Witness Name: Rt Hon Lord Vallance of Balham

Statement No.: 5

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UK COVID-19 INQUIRY

FIFTH WITNESS STATEMENT OF LORD VALLANCE OF BALHAM

Contents

OPENING REMARKS

1. I would like to start by reiterating some comments I made in my previous witness statements to the Inquiry. The Covid-19 pandemic caused huge suffering and misery across the world and had both direct impacts as a result of the disease itself and indirect impacts as a result of the effort to tackle the virus. Unfortunately it will not be the last pandemic the world will see and future pandemics will take the world by surprise in different ways. One thing that should not be a surprise in any future pandemic is that the most disadvantaged and vulnerable parts of society are likely to suffer most, and this was tragically evident during Covid-19. I would like to thank scientists, engineers, academics, healthcare professionals and experts who gave their time, effort and insights to help during the pandemic. They and their successors will be essential for any future response. This need for scientists and engineers from industry and academia was highly relevant to the development of medical countermeasures and technologies that were essential to bring this pandemic under some sort of control.

2. This statement is in response to the Inquiry's Rule 9 request of 26 September 2024. I understand that many of the documents relevant to the issues addressed in this statement will be listed or exhibited in the Module 7 witness statement of Dr Edward Hayden on behalf of the Government Office for Science (GOS) **[PV5/01 - INQ000000000]**.

3. In the hope of avoiding any unnecessary duplication and for ease of reference, I have exhibited to this statement the entirety of my second witness statement provided for Module 2 dated 14 August 2023 **[PV5/02 - INQ000238826]**, as it deals extensively with many issues relating to testing more broadly and some of the issues relating specifically to the Test Trace and Isolate ('TTI') system that fall within the scope of Module 7 and the Inquiry's Rule 9 request. I am grateful to the Inquiry for agreeing to this approach. I have also provided the Inquiry with other witness statements in Modules 1, 2 and 4 **[PV5/03 - INQ000147810]**, **[PV5/04 - INQ000273955]** and **[PV5/04A - INQ000474482]**.

INTRODUCTION

4. I understand that the primary focus of Module 7 of the Inquiry is to consider the TTI schemes that were established during the pandemic, and to make recommendations on approaches that may be adopted in the future. My earlier witness statements have dealt

extensively with scientific questions relating to tests and testing more broadly (see in particular paragraphs 496 to 551 of my second statement **[PV5/02 - INQ000238826]**) but many of the questions in this module focus on operational matters of the TTI system itself rather than testing *per se*. My role in respect of the operation of the TTI system was limited, as was that of the Government Office for Science ('GOS'), which I led at the time, and the Scientific Advisory Group for Emergencies ('SAGE'), which I co-chaired with the Chief Medical Officer ('CMO'). Collectively, we provided science advice on some matters relevant to TTI, particularly in response to questions put to SAGE. That science advice informed policy decisions that were taken in various decision-making forums from the Cabinet down. Once the decisions were made, they were operationalised by various Government departments and agencies, notably the Department for Health and Social Care ('DHSC'), Public Health England ('PHE') and equivalent devolved and successor bodies, and of course the NHS Test and Trace organisation. My role, and that of GOS, was to support the provision of science advice; policy decisions and the implementation and operationalisation of those decisions were for others.

5. SAGE addressed scientific questions in relation to tests and testing but was not the only source of science advice for the TTI system. DHSC, NHS Test and Trace, PHE and other public health bodies all employed many scientists, medical and public health experts who provided advice and day to day support, including on matters relevant to running large-scale TTI operations and organisations. Other expert bodies, notably the World Health Organisation ('WHO'), Royal Society, and academic institutions in the UK and elsewhere, also published relevant advice on which those leading the UK's TTI systems could draw.

6. While TTI was the most prominent example of the use of testing during the pandemic, it was not the only one. For example, tests were needed for clinical diagnosis in hospitals and general practices, or to identify infections in particularly risky settings, and a community-based sampling programme was established to understand the prevalence, incidence and spread of the virus within the population as well as to identify new variants as they emerged. Mass population testing was trialled in Liverpool as a way of seeking to identify and then isolate infected individuals. Environmental testing of wastewater was undertaken to monitor the virus in different localities and, in some cases, to seek to identify the source of outbreaks. I will briefly discuss those elements of testing further below but none of these were part of the formal TTI system. It is important to keep in mind the different purposes that they served, the different methods that were used to

achieve those purposes, and the different environments in which such testing proved more (or less) effective.

7. Before turning to each of these strands, it is worth considering what aims non-pharmaceutical interventions ('NPIs') may have and where testing plays a part. A primary aim of NPIs may be to reduce the overall incidence and prevalence of the virus in the population as a whole. This would usually require measures at a population wide level. A second aim might be to reduce the probability that anyone who is known to be infectious mixes with those who are uninfected and susceptible to infection. A third aim might be to prevent known infectious people from entering particularly high risk environments in which spreading is more likely to occur or where it might cause most harm. Finally, NPI measures might seek to make those environments as inconducive to spreading the virus as is practicable. Of course NPIs are also needed to protect the most vulnerable and that has been discussed in previous modules.

8. Testing plays an important role in the first three of the aims described above, but it is not alone in so doing. Other measures such as isolating, social distancing, the use of masks, furlough payments, sick pay, and environmental measures all play their part. One of the challenges during the pandemic was to seek to understand how the different NPIs interacted with one another, what that interaction would mean for the epidemic curve, and where an effective TTI system could have most effect.

9. TTI was a crucial part of the armamentarium across the world. Testing, contact tracing and encouragement to isolate are standard and well established public health measures that have been known and used for many decades (and forms of contact tracing and isolation for centuries). Advances in diagnostic technology and data management meant that TTI provided an opportunity to help control the spread of Covid-19, and countries such as South Korea were able to use this highly effectively during the pandemic. In the UK we did not have the infrastructure in place at the start of 2020 to allow for a scalable TTI programme that could keep the epidemic wave in check. Instead, in part due to the speed of widespread seeding of infection across the UK, our resources for containing the spread of infection through testing, contract tracing and isolation rapidly became overwhelmed. The initial approach to Covid-19 taken by DHSC and PHE was one of trying to contain the spread of infection but the extent and nature of the initial seeding events meant that the small scale of testing, contact tracing and isolation was inadequate. This also meant that hard decisions had to be taken on where to prioritise the finite number of tests that were available, which in the event were prioritised for use

in hospitals for diagnostic purposes. It is my understanding that it was not the case that the UK decided not to utilise widespread TTI in the early weeks of the pandemic; it was simply the reality that the UK could not do so. The challenge for the future is to find practical, pragmatic and realistic solutions to create a rapidly scalable TTI infrastructure, something that was done well by certain countries that had previously been exposed to SARS and MERS, and those which avoided early large seeding events.

10. Although PHE developed a test for Covid 19 rapidly, the absence of a scalable TTI programme contributed to the need for the first lockdown, a measure of last resort implemented in response to the exponential spread of the disease and the risk that the NHS would become overwhelmed. Once that lockdown was lifted, TTI was an important tool that, it was hoped, would combine with other measures to control the spread of disease and avoid the need for more extreme NPIs. Two lessons became clear over 2020.

