Witness Name: Professor Sir Gregor Smith
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UK COVID-19 INQUIRY
Module 2A

WITNESS STATEMENT OF PROFESSOR SIR GREGOR SMITH

In relation to the issues raised by the Rule 9 request dated 30 August 2023 in connection with Module 2A, I, Professor Sir Gregor Smith, will say as follows: -

1. I am Professor Sir Gregor Smith, currently employed as the Chief Medical Officer (CMO) for Scotland.

2. This statement covers the period from 21 January 2020, which is the date on which the World Health Organisation (WHO) published its 'Novel Coronavirus (2019-nCoV) Situation Report -1' and 30 April 2022, by which time the remaining Coronavirus restrictions had been lifted in Scotland.

3. I have prepared this statement myself and by reference to records and factual material provided to me by the Scottish Government Covid Inquiries Response Division, policy officials and external sources.

4. Unless stated otherwise, the facts stated in this witness statement are within my own knowledge and are true. Where they are not within my own knowledge, they are derived from sources to which I refer and are true to the best of my knowledge and belief.

Sources of advice; medical and scientific expertise, data and modelling

5. Strategic decisions relating to the response to Covid-19 were made by Scottish Ministers. As CMO I was amongst the advisers who attended meetings where advice was discussed, agreed and submitted to Scottish Ministers. Officials from across the Health & Social Care Directorate (HSCD) provided a breadth of Ministerial submissions and advice across a wide range of key areas. Similarly, I provided input to advice for Scottish Ministers that originated from other departments of Scottish Government. In contributing to this advice, I provided evidence and professional clinical advice to officials alongside my personal opinion, but I was not the policy or strategy lead.

6. Throughout the Covid-19 pandemic, within Scottish Government there was co-operation between myself, the Deputy Chief Medical Officers (DCMOs), the Chief Scientific Adviser (CSA), the Chief Nursing Officer (CNO), the National Clinical Director (NCD), the Chief Scientist (Health) and other clinical advisers. Evidence, news and pertinent information on the pandemic was carefully considered and clinical advice for colleagues and Scottish Ministers formulated where required.

7. It should be noted that the CSA Scotland does not carry out the same role as the UK Government (UK Government) Chief Scientific Adviser (GCSA). The two roles have some similarities but there are also key differences in scope and responsibility, and therefore they are not equivalent. The CSA Scotland is responsible for ensuring Scottish Ministers and officials have access to science advice and evidence, to inform policy development to benefit the economy, people and environment of Scotland. The CSA Scotland does not lead on issues of public health or clinical advice, including in an emergency.

8. The role of clinical advisers is to try to equip decision makers with as much information as possible to allow them to come to informed decisions, based on available evidence. It was not always possible to convey evidence with high confidence, particularly in the early stages of the pandemic, because this was a novel coronavirus with an evidence base and knowledge that was uncertain and still building.

9. The clinical information conveyed could be used by the Directorate for Population Health and the Covid Public Health Directorate to inform the policy decisions made by Scottish Ministers.

10. My role, and that of my team, is as independent clinical advisers to the Scottish Government. The way the role of CMO is set up has the effect that it sits slightly separately, though remains complementary to the rest of government. As a clinician and as a scientist, my first duty is a professional and ethical one, accountable to the regulatory body, which is the General Medical Council (GMC). To remain as a medical doctor, I cannot breach good medical practice, and this provides the CMO with their independence. In addition, an important part of the role of CMO is to be able to use judgement and experience to be able to communicate effectively and fully, so that commitment to professional and ethical requirements as defined by the GMC are not breached.

11. The approach to pandemic preparedness in Scotland was guided by the 2011 UK Pandemic Strategy and subsequent operational guidance produced in 2012. These were augmented by further engagement with NHS organisations through either specific guidance (2013 NHS Scotland Preparing for Emergencies) [GS2/001 – INQ000102971] or actions identified through exercises (Silver Swan, Cygnus) [GS2/002 – INQ000103011].

12. The extent of my responsibilities for matters relating to pandemic preparedness and early response to the pandemic in my role as DCMO (in the period from 2015 to my appointment as interim CMO for Scotland on 5 April 2020) was limited to participation in Exercise Cygnus. I provided clinical support and advice to Mr. John Connaghan, Chief Operating Officer (COO), NHS Scotland, in October 2016.

13. The Scottish Government involvement in the exercise was different to that in England, being at officials' level only. I participated in UK cross-government calls during the exercise, providing clinical advice and explanation to accompanying Scottish officials where this was necessary or useful. Much of this exercise focused on deliberation and response elsewhere in the UK, but learning derived from it was important and useful when contextualised for Scotland.

