. In my view the COVID-19 public dashboards, which I had no part in designing or commissioning, were a triumph of communication of science and public health. They were purely factual, based on solid data, and spared many details which were of limited interest to most people. They were also picked up a lot by journalists who amplified their message. Inevitably, they were not relevant to everybody, but to a large segment of the population they were a popular, trustworthy and useful resource. I would like to pay tribute to those who designed them.

The public narrative

- 14.11. My expertise is not as a public communications professional. I therefore did not contribute to the details of the various campaigns, except to be consulted about whether they were scientifically wrong.
- 14.12. The Inquiry has asked whether I consider the UK Government's public communication to have been characterised by a 'fear' narrative. I can only answer on the basis of my own aims and actions. I tried through various media ranging from press conferences to a Gresham lecture to provide a balanced understanding of the risks at both an individual and population level. One example of my way of trying to explain this was laid out in this publicly available slide (very similar to what I also said in press conferences):

“ At an individual level the chances of dying of coronavirus are low.

- *Over the whole epidemic, even if there is no vaccine, a high proportion will not get it.*

- *Of those who do, a significant proportion (exact number not yet clear) have no symptoms*
- *Of the symptomatic cases, the **great majority** (around 80%) a mild-moderate disease.*
- *A minority have to go to hospital, most need only oxygen. The great majority of these survive.*
- *A minority of those need ventilation.*
- *A minority of every age group sadly die with current treatment, but even of the oldest group most do not.” (CJMW4/226 – INQ000236408).*

14.13. This formulation was subsequently misused repeatedly by antivaxx propagandists to imply I said there was no risk from COVID-19, which is clearly false. I thought however it was important that people did not live their lives with an exaggerated fear of COVID-19, but rather had a balanced view of their personal risk but also the substantial risk to more vulnerable people, and at a population level the high number of potential deaths given the very high numbers infected. In my view, this balanced view of risk is exactly what the general public had. I consider for example that the great majority of younger citizens who took significant social and economic hits to adhere to government guidance were fully aware of the fact that their personal risk of mortality was extremely low, and they were doing it principally to protect more vulnerable others, most of whom they would never meet. This altruism was very admirable.

14.14. I do not, and have never, considered that excess fear is an appropriate communication strategy from healthcare professionals. Neither however is glossing over risk. If anything, the fact we did not appreciate the importance of Long COVID may have led to an under emphasis on the risk to younger and otherwise healthy individuals. A balanced view of risk is important to individual as well as population decision making.

Effectiveness of communications

14.15. I consider the Government’s communications efforts, including mine, to have had mixed success. On the positive side, I think they were accurate to the best of our ability based on what was known at the time and given the extraordinarily compressed timescales, once we had worked out approaches to visualisation of data which were reasonably clear. The fact that people understood the messages in the main I think was demonstrated by the extraordinary adherence to public health messages that was

seen throughout the pandemic. Some key scientific concepts such as R were in my view communicated relatively effectively. The general population engaged with often quite complex data to a degree which I think surprised some onlookers (but not me; my experience as a doctor has been that the great majority of people are very interested in, and have a sophisticated understanding of, data when they think it is relevant to their lives or those of their families).

14.16. There were however some significant limitations. We certainly did not manage to communicate as effectively with some groups, including some ethnic minority and linguistic minority groups, as we should have done. This was particularly true early in the pandemic. Getting the emotional tone right between false reassurance and stirring excess fear was quite complex; my role was relatively straightforward in the sense that it was simply to provide the facts but for those involved in public communications, including advertisements, more complex judgements had to be made. I do not feel qualified to judge whether these were the best under the circumstances, and would fully acknowledge that they were very difficult calls.

14.17. Like the GCSA and the DCMOs, I considered the concept that the Government was 'following the science' to be a misunderstanding, and potentially a misleading one. As laid out above, the decisions political leaders and other core decision-makers were taking were informed by the scientific and medical evidence available at the point in time the decision was taken. They were however also rightly informed by economic, social, political, diplomatic, operational, political and other issues. That Government was informed by the science of the moment, alongside many other inputs, is a more accurate formulation, albeit a less snappy one. At no point did I consider Ministers constrained my ability to express my understanding of the science of the time in Government, or to the public.