11. First, success relied on the totality of the system. That began with having enough tests, but this on its own was not enough. There had to be a way to report the tests into a network that allowed infected individuals to be informed quickly, and their contacts traced efficiently. People had to be encouraged and helped to isolate once they had tested positive, which raised questions of the sufficiency of support provided to enable isolation (including payments).

12. Second, TTI works best when the prevalence of infection is relatively low, and when used effectively it can keep infection rates down. However when deployed in areas of high prevalence TTI would quickly become overwhelmed and once overwhelmed it could only make a minor contribution to reducing the pandemic wave.

13. The latter point is what lay behind a key lesson from the first year of the pandemic that, when faced with a coming epidemic wave, it was sensible to introduce measures earlier than you think you want to, harder than you think you want to, and geographically broader than you think you want to. This is not a mantra to encourage the use of lockdowns, it is the opposite. Going earlier, harder and broader *than you would like to* is advice to take difficult decisions at timely stage in order to keep the prevalence of the virus at a level where TTI can work and therefore avoid further more extreme or prolonged NPIs.

THE DEVELOPMENT OF A TEST FOR COVID-19

14. The development of a test for Covid-19 by PHE was done rapidly, and the first reliable tests were the PCR tests that required a sample to be collected and sent to a laboratory. There were some practical things that needed to be established. It was important to determine the test's specificity (a measure of how well it avoids wrongly picking up people who don't have the disease) and sensitivity (a measure of how well the test identifies everyone who does have the disease). It was important to know whether the test could be made available at scale, how it could be provided to the people who need to use it, how to take, transport and store the relevant samples, how quickly results could be obtained, the materials and technology involved to manufacture, supply and operate the test, and how the results of the test could be communicated to those who needed to know them, in particular infected people and healthcare workers. Others from PHE and DHSC will be able to provide more information on these points but for any TTI system, the message is that it is the whole system rather than simply access to a laboratory test that needs to be in place. From an early stage SAGE advised that substantial testing resource would be required - see the chronology appended to Dr Hayden's witness statement for Module 7 **[PV5/01 - INQ000000000]**.

15. The Technical Report on the Covid-19 Pandemic published in December 2022 (the Technical Report) **[PV5/05 - INQ000203933]**, produced by the UK's Chief Medical Officers (CMOs), Deputy Chief Medical Officers (DCMOs) and me as GCSA, sets out a timeline of testing in Chapter 6. This charts the development of tests from the early use of the rapidly developed reverse transcription PCR (RT-PCR) test in existing laboratory arrangements, the workup of a new PCR diagnostic test a few weeks later, through to the roll out of self-testing lateral flow devices for the entire population from late 2020 allowing for much more rapid testing and self testing. The advent of lateral flow tests was a very important step for expanding testing across the population, and the ability to make an effective lateral flow type test should be a priority for any future pandemic of this type.

16. The development of diagnostic tests is an expert technical matter and, at the start of 2020, the UK had in place structures to facilitate and regulate the process of developing a new test but did not have good processes to scale testing facilities. DHSC was the government department which held accountability for developing tests, working closely with PHE and the devolved public health agencies whose role it was to prepare for and

respond to outbreaks of infectious diseases. DHSC and the public health agencies worked with the NHS, industry and academia on the production of a test. The relevant regulatory body was the Medicines and Healthcare products Regulatory Agency (MHRA). SAGE did not give scientific advice about specific testing technologies or the practical development of a diagnostic test. As GCSA I was also not involved in this work. It is worth observing that the UK, unlike for example Germany, did not have a strong private sector diagnostics industry and in my opinion this limited the speed at which scaling up of testing occurred.

17. The Technical Report includes a number of reflections and advice for a future CMO or GCSA on testing. Importantly, the ability to identify and develop an effective rapid near patient diagnostic test should not be taken for granted, as experience with Mpox has shown recently. On 14 August 2024, WHO declared Mpox a public health emergency of international concern (PHEIC), and on day 45 the 100 Days Mission (100DM) Mpox tracker reported that although there was a laboratory test there was still no approved antigen-based rapid diagnostics test **[PV5/06 - INQ000533168]**.

TEST, TRACE AND ISOLATE

18. TTI uses tests to identify whether an individual is actively infected, and by inference whether they might be infectious. If the test is positive, that individual is advised or required to isolate, and efforts are made to trace contacts to advise them to get tested to the same end. The intention of TTI is to seek to contain or slow the spread of the virus by identifying and isolating those who are infectious, or who may become infectious, for some or all the duration of the period for which they are infectious.

19. TTI can also be used to try to identify where and when an individual became infected through a process known as backward contact tracing. Here the aim is to trace the sources of outbreaks of infection. As a byproduct of TTI, data is generated that can also be analysed to help identify the broad trends in the prevalence and incidence of the virus, for example by showing that the number of identified cases has risen or fallen in a particular area. This is helpful, but it is not the purpose for which the TTI system was designed and it should not be confused with the carefully constructed surveys of community testing (discussed below) that were established specifically to provide more accurate data on the nature and extent of the epidemic wave.

20. While NHS Test and Trace was not formally launched in England until May 2020, the use of measures to identify potentially infectious people, contact them, isolate them and trace their contacts (prospectively or retrospectively) was always part of the UK response to the Covid-19 pandemic. This represented the application of long established public health principles. Before a test was widely available these measures were based on identifying relevant symptoms or signs. Once a test became available, it allowed for more specific focus on those who were infected with Covid-19 (as opposed to those who had general symptoms of a respiratory disease), and allowed for the identification of those infected asymptomatically or paucisymptomatically.

21. I discussed throughout my second statement the stages of the UK response to Covid-19 between January and March 2020, and I do not repeat that evidence here (see in particular paragraphs 146, 179 to 183 and 200 to 230 on the contain, delay, research and mitigate stages **[PV5/02 - INQ000238826]**). In terms of testing and TTI, what became termed the 'contain' stage involved attempts to control the spread of the virus through NPIs including testing, contact tracing and isolation. It proved impossible to prevent the epidemic in the UK through these measures for the reasons that I describe in my second statement, including the lack of a TTI system that was sufficiently scalable to meet the challenge that we were facing. Once it became apparent that there was insufficient testing capacity to maintain testing both in the community and in hospitals, a decision had to be taken on which to prioritise. That decision was to use the tests that were available within hospitals. That was not a decision for me (or for SAGE) to make, but it is one that I considered then and consider now to be reasonable. It is sometimes misrepresented as a positive decision to remove testing measures as part of a policy to allow the virus to circulate through the population. That is wrong. It was a decision that was forced upon policy makers by the limited resources available. They had the responsibility of deciding where that resource should be directed. At several points during that early period, SAGE stressed the need for testing and the need to be able to test at large scale (see paragraph 503 of my Module 2 statement **[PV5/02 - INQ000238826]**).