14. The Scottish Government subsequently considered the 22 recommendations made after the exercise and of these, 14 recommendations were considered complete for a Scottish context; work to address the remaining 8 recommendations was then taken forward by others. I was not involved in the consideration of these recommendations.

15. Dr Catherine Calderwood (who was CMO at the time of Exercise Cygnus) was verbally debriefed on this exercise and other aspects of pandemic flu work I was involved in, at our regular monthly catch up meetings. These meetings were not minuted.

16. No action was expected of Dr Calderwood as a result of these meetings, with briefing being for awareness and interest. Policy work in relation to pandemic planning was led elsewhere in Scottish Government, with health aspects being covered by the Health Resilience Unit of the COO's Directorate.

17. There was a debrief and presentation on the content of the exercise at the Health and Social Care Management Board (of which Dr Calderwood was a member) on 30 November 2016. This was led by John Connaghan and I provided clinical support during the presentation.

18. A number of issues in relation to the exercise were discussed including:

- Adjusting models of care when demand for services outstripped supply;
- National stockpiles of antivirals, management and efficacy;
- Population level triage;
- Critical care provision; and
- Clarity around national and local roles, including identifying Gold Commanders.

19. A copy of the minutes and PowerPoint presentation shown and distributed at that meeting is enclosed [GS2/003 - INQ000249090] and [GS2/004 – INQ000226595].

20. In addition to supporting the CMO and COO during Exercise Cygnus, I was asked to chair a Short Life Working Group (SLWG) in 2017.

21. The purpose of the SLWG was to identify key information from the UK Pandemic Flu plan and alongside learning from exercises, contextualise and communicate this to Scottish response structures; particularly health boards and resilience partnerships, emphasising the need for a 'system level' response and adaptation where operational structures were different.

22. Importantly, this task was viewed as a communication exercise rather than the development of new guidance. The output of the SLWG formed from policy officials and service leads, was a Deputy Chief Medical Officer letter issued 6th November 2017 [GS2/005 - INQ000228440].

23. Further information and opinion on pandemic preparedness can be found in my response to the Rule 9 request dated 13th June 2023 in connection with Module 1 – M1-SMITH.01 [GS2/006- INQ000228359].

24. Following the resignation of my predecessor Dr Calderwood on 5 April 2020, I was appointed interim-CMO by the First Minister (FM). I was already the DCMO and therefore the best equipped person to take on the role and provide continuity to the CMO Directorate (CMOD).

25. Controls on internal and external recruitment apply across the core Scottish Government and have to follow an open and transparent process. The role of CMO, with recruitment that necessitates consideration of candidates from outside government, is overseen by civil service commissioners and is a robust and protracted process, generally requiring several months to navigate from beginning to appointment. Given the developing situation with the pandemic and all the resources this was consuming across Scottish Government, it would not

have been appropriate to run a recruitment campaign at that time. The recruitment exercise subsequently took place later in the year and I was appointed to the CMO role on a permanent basis in December 2020, after participating in a competitive process with other candidates.

26. The change in CMO did not affect the ability of the CMOD to respond to the pandemic. Being in the role of DCMO prior to the start of the pandemic and in the first few months of it, gave me insight and allowed a smooth transition. Although the role was on an interim basis between April and December 2020, in practical terms the CMO role was exactly the same and there were no implications of the role initially being interim in terms of ability to respond to the pandemic.

27. The resignation of Dr Calderwood did not affect Scotland's pandemic response and the CMOD continued to provide advice to policy colleagues and the Scottish Cabinet.

28. After I took office as interim CMO in April 2020, I reassessed the capacity of clinical advice available to the Scottish Government and identified that having more senior advisers would be beneficial given the ever increasing workload during the pandemic. This was not because advice available was lacking in clinical expertise, but because the volume of requests for such advice was increasing exponentially (including out of hours and at weekends) from policy officials and Scottish Ministers. Even with these additional appointments, working hours for my senior team were generally of the order of 12-16 hours each day, 7 days a week. The intensity of this work lasted throughout 2020 and beyond, with very little noticeable reduction throughout the period covered by this module.

29. At the start of April 2020, there was one DCMO and over the Summer of 2020, the number of DCMOs increased to three. Each of the DCMOs who were appointed at that time had a broad portfolio and complemented one another's skills and experience.

30. The CMO Medical Advisory Group (MAG) was set up at the beginning of March 2020. This group met very regularly and sometimes every morning at the height of

the pandemic. The group met virtually and not in person. Its purpose was to create situational awareness and contribute to solving issues and problems and was one of a number of different groups working on the response to the pandemic.