14.18. Whilst we did not state for every fact in a press conference or communication exactly how the division between scientific advice and political decision was split, in my view this was understood by the great majority of the public. Neither the GCSA, the DCMOs nor I were prepared to present data with which we were not personally comfortable. This sometimes involved a process of negotiation with communication teams who were keen to present a clear narrative. I never felt that this was intended to deceive, but rather it was an attempt to simplify which in my view occasionally extended to oversimplification.

- 14.19. In written statements by the Prime Minister and other Ministers when we were also at the podium, the GCSA and I usually had prior sight of what would be said in the scripted statement and the ability to correct technical scientific or medical errors in advance. For errors of fact made by Ministers or others in answer to questions, where I felt it was material I tried as best I could to correct it contemporaneously. At no point was I subsequently challenged on my decision to do so by the Prime Minister or others, even when this was occasionally embarrassing. Many minor errors were simply a matter of a slip of the tongue or minor misremembering, including by me, the GCSA and DCMOs as well as by Ministers. We tried to correct these rapidly when they were material, and in subsequent press conferences when they were largely technical.
- 14.20. There was always a tension between expressing a clear central view so that the public understood the point, making clear that there was some uncertainty (particularly early in the pandemic), and spending so much time caveating the view that the central message was indecipherable. Communicating via the relatively short exposure during media clips and press conferences imposes very significant limitations and getting the balance right between these is not at all easy. My sense, based on feedback, was that people were aware that we had uncertainties; the exact details of these were probably neither possible to communicate accurately nor particularly important to communicate given the time constraints and the need for clarity.
- 14.21. In my view there was no point at which we had been so definitive on an issue that when we had to change position as the scientific midpoint changed (for example on facemasks) this was not understood and accepted by the reasonable majority.
- 14.22. The Inquiry has asked whether I thought there was an overemphasis in communications on surface transmission and hand washing in the initial period of the pandemic, and an under emphasis on airborne transmission and ventilation. In terms of the balance of time spent talking about these, undoubtedly were we to rerun the scientific communications at the beginning of the pandemic we would put more emphasis on airborne transmission and in particular ventilation. It was not however dichotomous; from early in the pandemic the importance of outdoor spaces was strongly emphasised in the practical advice. Hand washing is a simple technique which was and remains relevant. The ratio between these undoubtedly shifted as the scientific understanding evolved but changes in the scientific consensus were inevitable with a new infection and we said so from early on. I do not consider this was a major contemporaneous error based on the information at the time.

- 14.23. I had, and have, no data on which to base the impact of public reports of alleged or proven breaches by senior Government officials of the rules. At the time, my view was that whilst these undoubtedly caused considerable and understandable anger, the average person made decisions about their own behaviour based on their own judgement of what was right and wrong to protect others. I continued to make the scientific and public health points and acted on the basis that the majority of the population probably continued to act according to their own view about what was the correct approach, irrespective of what those in Westminster and Whitehall did, and did not take senior Government figures as their role models. The most corrosive element was any undermining of the sense of fairness- we are all in this together and the rules apply equally to all. From the beginning fairness was emphasised, for good reason, by SPI-B and SAGE as essential to maintaining public support for measures.
- 14.24. On 31 October 2020, the GCSA, at the request of the Prime Minister, presented modelling data relevant to the decision to impose a second national lockdown; I was present in support of the GCSA. Neither he nor I particularly liked presenting modelling data in press conferences due to the very wide uncertainties involved which were difficult to explain in the short time available. As I have said, wherever possible I avoided doing so and preferred to use actual data. Nevertheless, it had some importance for the public and in decision-making so it was a reasonable request from the centre to expose it to public view.
- 14.25. There was at the time a criticism, mainly from those who did not want to support a lockdown or other NPIs, that some of the scenarios presented were out of date. This of course was true; most scenarios will be out of date to some degree at the time they are presented. The question is whether they were misleading in terms of the broad thrust of the pandemic and the implications for public behaviour. Those criticising the scenarios appeared to want to believe that a lockdown or other new social measures could be avoided because a bad outcome was not going to occur if they discredited the models.
- 14.26. The virus of course pays no more attention to debates around models than it does to religious festivals. It was back to doubling, and in the context of going into winter and a still largely immune naïve and unvaccinated population, it was not clear why it was not going to continue to double without action. The exact path was debatable; the direction of travel was clear. Some of the attempts to discredit what was essentially a

simple point about exponential increase were either based on restricted understanding of doubling or were in my view disingenuous. It is worth re-reading some of the criticism of the time, and then comparing it to how the reality played out over the next few weeks.