22. I understand that the NHS Test and Trace system of TTI that was formally launched in England on 28 May 2020 will be the primary focus of Module 7. Neither I, as GCSA, nor SAGE were involved in decisions about how NHS Test and Trace should be led, organised or run. These were operational and policy matters for the Cabinet, the DHSC and other relevant Government departments, agencies and decision-making forums. The only advice I recall giving was that the leadership of NHS Test and Trace would be

most effective if there was a single point of accountability and that it was likely to need private sector involvement as it would be required to operate at a much greater scale than anything that PHE and the public health services had done before (rather confusingly this was sometimes referred to as a need to do mass testing – meaning at large scale rather than total population screening which was how the term "mass testing" later become known) **[PV5/07 - INQ000533155]**. This was not formal advice from the GCSA, but reflected my view based on my wider experience and the approach that I had advocated in respect of the Vaccines Taskforce. I have discussed the reasons behind that approach in my Module 4 witness statement, in which I wrote **[PV5/04A - INQ000474482, §40 and §46]**:

> '[40] It rapidly became clear that to ensure the UK could get vaccines for the population as soon as possible (assuming an effective vaccine could be discovered) it would be necessary to have a dedicated operational structure with decision making authority, supported by a team within Whitehall with ministerial oversight, and a single point of accountability. The concept was that this should be built along the lines of a paper that I co-authored that was published by GO-Science in 2019 entitled "Principles for running a successful mission".
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> [46] The "Principles for running a successful mission" work which is highlighted in the 2019 Science Capability Review and in a letter from the PM's Council for Science and Technology informed the model for the VTF at a high level [PV4/45 INQ000061614]. The seven guiding principles were: (1) an empowered and accountable mission leader, (2) a flexible and empowered core team of sufficient critical mass, (3) a whole systems approach to delivering the mission, (4) resources to deliver transformative change, (5) clear and simple governance structures, (6) well defined delivery plans and (7) access to expertise **[PV4 / 45 INQ000061614 – Annex D. pp.83 - 84]**, see also **[PV4 / 46 INQ000399291].**'

23. In the event, Dido Harding was appointed and established a very large organisation. I was not involved in the decision on the establishment of the TTI organisation or the choice of leader.

24. In late April 2020, SAGE (and presumably others in DHSC and PHE) were commissioned to provide science advice on a number of issues relating to TTI, in anticipation of the NHS Test and Trace programme. In advance of SAGE 30, those

requests were formulated by the SAGE secretariat into questions including '*Should we test all contacts of index cases?'* and *'What other indicators should we be using for surveillance?'* and a number of additional questions from the GOS secretariat following their discussion with Cabinet Office and DHSC **[PV5/08 - INQ000533163]**. At SAGE 30, the scientific principles for testing in a contact tracing system were discussed and it was agreed that a sub-group of SAGE participants would hold a dedicated meeting on 1 May (SAGE 32) to consider more specific questions and to finalise the advice **[PV5/09 - INQ000221802]**. Questions for SAGE 32 included: '*Does SAGE agree that ideally, contacts of an index case should be identified within [x hours], and isolated within [x hours], from [delete as appropriate: the contact itself/ reporting of an index case/ positive testing for an index case/ etc]?'* (emphasis added).

25. The purpose of these questions was to obtain science advice from an expert body on the evidence for parameters that would be most likely to identify infectious individuals and contain spread of disease. That advice took into account what was known at that time about the properties of the virus, including (but not limited to) how quickly and easily it spread, the incubation period, the length of time for which an individual who had contracted the virus was likely to remain infectious, and so forth. It drew upon modelling and behavioural science to inform decisions that would be taken by others when designing the system that would be adopted by NHS Test and Trace.

26. There were no 'right' or 'wrong' answers to many of the questions posed. To give an example, there is no single period for which someone infected with Covid-19 would remain infectious; there was an indicative range. SAGE's science advice on the length of time for which someone should isolate therefore reflected population-based assessments of probabilities: if you wanted to prevent *x*% of onward infections, then an isolation period of *y* days would likely achieve that goal based on present data. It was then for the policy makers and those responsible for operationalising Test and Trace to determine the appropriate balance between breaking onward transmission and the length of isolation that could be tolerated. This science advice from SAGE was one input to the decisions, but there were others including: the economic costs of periods of isolation, the cost in terms of mental health, people's willingness to comply with such isolation periods etc.

27. It is relevant to note that the question posed of SAGE 32 about the length of time to trace contacts was couched in terms of what the *'ideal'* time would be. This allowed for a scientific answer to that question, providing a range without consideration of what might

be obtainable in practice. Those practicalities were matters that those setting the objectives for NHS Test and Trace would, of course, have to take into account, alongside the science advice that SAGE provided on the effects of adopting different times to detection.

28. It follows that SAGE was not being asked to, and did not, set 'targets' or 'parameters' for NHS Test and Trace. That was for those responsible and accountable for establishing and running the system, who appropriately sought science advice to inform their decisions but also considered a range of other factors. Thus while SAGE might say that the science and modelling suggested that a 48 hours period for identifying contacts of an index case would have a bigger effect than a longer time, operational considerations may have meant that those running the system nonetheless adopted a 72 hour target.

29. In advance of both SAGE 30 and 32, the following were prepared for the discussion on TTI related questions: a draft minute from Scientific Pandemic Influenza Group on Modelling, Operational (SPI-M-O) and New and Emerging Respiratory Virus Threats Advisory Group (NERVTAG) **[PV5/10 - INQ000074968]**, a Scientific Pandemic Insights Group on Behaviour (SPI-B) paper 'Symptom vs Test Based Approach' **[PV5/11 - INQ000533162]** and an updated view on behavioural issues relevant to TTI, two papers from London School of Hygiene and Tropical Medicine (LSHTM)'s modelling group on the estimated impact various TTI timings, and FCO data on international approaches.

30. The minutes of SAGE 32 **[PV5/12 - INQ000061540]** noted the scientific principles for an effective test and trace system, including that at least 80% of contacts of an index case would need to isolate, and that it was desirable for contacts of an individual with Covid-19 to isolate within 48 hours of identification of an index case. Both the SAGE minutes and the relevant modelling papers made clear the uncertainties inherent in the modelling (which relies on a set of assumptions), ever changing data, and the considerable biological and epidemiological uncertainty of the evolving pandemic.

31. Both SAGE 30 and 32 also highlighted the importance of backward contact tracing as part of best practice and advised that it be incorporated into TTI. Backward contact tracing is particularly important to identify the sources of outbreaks. SAGE re-emphasised the importance of backward contact tracing in further meetings, see for example SAGE 40 (4 June 2020) **[PV5/13 - INQ000061548], §9]**. It is my understanding that backward contacting tracing was a key feature of the South Korean response.

32. As the pandemic progressed, advice on isolation periods changed. In part this was because of increased understanding of relevant factors, such as duration of viral shredding and the nature of transmission risk. In part, it was because the virus itself changed as it evolved. There was no single fixed term for how long an individual would remain infectious but a probability range.

33. At paragraph 286 of my second statement I described how it is important to distinguish between the 7-day period advised for an individual who showed symptoms (see guidance on 12 March 2020) and the 14-day period advised for members of a household, including the index individual, to isolate (see guidance on 16 March 2020) **[PV5/02 - INQ000238826]**. The science and analysis that led to these figures is contained within SAGE and NERVTAG minutes and papers. Ultimately, however, those responsible for NHS Test and Trace needed to decide the degree of assurance that they thought was acceptable in light of all the advice that they had received, including practical and economic considerations. They would be best placed to address what degree of assurance was deemed necessary and how they assessed it. NHS Test and Trace never operated on the basis of seeking 100% assurance that the virus could not be spread from an infected individual. Such an approach would have required a much longer isolation period than the ones adopted. In any duration of isolation of course spread within the household remained a risk.

34. SAGE also advised that when thinking about demands on TTI and overall testing targets, PHE needed to consider the impact of other respiratory illnesses going into autumn and winter months. This was because it was anticipated that a significant proportion of the population would acquire non-Covid-19 respiratory diseases that would give similar symptoms. Those individuals would of course also seek Covid-19 tests, and indeed were encouraged to do so. The advice that SAGE provided was that this uncertainty in the overall symptomatic population needed to be factored into the planning for the size of the TTI system to prevent it becoming overwhelmed when the general level of respiratory illness rose during the colder part of the year. This was reflected in the advice given in the minutes of SAGE 56 (10 September 2020), which recorded at §15 that '[a]s previously advised, preparation for increases in numbers of cases, hospitalisations and deaths will be critical, particularly as winter approaches. This will require preparation from across the whole of the national response, including in the NHS and care homes. The impact of other respiratory illnesses will need to be carefully monitored, including impact on testing demand and interactions with COVID-19.' **[PV5/14 - INQ000061564]**. Managing capacity for additional testing in light of these demands would have been an

issue for DHSC/PHE. A scientific and medical report was commissioned from the Academy of Medical Sciences to identify the challenges that winter would bring **[PV5/15 - INQ000062402]**.

35. Throughout the pandemic SAGE continued to advise on scientific principles to inform TTI, and this advice is detailed in the witness statement of Dr Hayden and the exhibits to that statement. This was not the only source of science advice that NHS Test and Trace had. PHE, DHSC and NHS Test and Trace all drew upon their own expertise in science, medicine, public health and modelling in order to inform the operational decisions that were being made. However, some important principles were reiterated in advice from me and SAGE.

36. First, and as described above, TTI needs to be seen within the context of a range of measures and approaches to controlling the spread of the virus, ranging from social distancing in public to various degrees of restrictive measures or partial or full lockdowns. On 4 April 2020, I wrote a paper titled Science for Covid, in which I stressed that an effective testing system was critical to keeping numbers down and R under control, and if a clear testing strategy, testing available at scale and excellent informatics existed, then restrictions imposed at a population level could be reduced **[PV5/16 - INQ000203894]**. This paper was disseminated in government, including to the Cabinet Office.

37. Second, SAGE advice, which I repeated in press conferences **[PV5/17 - INQ000533169]**, was that TTI is very effective at containing the spread of the virus if prevalence is relatively low, see for example the minutes of SAGE 38 (21 May 2020) **[PV5/18 - INQ000061546]**. When prevalence rises, TTI risks becoming overwhelmed, and once overwhelmed it has a minimal impact on controlling the spread of the virus. Accordingly, in circumstances where measures including full lockdowns were used to bring prevalence down in an area, we advised that it would make sense to increase TTI capacity in that area to keep prevalence down in concert with other NPIs. In contrast, directing TTI to high prevalence areas would likely have limited effectiveness unless it could be operated at very large scale. This point was relevant to the tier system that was introduced, but in the event the decision was made to increase TTI use in high prevalence areas.

38. Third, if you wanted to optimise the TTI system then as much attention needed to be paid to adherence to isolation (specifically the barriers to individuals and certain

communities effectively self-isolating) as to testing and tracing. Testing and tracing *per se* do not alter the spread of infection unless they are coupled with some action to isolate the infectious. There were a number of issues relating to self-isolation, including multi-generational households and individuals in precarious and/or low paid employment without sick leave provision, which we advised required attention. SAGE had input from SPI-B, who advised that barriers to isolation included loneliness, requests to repeatedly isolate, and when there was a financial impact associated with isolating, see SAGE 32 minutes **[PV5/12 - INQ000061540, §21]**. This advice was repeated at SAGE 52 **[PV5/19 - INQ000061560, §14]** and SAGE 57 **[PV5/20 - INQ000061565, §6]**. Following an action at SAGE 32 (1 May 2020) **[PV5/12 - INQ000061540]**, the International Comparators Joint Unit (ICJU) (a joint team between FCDO and Cabinet Office) produced a paper dated 18 May 2020 identifying differences in international TTI approaches **[PV5/21 - INQ000551796]**, and later produced a paper covered financial incentives to isolate including sick pay **[PV5/22 - INQ000551797]** These were circulated within GOS and were discussed extensively across government **[PV5/23 - INQ000533165]**.

39. I am asked by the Inquiry when, how and by whom it was decided that SAGE would not participate in operational decisions. I think that this question might arise from a misunderstanding of a comment in the minutes of SAGE 34 (7 May 2020) in which it is recorded (in respect of a paper presented on risk assessments) that: 'SAGE did not endorse the paper in its current form as SAGE does not give specific operational advice. This is a matter for Health & Safety Executive (HSE) and the safer working places group' **[PV5/24 - INQ000061542]**. This was a statement of fact, not a record of a decision. SAGE is not, and has never been, a forum for providing operational advice and is not constituted to do so. It is a science advice group. As is shown by the subsequent paragraph of the SAGE 34 minutes, SAGE could comment on the 'underpinning scientific principles' that informed the paper, but not on the proposals themselves. The same was true of matters relating to TTI. There are operational experts in government and it would have been entirely appropriate for the TTI system to seek advice from experts in operational matters from inside or outside government.

40. The NHS Test and Trace service was formally launched in England on 28 May 2020. I have set out in detail in my second witness statement, and within this statement, the science advice on testing which was available to government prior to and after this date. I am asked specifically by the Inquiry about a paper entitled *A blueprint to achieve an excellent Find, Test, Trace, Isolate and Support system* **[PV5/25 - INQ000573928]**. This was produced in October 2020 (some five months after the launch of the NHS Test and

Trace service) by the group that called itself 'Independent SAGE'. I would have read this paper at or around the time that it was published and it would have been available to those responsible for operationalising TTI through NHS Test and Trace and other relevant bodies including PHE. The paper made several recommendations, including not using the private sector, increasing laboratory capacity, asking the NHS to take a lead, and the provision of financial support to help those isolating.

41. By this stage of the pandemic, SAGE had on several occasions given advice that financial and other support for self-isolation would be important to improve compliance, including but not limited to advice arising from SAGE 32 (1 May 2020) **[PV5/09 - INQ000221802, §§21-22]**, SAGE 52 (20 August 2020) **[PV5/19 - INQ000061560, §14]**, and SAGE 57 (17 September 2020) **[PV5/20 - INQ000061565, §6]**. The limitations of laboratory capacity for testing had been acknowledged since the earliest stages of the pandemic. For example, the minutes from SAGE 4 on 4 February 2020 recorded in respect of testing and swabbing that 'Although the UK is building regional diagnostic capability within weeks, overall capacity is limited.' **[PV5/26 - INQ000061512, §26]**. The question of laboratory capacity for testing remained live throughout the pandemic, and is discussed in detail in my second statement, including at paragraphs 469-510 **[PV5/02 - INQ000238826]**.