The UK's approach to communications

- 14.27. The particular format that the UK Government chose to use for the press conferences was unique to the UK, but the broad approach was quite similar to a number of other countries. The approaches generally split into those where the political leader took the press conferences in practice on their own (even if scientists were present in the room), those where the scientific/public health leads held the press conferences on their own without political input, and those which were a hybrid.
- 14.28. There are arguments for and against each of these but in the context of a prolonged emergency the hybrid model had some advantages. There were major issues around what the Government was deciding to do, and these were in my view best fronted by, and questions answered by, the Prime Minister and other elected political leaders who had taken a decision on behalf of the public. It is not the job of scientific or medical advisers to defend or criticise Government policy. Ministers are also highly experienced at communicating to the general public via media; this is a key political skill. At the same time, there are important medical, public health and scientific questions which the general public wished to know the answer to and which it was not realistic to expect political leaders to be able to provide, particularly in a question and answer session. The hybrid model allowed both to occur.
- 14.29. On a few occasions political leaders asked us to do press conferences or other media without politicians present. These were generally where the Government had not yet made a formal decision but wished the general public to understand the underlying epidemic.
- 14.30. Some countries chose to have a single scientific voice. I am glad that for this prolonged and major pandemic the UK model allowed for a restricted rotating cast of scientific and health advisers with different communication styles. The strain of press conferences to those of us not used to them was very considerable, and preparation for them was extremely time-consuming. It also meant that when one of us made a slipup or communicated poorly (I have given the example of my communication around 'behavioural fatigue') we were not the only voice which could become discredited by a

poorly expressed answer to a single question. Therefore, although it led to some risk that the public could become confused by a rotating cast, on balance I think the benefits of this model for an emergency running over years outweighed the disadvantages. Had it been an emergency of a few weeks, a smaller cast list would probably have been better.

- 14.31. There was some degree of specialisation in the communication roles we tended to take. Purely scientific data tended to be presented by the GCSA, clinical data by me, vaccine data by Sir Jonathan Van-Tam and so on, but we were all capable of answering questions on any of these subjects as we had formed a collective scientific view.
- 14.32. The Inquiry has asked what problems I believed were caused by any apparent alignment between me as CMO with the Prime Minister and other Ministers in broadcasts and briefings, and whether we should have distanced ourselves more from them. I was well aware that multiple voices, including many I respected, made public calls for me and the other clinical and science advisers to distance ourselves (or still better speak out against or denounce) the Prime Minister and other Ministers. In my view however the separation of roles was clear to most reasonable observers. I was a professional technical adviser, and restricted as best I could my public comments to that role. I tried very hard not to comment, positively or negatively, on the policy decisions of Ministers, and not to criticise individuals whether Ministers or others, even if it might on occasion have been popular to do so. On occasions if asked in a press conference I would say if I thought government policy was unlikely to work- that is a technical judgement. I usually only did that when I thought there was some public health benefit to doing so. Some of those asking for me to dissociate myself from government I think saw a very neat division between communication on the one hand, and being able to give scientific advice on the other, and would have liked my communication to have been entirely separate to the government's. Policy and communication are however linked at multiple levels. In my view the fact we were giving commentary with the Prime Minister meant the scientific advice was much more clearly conveyed to a wider audience than if we had not been. The advantages of that for public understanding and public health outweighed the disadvantages of appearing to some to be too close to the Prime Minister in my view. There were plenty of senior scientific and medical leaders, occupying positions where they were not working closely with Ministers, who were perfectly capable of providing a running public

commentary on and critique of government policy (and did); that is not the role of the CMO.

Section 15: Public Health and Coronavirus Legislation and Regulations.

15.1 Although I gave public health advice based on SAGE deliberations, usually in concert with the GCSA, I was not involved in any meaningful way in drawing up legislation and regulations, which is not my core skill set. OCMO was sent drafts of the coronavirus regulations to review and comment on the accuracy and appropriateness of some of the medical/scientific references in the provisions. I did occasionally query whether legislation or regulations were proportionate, but this was usually at the political or policy stage rather than at the point of drawing up formal documents. I was not involved in enforcement. I had no view on whether criminal or civil sanctions were the correct mechanism for enforcement. In my view, this was an issue for elected politicians informed by legal advice. I gave no advice on whether to use the Civil Contingencies Act or public health legislation since it is a question of law.

Section 16: Lessons Learned and Recommendations

Introduction

16.1. My main contribution to lesson learning is the *Technical Report*. This 381 page report contains many lessons learned and I hope that in combination this report, and this and my other witness statements, pull out many of the key lessons to be learned from a perspective of a CMO. I was also involved in reviews and reports to learn lessons with the GCSA among others, including:

Date	Activity
April–November 2020	The Royal Society: Data Evaluation and Learning for Viral Epidemics (DELVE)
June–September 2020	Sir Adrian Smith review of the immediate lessons learnt from COVID-19
June 2020	Beyond the data: Understanding the impact of COVID-19 on BAME groups

July 2020- July 2021	Academy of Medical Sciences Winter Risks work
July 2020	DHSC COVID-19 Lessons Learnt Review
January 2021	Science and Technology Committee – the UK response to COVID-19: use of scientific advice
May 2021-July 2021	National Core Studies (NCS) Lessons Learnt Exercise
May 2021-March 2022	SAGE sub-group review
September 2021	SAGE Participant Away Day
October 2021	Health and Social Care Committee and Science and Technology Committee – Coronavirus lessons learnt inquiry
February 2022	British Academy and Academy of Medical Science: Historic and Geographic Patterns of Health Inequalities

16.2. Below I outline some reflections and lessons learned I consider to be of particular importance for the future, and the Inquiry's work on Module 2. Some of these have already been set out in this lengthy statement, but I repeat them here so that the Inquiry has them all in one place and because they answer specific questions that have been posed in the Rule 9 request.

Provision of Scientific Advice to Government

16.3. The SAGE mechanism is not perfect, but it is in my view highly unlikely that not having it would have led to better outcomes. In return for some delay (usually no more than a few days, and sometimes only a few hours) it led to a unified view bringing skills from multiple sciences. It is not obvious there is a better model internationally. I regret that the Minutes were not published at an earlier stage, but from a scientific perspective I think SAGE and its subcommittees achieved what it was supposed to which is to give policymakers a central view that reflected contemporary scientific understanding. SAGE also proved able to change its mind as the science developed, which is a key characteristic of an effective scientific advisory system. I would certainly have found it considerably more difficult to feel confident that I was giving scientific advice which reflected the centre point and range of contemporary scientific opinion if SAGE had not existed.

- 16.4. In saying this, I would like to pay tribute to the individual scientists on SAGE, who put in huge amounts of effort and time, the SAGE Secretariat, the subgroups and scientists who fed into them from across the UK, and the very able chairing of the GCSA. It was an immense amount of work over a prolonged period in an occasionally hostile environment. Ultimately however, the point of SAGE was to inform core decision-makers. They are therefore the people who should judge to what extent it was successful.
- 16.5. Overall my view was that collaboration between SAGE, its subgroups and the wider scientific community was always reasonable, and mainly good, throughout the pandemic. The principal route by which subgroups fed their information and views into SAGE was through the chair of the subgroup being on SAGE and representing the views of the group, in return taking back questions of clarification or any further analysis requested. Two key sub-groups (SPI-M-O and SPI-B) had two co-chairs which helped to deal with people not being available at particular points and also widened the understanding of what the subgroup said. Inevitably, individual members of subgroups occasionally felt their insights were being given insufficient weight. In my experience however, the GCSA tried very hard to ensure that all ranges of opinion were reflected. The issue which occasionally caused friction was when individual subgroup members chose to use the press as a way of continuing a scientific argument within a subgroup or amplifying their personal perspective; fortunately this was relatively rare.
- 16.6. The Inquiry has asked whether I was aware that the GCSA requested participants in SAGE to edit their reports. I am not aware that the GCSA personally did (he may well have, but I am not aware of it). There were several occasions when SAGE as a body having debated a paper from a subgroup suggested changes before it was finalised- I do not consider this in any way unusual, and happens the whole time in academia. For example papers submitted to journals will always be revised, and sometimes substantially revised or cut, in the light of comments from referees and editors before they are accepted for publication. These requests would have been communicated via the SAGE secretariat in GO-Science. Very few papers, in my view, are not improved by editing suggestions from other scientists, even if unwelcome to the authors, and for this reason it is normal academic practice, although the exact mechanism varies between disciplines. The GCSA and I were both alive to the difference between scientific advice and policy advice; SAGE and its subgroups were there to provide