42. The October 2020 'Independent SAGE' paper discusses laboratory testing capacity and support for those self-isolating. I agree that these were relevant considerations, and as such science advice had repeatedly been provided on those issues, as set out above and in numerous SAGE papers. However, other matters set out in the paper, such as the leadership of TTI, the involvement of the private sector, and a suggested name change for TTI, are clearly policy choices, not scientific matters. Indeed, the report overall largely related to policy, organisational and operational matters rather than science advice.

43. I am asked how effective I consider SAGE's structures and processes to have been in respect of testing, and whether it would have benefited from other specialist expertise, particularly in relation to TTI. It is my opinion that SAGE's structures and processes worked well for the job that it was asked to do, which was to provide the science advice that formed one input into the TTI system that the UK operated. It was not its role, nor did it have the expertise, to provide operational advice and it did not do so. I do not think that further specialist expertise on SAGE was required in relation to providing science advice to TTI. I am specifically asked whether greater public health expertise on SAGE

might have been beneficial. The public health system, including UKHSA, its predecessor PHE, and the medical system from within DHSC, were all available to the TTI system and would no doubt have fed into their thinking and process, I agree that expertise from public health was of particular importance to TTI and both national and regional public health bodies existed that were available for this purpose. If a further body was thought helpful to provide specific operational or policy advice, this would require establishing a new group. Those directly involved in TTI would be in a position to describe how they received the operational and public health advice they needed. NHS Test and Trace was a very large organisation.

44. I am asked about other sources of advice on TTI, for example the 18 May 2020 report from the Royal Society group Data Evaluation and Learning for Viral Epidemics (DELVE) **[PV5/27 - INQ000194035]** DELVE was not commissioned by SAGE, but I welcomed its establishment, met with the group and found the science advice that it fed into SAGE and elsewhere helpful. SAGE 37 (19 May 2020) considered the DELVE report on TTI which reinforced much of the existing SAGE advice **[PV5/28 - INQ000061545, §§14-22]**. SAGE maintained its advice that isolation of contacts within 48 hours of identification of an index case was desirable, whereas DELVE had given somewhat longer timelines.

45. Early in the pandemic several academic groups and private companies offered to provide testing resources to help PHE. I passed these offers on to PHE for them to consider, see for example **[PV5/29 - INQ000533154]**, **[PV5/30 - INQ000533156]**, **[PV5/31 - INQ000533154]** From time to time early in the pandemic and even after TTI and more centralised testing systems were established I became aware of academic institutions, research centres and other laboratories offering to assist by providing facilities to process Covid-19 tests. Where these offers came to me I would pass them on to the relevant people within PHE or the TTI system. While I was involved by way of linking up these institutions for an initial discussion with PHE, it would then have been for PHE or TTI leaders to decide what, if anything, to do next. These offers were undoubtedly well-intentioned but processing test results is only one part of a TTI system. Unless the laboratories could be brought into the wider TTI operation, testing alone was of limited assistance. There is however a very legitimate question about whether the best model to scale laboratory testing in an emergency is a centralised large facility or a distributed network. This is an entirely operational question and not one about which I was asked, nor would I have expected to have been asked about this. In the event, PHE and those responsible for operationalising TTI elected to go for the large "lighthouse laboratory" model. Whatever system is chosen, those participating need to be linked to

an informatic system efficiently, so that infected people can be traced and contacted, and records updated. The system must also maintain consistent standards and quality assurance across laboratories.

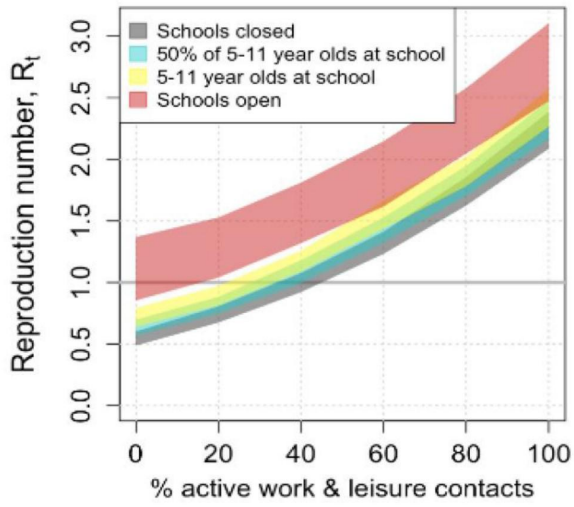
46. I am asked about what involvement I had in running the Lighthouse Laboratory Network. Neither I nor SAGE were involved as this was an operational matter on which science advice from SAGE was not sought.

47. I am asked the degree to which assessment of the Reasonable Worst Case Scenario (RWCS) and advice in relation to it, took account of the TTI system. A RWCS is a planning tool intended to inform decision-makers about what would happen without mitigations being put in place. Therefore, a RWCS is, by definition, one which does not account for interventions (including NPIs such as TTI) designed to prevent it from happening. The expectation should be that the RWCS will not be realised because interventions and behavioural change would likely occur. The RWCS relevant to an infectious disease pandemic was produced as a planning tool for the Civil Contingencies Secretariat (CCS). Those responsible for operationalising TTI would be best placed to explain the extent to which it formed part of planning and decision making.

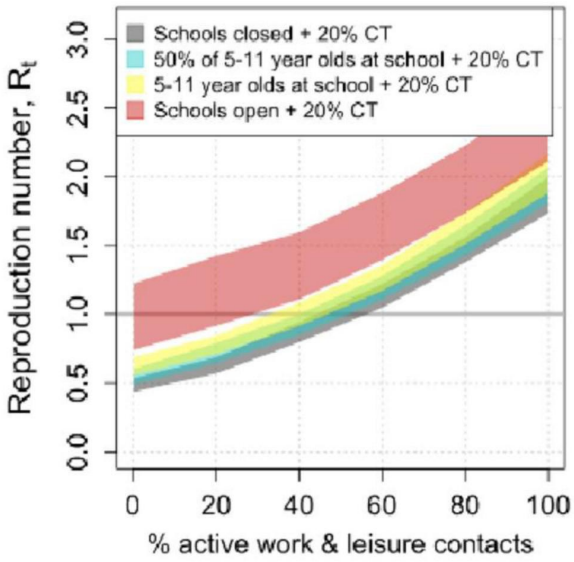
48. Alternative approaches to RWCS with a range of scenarios were proposed in the report from the Royal Academy of Engineering that was produced after the pandemic **[PV5/32 - INQ000068403]**. I noted in my Module 1 witness statement that the report 'made important, sensible and practical recommendations on many aspects of methodology, including on the construction of reasonable worst-case scenarios (RWCSs), the separation of acute and chronic risks, and the need to focus on potential impact rather than simply likelihood when preparing for risks. I agree with their recommendations on these points'. **[PV5/03 - INQ000147810, §26]**.