- scientific advice to inform policy, or advice on the likely scientific implications of one policy compared to another.
- 16.7. The Inquiry has asked whether I was aware that there was frustration among some SPI-B members that their advice was not always adopted, or not adopted in the way they would have liked. I was aware of it. The SPI-B co-chairs, for whom I had great respect, communicated that very clearly. Even without that I would not have had much difficulty in knowing as some of the members chose to make their views known in the media on multiple occasions, and several joined independent SAGE as well as being in SPI-B. I was not convinced at the time that that was the most likely way to increase the influence they had in government decision making. I had had a very positive experience of the large positive impact anthropological insights had on combatting the Ebola crisis in West Africa in 2014-16, and so was concerned the input of behavioural science (a different discipline) in COVID-19 was less effective. In retrospect I think we should have broadened the scientific range of SPI-B. It had several excellent behavioural scientists, and very good co-chairs, but at times additional skills including anthropology, marketing science, political science and others would have been valuable.
- 16.8. The Inquiry has asked whether the existence of SAGE without balancing information from the economic and other fields led to an unbalanced approach in Government. In particular, it has asked whether the 'voluminous' scientific advice unbalanced the advice in Government. I do not think it is for me to determine how the Chancellor, Prime Minister and other core decision-makers choose to get their economic advice, or indeed advice on any other technical topic unrelated to science, medicine or public health. I have laid out my view on the importance of economic and other advice (but not via the SAGE mechanism) in my answers to questions during Module 1, as well as in this statement.
- 16.9. It is however worth repeating that I do not think that anyone who properly understands the situation we were in would seriously argue that there should have been less advice from SAGE, less scientific data to underpin that advice, or less advice available in the public domain for people to interrogate and comment on. I am therefore confident the answer to this question from the Inquiry is not that there should be less advice from SAGE in this or any subsequent emergency. Decision-makers can of course take or leave that scientific advice as they see fit. Here I would like to differentiate between

two elements of this; the transparency of the data and underlying papers, and the integration mechanism through SAGE.

- 16.10. On transparency, the lack of availability to those outside the Treasury of the economic advice may well not have helped rational decision-making for Ministers who were not privy to it, and arguably it would have helped transparency for the economic advice to be available to be interrogated both by Ministers and by academic and other independent experts in the same way that the scientific data were. This is however entirely a matter for the Treasury, Cabinet Office and No 10. The integration of economic data using a Government and independent expert panel in a similar way to how SAGE operates has been proposed at various points but has never been taken up, and so I assume is not considered to be helpful by the decision-makers who are ultimately the people who need to use it.
- 16.11. Whilst it was widely understood and agreed by economic advisers that getting on top of the pandemic was essential for the economy, from the raising of the first lockdown all the way through to the end of the period of interest to the Inquiry there was some degree of tension, entirely appropriately, between the optimal public health outcomes and the optimal economic outcomes. Ministers had to balance this tension. This will also be true in any future pandemic. Those seeking to learn lessons in the future will have a lot to draw on from the science side. All the minutes of SAGE and its subcommittees were published alongside the underlying papers; the GCSA and I were present in many of the key meetings minuted by Cabinet Office; we had daily press conferences at which the GCSA and I or the DCMOs answered questions from the public and the media about science and medicine. In addition, we had multiple, independent media meetings, briefed parliamentarians and the key issues were debated by protagonists from different scientific disciplines every day across the media. In our Technical Report we brought together many of the lessons we learned for our successors and put it into the public domain. Those facing future pandemics looking for the economic advice and the analytical basis on which it was founded will find it much harder. Most of it I did not see, even though I was in many of the key meetings (economists, rightly, could see all the science and public health advice).

International comparisons

- 16.12. The Inquiry wants to know whether I felt we learned sufficient lessons from other countries. I can say with confidence we learnt a large amount from other countries at

all stages of the pandemic, and in the early stages of the pandemic were entirely reliant on data from them. Against an absolute standard of getting the maximum information from other nations, the answer will always be no, we could have learned more and the same will be true for every single nation globally.

- 16.13. I would divide up what we could learn from other nations into three groups: data and epidemiology; scientific insights; policy and political choices. For data and epidemiology, I think there was a very serious attempt in the UK to get the maximum information we could internationally, with the biggest limitations being the capacity of some nations to undertake full analysis (for example on genomics) and in a few cases the unwillingness of governments to share. A practical issue that arose was that most people in the UK who were able to interpret the international data were also involved very heavily in the UK response, so had multiple calls on their time. Science was shared internationally as it always is and again a serious attempt was made to get scientific information from wherever it could be found. It is of course always possible to have done more, but judged against a reasonable bar of what was achievable in the middle of an exceptionally fast moving situation in every nation in the world, it is not really obvious to me how we could have done a large amount more, nor that it would have changed the outcomes significantly.
- 16.14. Whether we learnt enough lessons, or the right lessons, from international policy and political choices is largely subjective. Most Western democracies followed a broadly similar approach. In some cases, commentators like to highlight the differences, but these are not as great as are sometimes claimed. There were occasions on which we actively chose to break from the consensus with, in the technical sphere, the decision to delay the first dose of vaccines being an example. In retrospect this decision looks prudent, but it was one which was highly contested internationally at the time and some of the commentary surrounding it was fairly hyperbolic. In general however, we were learning lessons from other nations throughout the entire pandemic and benefited greatly from doing so. Most nations and their scientists were very willing to share information even when they were under great pressure, and I hope and think the UK also shared widely with others.
- 16.15. There was a genuine difference of approach between China; some other East Asian countries, notably South Korea; Australia and New Zealand; and other high or middle-income countries around the world with large older populations notably in Europe. Their approaches were also different from one another. The easiest comparator to the

UK is Australia and New Zealand. The approach taken by these two nations relied in large part on being able to largely stop international travel and therefore minimise introduction and reintroduction. Their geographical situation and much more widely dispersed population made this a realistic possibility; the practicalities of undertaking this in the UK would have been very different over a pandemic likely to last years. It is worth noting in passing that although New Zealand is, reasonably in my view, held up as a country which took a very effective approach to COVID-19, there is a much more mixed view domestically in New Zealand and also Australia of their own response. In both these nations, had the vaccine taken longer to arrive, which was not predictable at the start of the pandemic, how their response is now viewed both domestically and internationally might well have been different.

16.16. China, and to a lesser extent South Korea, took a notably different approach to most Western nations. In the case of South Korea, this was in particular during the early part of the pandemic, and was built on their relatively extensive case finding, isolation and testing capacity. Their view expressed to me was that they invested to build this up after a bad although limited experience of MERS in 2015. I professionally admire the technical response of the South Korean public health system to COVID-19, especially in the early months. It was however predicated on increased investment in public health post-2015, specifically health protection. This was not something experienced in the UK over the same timeframe. It is also worth noting that the South Korean response relied upon some means of surveillance which might not have been acceptable in the UK, although that would be a political decision.

16.17. In the case of China, their response was built on very substantial curbs on civil liberties, even greater than those seen in Western democracies. In all these responses the initial decisions by governments delayed the onset of the worst of the pandemic, but eventually exit waves did occur with significant loss of life. These were lower than would have been the case had a vaccine not been available. The possibility, and if so timing, of a vaccine and other medical countermeasures was one of the great unknowns at the beginning of the pandemic. Had we known when a highly effective vaccine would be available, the arguments for stronger social measures that delayed the largest waves would probably have been greater. There were however significant social and economic costs to the approaches taken in China, Australia and New Zealand and in my view we would have found it considerably more difficult than Australia and New Zealand to follow the path they chose given their relative isolation. In my view, the example of South Korea demonstrates the advantages to investment

in health protection capability if the aim is to reduce subsequent impacts from major epidemics and pandemics.

16.18. One area in which the UK took a leading role internationally was research, and here our differences from both multilateral and bilateral partners were in my view (and were seen internationally) to be ones where the UK was an example to emulate. Since a subsequent module will cover this more fully, I will not go into detail at this point, but the differences were both in philosophical approach, and organisational speed.