49. Other forms of analysis by SPI-M-O did consider the impact that TTI would have, see for example the ribbon diagrams developed by Professor Brooks Pollock on the potential impact of various degrees of contact tracing from 0% to 80% on reducing the R **[PV5/33 - INQ000236965]**. These diagrams were also set out and discussed within the minutes of SAGE 38 (21 May 2020) **[PV5/18 - INQ000061546]**, and so formed part of the science advice which went to decision makers. Many models looked at the impact of contact tracing, and Professor Brooks Pollock's diagrams are an example of how this information was communicated through simple visual representation. They are reproduced below:

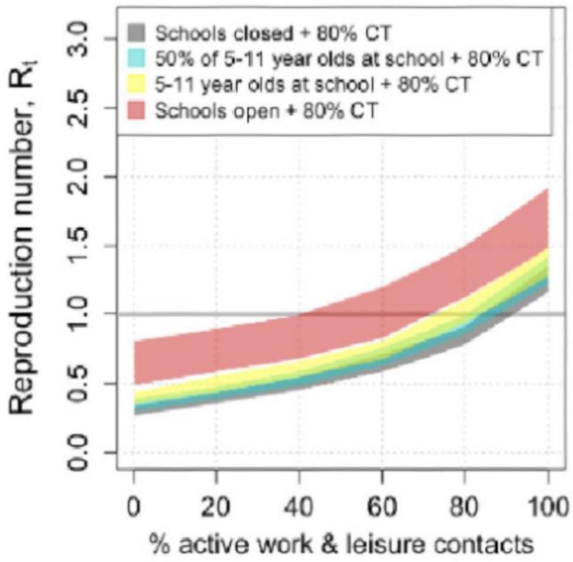
a. Level of contact tracing: none



b. Level of contact tracing: 20%



c. Level of contact tracing:80%



50. Modelling from Professor Matthew Keeling, the University of Warwick modelling group, the JBC, and others also provided examples of modelling the effects of various interventions **[PV5/34 - INQ000533167]**, **[PV5/35 - INQ000383617]**, **[PV5/36 - INQ000148836]**.

COMMUNITY SURVEY TESTING

51. The community testing survey was a process whereby a statistically representative sample of the population was tested for Covid-19 with the sole aim of trying to understand the incidence and prevalence of the disease within the population as a whole. When repeated over time, community testing allows for incidence and prevalence to be tracked, and trends identified (including the emergence of new variants). This assists in analysing the extent, spread and nature of an epidemic. Community testing of this type serves a different purpose from TTI and is achieved through different means. In the UK during the Covid-19 pandemic, the principal method of establishing incidence and prevalence in the community was the ONS Covid-19 Infection survey (the ONS survey), which was established in early April 2020.

52. As I have explained at paragraph 47 of my second statement, the data available to SAGE and policy makers in the early stages of the pandemic was limited and of variable quality

[PV5/02 - INQ000238826]. This seriously hampered understanding of the spread of the virus within UK, and hence the ability to take informed decisions on the timing and nature of the NPIs that could be introduced in response. SAGE stressed the importance of data from community testing, see for example the SAGE 16 minutes of 16 March 2020 **[PV5/37 - INQ000061524]**. I also raised this with No.10 and the Cabinet Office in my capacity as GCSA **[PV5/38 - INQ000533161]**.

53. Again as I describe at paragraphs 503 to 504 of my second statement, it was initially envisaged that PHE would be responsible for conducting a community testing survey **[PV5/02 - INQ000238826]**. However, it became apparent that they would not have the capacity to do this given their other responsibilities at that stage of the pandemic. The ONS therefore stepped in and established the ONS survey, as was encouraged by SAGE on 16 April 2020 **[PV5/39 - INQ000061534]**. The ONS survey was hugely successful; it was a vital source of data for the UK response that was used and admired internationally. Data from the ONS survey fed into the work of SAGE subgroups, particularly SPI-M-O, who occasionally commented on the test data received, including from the ONS survey, and how it could be improved to produce more reliable estimations such as medium-term projections.

54. The interplay between testing data including that from the ONS survey, the modelling output of SPI-M-O, and SAGE advice is exemplified in the minutes of SAGE 62 on 15 October 2020 **[PV5/40 - INQ000061570]**, and the SPI-M-O consensus statement for the same meeting **[PV5/41 - INQ000533154]** The SAGE 62 minutes recorded at paragraphs 5 to 9:

> '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.'

55. I am asked about the degree to which this information was fed back to decision makers and how it informed TTI decision making. As with the output of all SAGE meetings, this information and advice was provided to decision makers and discussed at various meetings.

56. The ONS survey was supported by a private sector workforce from IQVIA, a contract research organisation. Stepping outside my advisory role as GCSA, in March 2020 I linked the CEO of IQVIA – who was offering assistance with therapeutics and data analysis having stopped IQVIA's work on clinical trials because of the pandemic – first to Professor Jonathan Van-Tam following a No.10 meeting, and then to Professor Sir Ian Diamond and the ONS team **[PV5/42 - INQ000533157]**. This collaboration speaks to the importance of the strong industrial biomedical science base in the UK, a theme on which I comment throughout my witness statements for Module 1 **[PV5/03 - INQ000147810]** and Module 4 **[PV5/04A - INQ000474482]**. It is also worth noting that the relative lack of an industrial diagnostics sector in the UK was one of the reasons that I think it was difficult to scale testing.

57. Around the same time that the ONS survey was set up, other community testing studies emerged, most notably the Real-Time Assessment of Community Transmission (REACT) programme led by Imperial College London and Ipsos MORI, and the ZOE COVID Study. These studies were not commissioned by GOS or SAGE, but as GCSA I supported such initiatives as I saw them to be valuable additional data sources for the

work of SAGE and its subgroups. These studies had different methodologies, sampled different populations, and therefore contributed to a good, reliable scientific means of assessing the likely position. I spoke to the scientists in both groups on several occasions through the pandemic. The output of the REACT study would have been provided directly to DHSC, and the ZOE study was also made broadly available. My role, and that of SAGE, was not to present or to prioritise a single source of data, but to give an integrated view based on a wide range of data and analyses. This had the benefit of avoiding any particular piece of evidence being received by decision makers without context or an understanding of the variabilities or uncertainties associated with individual studies, and avoiding a single study being given disproportionate focus.

58. Considering the proliferation of data sources, there was huge value in bringing them together to one place that could be used by the key decision makers. In May 2020, the Joint Biosecurity Centre (JBC) was established to this end. I have explained how and why this happened, and the value that the JBC added, in my second statement at paragraph 714 **[PV5/02 - INQ000238826].**

ENVIRONMENTAL SURVEILLANCE

59. Environmental surveillance technologies, including wastewater testing, have the potential to provide insight on the presence of a virus in the location tested. In particular, it can signal the presence or absence of cases and potentially identify new variants in an area or setting. This form of testing is most useful when case variant or testing rates are low to identify outbreaks or emergent variants. Its usefulness is dependent on a number of factors including the distribution of wastewater outlets (where they drain from). It also depends heavily on the characteristics of the virus in question; for viruses such as polio it is very useful, it certainly had some value in Covid and would not have been worthwhile for HIV. The use of wastewater genomic screening as a tool to detect new epidemics is being explored.