16.19. An example of the slight difference of philosophical approach to research is that WHO advice on 31 March 2020 was:

“It can be ethically appropriate to offer individual patients experimental interventions on an emergency basis outside clinical trials, provided that no proven effective treatment exists; it is not possible to initiate clinical studies immediately; the patient or his or her legal representative has given informed consent; and the emergency use of the intervention is monitored, and the results are documented and shared in a timely manner with the wider medical and scientific community.

The decision to offer a patient an unproven or experimental treatment is between the doctor and the patient but must comply with national law. Where it is possible and feasible for the treatment to be given as part of a clinical trial, this should be done unless the patient declines to participate in the trial.”

16.20. We took a stronger line on the usage of treatments outside of a trial, as set out in the letter from the UK CMOs to the NHS on 1 April 2020:

“The faster that patients are recruited, the sooner we will get reliable results. While it is for every individual clinician to make prescribing decisions, we strongly discourage the use of off-licence treatments outside of a trial, where participation in a trial is possible. Use of treatments outside of a trial, where participation was possible, is a wasted opportunity to create information that will benefit others. The evidence will be used to inform treatment decisions and benefit patients in the immediate future. Any treatment given for coronavirus other than general supportive care, treatment for underlying conditions, and antibiotics for secondary bacterial complications, should currently be as part of a trial, where that is possible.” (CJMW4/010 – INQ000068589).

- 16.21. We also took a much more directive approach than other countries to which studies were supported, in order to minimise the risk (that was seen in many countries) that multiple under-powered studies would be started that never reached clinically or statistically meaningful endpoints.
- 16.22. In terms of speed of startup, the UK did not join the WHO SOLIDARITY trial, but set up its own trial RECOVERY. This was not because we were not very supportive of the WHO trial (we were), but because we were confident we could move more rapidly than international peers, and therefore had a responsibility to do so. RECOVERY both started, and reported, before SOLIDARITY, providing information that was used globally although we were very glad that WHO was setting up SOLIDARITY. The RECOVERY trial was the largest COVID-19 treatment trial globally, before being overtaken by PANORAMIC, also a UK trial.
- 16.23. UK observational studies including SIREN, CO-CIN, the ONS prevalence study and VIVALDI were also used internationally to inform policy in other countries as well as the UK.

Timing of Lockdowns

- 16.24. As I have set out earlier in this statement, it is reasonably widely agreed, and certainly it is my view, that knowing what subsequently happened the various restrictive measures including but not restricted only to lockdown should have happened a number of days earlier (maybe 7 days) in March 2020. I do not consider that the underlying scientific model we had adopted for our response was flawed; rather we did not realise how far along the epidemic curve we were until it was too late. This is principally a failure of acquisition of data rather than of the scientific concept.
- 16.25. Had we had the level of surveillance that was available later in the pandemic, it would have been possible to have predicted much more accurately the likely course of the first wave at a much earlier stage. This would almost certainly have led to slightly earlier scientific advice that without very substantial measures a major wave was going to occur. This point about inability to scale surveillance is one that needs to be made clearly. Investing in the ability to scale up surveillance and testing in advance of a pandemic is essential if decisions are to be informed by good data and science. Scientific advice depends on accurate data and in this case the data was too slow and too sparse for optimal decision-making. Between emergencies political leaders

inevitably are tempted to prioritise away from health protection capacity towards ongoing needs in the health system.

Three Key Lessons

16.26. The three most generally applicable lessons in my view of the COVID-19 pandemic in the UK were: the need for scale-up; the absolute need for rapid research at scale; the altruism of the UK public. Scale-up was our great weakness in our response at the start of the pandemic; we had significant scientific capability, but little scale up capacity to meet the needs of an exponentially rising epidemic. This was especially clear with testing, but was also a weakness in contact tracing and bed base availability. Having the capacity to scale up requires investment in advance. COVID-19 demonstrated again that there will always be a need to move from social measures (NPIs) to medical countermeasures (drugs, diagnostics and vaccines) and that in turn relies on a rapid research response. The UK was in this an international leader. Finally, the remarkable altruism of the UK public was on full display, with many individuals and families enduring very substantial social and economic disruption over prolonged periods to protect those more vulnerable than themselves. Further lessons for future pandemics, which will occur, are laid out in the Technical Report.

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 or without an honest belief of its truth.

Signed:

Personal Data

Dated: 22 August 2023