60. I spoke to Dr Maria Zambon from PHE about environmental surveillance in early March 2020, and was informed that at that stage resource was not available to make it feasible **[PV5/43 - INQ000533153]**. However, SAGE continued to consider the scientific underpinning for environmental surveillance in case the position changed **[PV5/44 - INQ000533159]** and the benefits of wastewater monitoring were noted by SAGE, see for example SAGE 67 (12 November 2020) **[PV5/45 - INQ000061575]** and SAGE 86 (8

April 2021). As noted at SAGE 86, wastewater monitoring was particularly useful in detecting outbreaks when prevalence was low, and to detect the presence and geographical spread of new variants. It was less effective for precise quantification of levels of the virus (or particular variants) in a population **[PV5/46 - INQ000061594, §4]**. The CMO and I also spoke to Professor Jaap Van Dissel on 4 September 2020 to learn of the Netherland's positive experience of wastewater surveillance and sought to link British and Dutch teams working in this area **[PV5/47 - INQ000608011 [PV5/48 - INQ000575828**

61. From June 2021 to 7 March 2022, the Environmental Monitoring for Health Protection (EMHP) Covid-19 wastewater monitoring programme was set up and was led by the UKHSA in partnership with Department for the Environment, Food and Rural Affairs (Defra), the Environment Agency, the Centre for Environment, Fisheries and Aquaculture Science (Cefas), water companies and academia. These bodies will be best placed to comment on the experience of wastewater testing during the pandemic and the lessons that can be learned for the future.

MASS TESTING

62. Mass community testing as the term was used was related to TTI but rather than actively looking for contacts it was a way to try to identify everybody infected in a given population at a certain point in time. It has the same intention of identifying infected individuals and isolating them to contain or slow the spread of the virus. As the name suggests, it involves conducting a very large number of Covid-19 tests within a given population (which could be a city or a country) over a limited time period with the intention of separating all of those who are positive from those who are negative. Individuals with positive results are encouraged or required to isolate and further contact tracing may follow. Ideally such testing would cover everyone in the region being targeted and would take place over a short period of time.

63. TTI by contrast is more focussed and less ubiquitous in its coverage but is undertaken continuously and involves seeking contacts. In the UK, the system was intended to operate on a continuous basis once it was scaled up and was used especially to identify infection in symptomatic or at-risk individuals and their contacts.

64. Mass testing was trialled in Liverpool as part of Operation Moonshot, which was an example of a mass testing policy designed to allow for same day results across a community. Operation Moonshot was an operational and policy issue, therefore my and SAGE's involvement was limited. Before the policy was announced, SAGE commissioned work on the potential impact of mass testing from the multi-disciplinary Mass Screening Task and Finish Group, which was considered and endorsed at SAGE 53 (27 August 2020) **[PV5/49 - INQ000061561]**. The minutes are detailed at paragraph 508 of my second statement **[PV5/02 - INQ000238826]**.

65. Mass testing was trialled in Slovakia during the Covid-19 pandemic. I spoke to Professor Pavol Jarčuška, President of the Slovak Society of Infectious Diseases, with the CMO on 16 December 2020 and on 13 April 2021, to discuss their mass testing programme **[PV5/50 - INQ000229932]**, **[PV5/51 - INQ000575830]** My impression was that mass testing had not achieved as much as they had hoped for. It was also my understanding that they found that once a mass testing round ended, people's attitudes to compliance with restrictions changed, resulting in a spike of cases afterwards.

66. Repeated rounds of mass testing are needed to have a significant impact. The conclusion of lead investigator Professor Iain Buchan was that the mass testing pilot in Liverpool did appear to have an effect: he stated 'The world's first voluntary asymptomatic mass testing for Covid-19 in Liverpool likely reduced Covid-19 hospital admissions by more than many of us had anticipated'. Further details can be found in the scientific report produced in relation to this pilot. Much more widespread testing became possible with the advent of simple to use lateral flow tests that did not require a laboratory for analysis.

ASYMPTOMATIC TRANSMISSION

67. As early as SAGE 2 on 28 January 2020 **[PV5/52 - INQ000061510]** it was recognised that there was some evidence of asymptomatic transmission, and on 30 January 2020, a case of asymptomatic transmission was described in an article in the New England Journal of Medicine. From a very early stage of the pandemic, therefore, we worked on the assumption of likely asymptomatic transmission and as the pandemic progressed and data increased, the evidence of asymptomatic transmission was confirmed.

68. The potential for asymptomatic (or paucisymptomatic) transmission and infection was relevant in the following ways to the different testing strategies and data derived from them.

a. PCR and lateral flow tests could pick up asymptomatic cases, which meant that there was value in testing people with and without symptoms, even if those tests were not 100% sensitive. The advice on the reliability of testing asymptomatic individuals was provided in and around March 2020 (testing does work), but unfortunately there was initially some confusion in some parts of government and this is discussed in detail at paragraphs 511 to 523 of my second statement **[PV5/02 - INQ000238826]**.

b. In terms of TTI, the existence of asymptomatic transmissions meant that the contact tracing element of the system could not operate based on symptoms alone. Contacts needed to be asked to take a Covid test regardless of their symptoms, which meant that the demand for tests (and the processing of tests) was higher than it would otherwise have been.

c. The community testing survey was not directly affected by the presence of asymptomatic transmission as it tested for overall prevalence regardless of symptoms. The data it produced assisted in analysing the extent of asymptomatic transmission.

d. Environmental testing was similarly unaffected by asymptomatic transmission.

e. Mass testing tested all individuals regardless of symptoms picked up both asymptomatic and symptomatic infected individuals. The same point applies as with TTI in respect of the need for tests to be provided and processed for contacts of those identified as index cases through mass testing.

ANTIBODY TESTING

69. Testing for active infection with Covid-19 as described in detail in the sections above was by way of antigen testing and molecular testing. TTI uses such tests to identify whether an individual is actively infected, and so whether they might be infectious. This is distinct from antibody (serology) testing, which identifies past infection based on the presence of antibodies, which are proteins produced by the immune system to fight

bacteria and viruses. Antibodies may remain detectable in the blood for weeks, months and sometimes years after the period of active infection. This can be useful to detect who has been infected and may give an indication of immunity that might prevent or decrease the severity of future infection.

70. At various points during the early stages of the pandemic, the importance of antibody testing in addition to testing for active infection was recognised and formed part of the science advice to decision makers. As I describe at paragraph 267 of my second statement, on 14 March 2020 in an email to Mr Cummings, the CMO and I highlighted that serology testing needed to be in place to determine the proportion of asymptomatic cases **[PV5/02 - INQ000238826]**.

71. The role of antibody testing was also discussed in meetings of SAGE. For example, the minutes of SAGE 16 on 16 March 2020 recorded at paragraph 20 that: 'Antibody testing is particularly vital to address the central unknown question of the ratio of asymptomatic to symptomatic cases…' **[PV5/37 - INQ000061524]**. On 9 April 2020, SAGE 24 advised that planning should be done for the introduction of blood tests in care homes to determine who had antibodies **[PV5/53 - INQ000061532, §31]**, see also my second statement, at paragraphs 515 and 530 **[PV5/02 - INQ000238826]**. Antibody testing is also useful in studies like the community infection study run by ONS (discussed above) to determine the proportion of the population previously infected, and later in the pandemic became a routine part of what was measured.

72. I am asked specifically about the relevance of antibody testing in relation to TTI. If presence of antibodies conferred full protection against infectivity, this could have been relevant to TTI, as it would have meant that anyone positive for antibodies might not need to have been traced or isolated. However, that was not the case; antibodies whilst altering the clinical course of the disease do not seem to confer complete or strong protection against infection or infectivity in the case of the SARS-CoV-2 virus.

OTHER MATTERS

73. Throughout the pandemic I spoke regularly to international colleagues about their experiences of the pandemic, and their pandemic responses. Those discussions are set out at paragraphs 704 to 709 in my second statement **[PV5/02 - INQ000238826]**, and I have mentioned a number of specific examples in relation to testing in this statement. As the UK's official representative to the WHO, the CMO gave updates to SAGE from

the WHO as required, and kept me informed of his conversations with scientists in other countries. These were valuable and insightful perspectives, but it was always important to explore points of difference.

74. In 2020 attempts were made to create an App for use in contact tracing. This was led by PHE and NHS Test and Trace together with advice from scientists and engineers. I had no significant input into this project. The proposal was to identify close contacts through Bluetooth on mobile phones and then to automate contact, testing and isolation. Others would be better placed to describe this project and its effects. There were challenges with the number of contacts identified which caused a very high number of potential isolation requests, sometimes occurring more than once. DHSC has produced a report evaluating the pilot study undertaken in the Isle of Wight **[PV5/54 - INQ000533166]**. Those in the TTI team would be best placed to give further information on this approach. There is work going on globally to explore whether such approaches could be useful in the future.

LESSONS LEARNED AND RECOMMENDATIONS

75. I am asked for my reflections on key lessons learned in relation to matters relevant to Module 7. I have discussed lessons learned in my first, second and fourth witness statements to the Inquiry, as well as in the Technical Report published on 1 December 2022 **[PV5/05 - INQ000203933]** which I will not repeat here. Separately, the SAGE development programme has brought together the process lessons for SAGE **[PV5/55 - INQ000142161]**.

76. The varying successes of test and trace schemes across the world, as well as the international nature of the race to identify and develop diagnostic tests for Covid-19, attests to the importance of global perspectives when considering lessons learnt and pandemic preparedness on testing. The 100DM tries to achieve this, and in my Module 4 witness statement, I have explained my role in setting up and co-chairing this initiative, see **[PV5/04A - INQ000474482]**. The 100DM has highlighted three headline needs: (i) restock the armamentarium (i.e. building blocks for vaccines, therapeutics and diagnostics), (ii) make the exceptional routine (i.e. embed in everyday practice what you would need to scale in the event of a pandemic – clinical trials or use of testing for other conditions for example), and (iii) define the rules of the road in advance (i.e. don't leave things to be negotiated in the middle of the pandemic – sort out regulatory approaches

for example in advance). All of these needs are all relevant to both the development of a test, and the various testing schemes, discussed in this statement. These lessons are discussed in more detail in my Module 4 witness statement **[PV5/04A - INQ000474482]**, and an up-to-date summary is provided in the 100DM Fourth Implementation Report, published 31 January 2025. This report highlights three essential priorities for 2025, one of which is to 'collaborate with partners in the diagnostics ecosystem to enhance coordination and implement the 100DM roadmap' **[PV5/56 - INQ000575831 page 5]**. These interventions of vaccines, therapeutics and diagnostics need collaboration with the private sector which will ultimately make and distribute them.

77. **Detect early and be ready.** Any unfolding pandemic requires an effective early warning system to detect new infectious agents (which might include the use of environmental sampling), and the rapid development of diagnostics, therapeutics and vaccines, so that the spread of the disease can be brought under control. Testing is an integral part of this. Once a pandemic threat has been identified, high quality validated diagnostic tests are required. In the Covid-19 pandemic, diagnostic tests were developed within a week, and made more widely available within 64 days. The first rapid diagnostic tests that did not require a laboratory gained WHO approval in 236 days. Whilst these are significant achievements, the aim is be ready with a rapid test within 100 days of an outbreak of any new epidemic or pandemic. The 100DM has produced reviews of how the systems are working in relation to the Mpox outbreak, see my Module 4 witness statement **[PV5/04A - INQ000474482, §151]**.

78. **TTI works best at lower prevalence.** A TTI system works most effectively if prevalence is low in comparison to the capacity to test, trace and isolate. If there is sufficient capacity to test, contact trace and isolate those exposed to a virus then there is a greater likelihood that the virus can be contained. If there is high prevalence compared to capacity then it becomes much harder and eventually impossible to contain the virus. Therefore, having a readily scalable TTI system as soon as a pandemic threat has been identified is crucial to containing and controlling the spread of the virus, at least for certain types of viral infection. The pandemic response of South Korea in the early months of the pandemic, building on its experience handling MERS, highlights the importance of having a scalable TTI system. The inability of the UK to scale up the number of tests available meant that the UK quickly departed from 'contain' to 'delay' strategies. Importantly, this does not require the constant presence of an enormous and expensive TTI infrastructure, rather an identification in 'peace time' of how a testing system would be scaled, for example by using regional public health expertise and pre-existing

diagnostics laboratories. This would also include forethought on public health communication strategies particularly related to TTI, which need to be developed in advance of a pandemic.

79. **Data systems are essential.** One of the principal lessons from the UK pandemic response, in particular with regard to testing, is the importance of data collection, data flow, interoperability, data systems, and analytics. I refer the Inquiry to my Module 1 witness statement where I explain the lessons learned with regard to data **[PV5/03 - INQ000147810, §§87 – 94]**.

80. **Inequality must be considered.** As I stated in my oral evidence to the Inquiry during Module 1, it is a terrible truth that all pandemics feed off inequality and drive inequality, and that this needs to be built into the thinking right at the outset. It is entirely foreseeable that pre-existing structural and health inequalities within ethnic minority and other vulnerable groups will result in disparities in risk and outcome. Accordingly, policymakers should assume that marginal and vulnerable communities will be most affected by a pandemic. These considerations were relevant to testing, in particular TTI, as marginalised communities were often less able to access testing and less able to self-isolate. These are policy and operational matters that lay outside the remit of SAGE. SAGE gave high level advice on modes of transmission and the period of time for which someone was infectious, which was relevant to certain closed communities like care homes and prisons, but SAGE did not take an operational role in designing policies, guidance and practices specific to those communities. In a similar vein, SAGE highlighted the emerging data on disparities specific to Covid-19, and this is summarised in my second statement at paragraphs 552 to 562 **[PV5/02 - INQ000238826]**.

81. The evidence I have given in this statement is focussed on matters specific to Module 7. In order to provide wider context, and with the agreement of the Inquiry, I have also appended in full the witness statement that I gave in Module 2. I hope that, taken together, this evidence will assist the Inquiry in its work.

Statement of Truth

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

Signed: Personal Data

Dated: 13 March 2025