31. The CMO MAG then evolved into the Professional Advisory Group (PAG) supported by the Clinical Cell Group. The Terms of Reference for both groups is attached as exhibit - [GS2/007 – INQ000326368 and GS2/008 – INQ000326414]. These groups were useful advisory fora in which to discuss thorny medical or nursing issues thrown up by the pandemic and seek to reach a consensus on how best to approach them. They provided effective support to the CMO, DCMOs, the CMOD and other senior clinicians in Scottish Government.

32. Most of the advice PAG provided would have been shared with Scottish Ministers by the appropriate policy teams and CMOD do not hold these submissions. CMOD did seek PAGs advice and support in developing guidance on the management of Covid-19 which was published in April 2020. A submission from this time is attached as exhibit – [GS2/009 - INQ000078542]

CMO/CMOD advice and medical/scientific advisory bodies

33. The CMO attended many advisory group meetings, depending on the issues being discussed and the need for clinical advice. The CMO is routinely informed when Scientific Advisory Group for Emergencies (SAGE) is being convened, but attendance at SAGE or any of the advisory group meetings may be delegated to other senior clinicians, depending on availability or the issue being discussed. At the Scottish Government level there is internal discussion and decision amongst advisers about who would be the most appropriate attendee(s) at SAGE or any of the advisory group meetings for the Scottish Government's interests.

34. I am unable to recall every advisory body I attended but the minutes of those meetings would note my attendance or that of the previous CMO, Dr Calderwood.

35. I was aware of the following meetings:

- Scientific Advisory Group for Emergencies (SAGE);

- Four Nations Chief Medical and Scientific Officers;
- Scientific Pandemic Influenza Group on Modelling (SPI-M);
- Scientific Pandemic Insights Group on Behaviours (SPI-B);
- Joint Committee on Vaccination and Immunisation (JCVI);
- Joint Biosecurity Centre (JBC);
- New and Emerging Respiratory Virus Threats Advisory Group (NERVTAG);
- UK Health Security Agency (UKHSA); and
- Scottish Government Covid-19 Advisory Group (C19AG), including its Sub-Groups.

36. The role the advisory bodies played in the management of the pandemic in Scotland can be found in their Terms of Reference.

37. SAGE and bodies such as NERVTAG are part of the critical function of how evidence is developed, received and considered. They play an extremely valuable role in the management of the situation. SAGE tries to identify what evidence is needed, whether it exists, and if so, where it can be obtained; it is then considered and consensus formed about the significance and application of this evidence in advice.

38. Between January 2020 and April 2022 the roles of advisory bodies developed and evolved as understanding of the pathogen increased. This improved understanding of the virus and the disease, and helped to develop the best available responses (both pharmaceutical and non-pharmaceutical).

39. My understanding of the Scottish Government's strategic aim was to minimise the overall harm of the pandemic. In April 2020, the Scottish Government published the way it would take future decisions on its pandemic response in the Framework for Decision Making [GS2/010 – INQ000131025]. This document enunciated the Scottish Government's principles and approach to managing the pandemic, particularly in relation to the use of NPIs and the use of medical and scientific advice. It also covers the respective role of Scottish Ministers and their advisers.

40. I first attended a SAGE meeting on the Wuhan Coronavirus (Covid-19), in mid-February 2020 in my capacity as DCMO and as an observer. Questions about the operation of SAGE, including decisions about attendees and how meetings are organised, are for the UK Government to answer (SAGE Secretariat sits in the Government Office for Science, known as GO-Science). All of the minutes from SAGE meetings (which have been provided to the UK Inquiry) record my attendance, though I note that there is some uncertainty about whether all observers were recorded in early meetings.

41. As discussed in the Module 1 DG Health and Social Care (CMOD/CSO) statement provided to the Inquiry on 17 February 2023 [GS2/011 – INQ000184897], SAGE was a useful source of evidence and scientific consensus from which the CMO could develop advice for the Scottish Government, but a drawback was that observers and Scottish Ministers could not ask questions directly of SAGE participants. That was why the FM arranged for Dr Calderwood, then CMO, to set up the Scottish Covid-19 Advisory Group (C19AG).

42. In Scotland, where a decision requires to be taken by Scottish Ministers that may, or is likely to, impact on the health of members of the public, it is embedded in Scottish Government processes that clinical advisers are involved at an early stage. Clinical views are sought and attendance requested at decision-making meetings (such as Scottish Government Resilience Room (SGoRR) or Cabinet), whether that is the CMO, DCMO or other senior clinical advisers.

43. In order to formulate advice to Scottish Ministers, the CMOD seeks to identify trusted sources of evidence (for example published, peer reviewed journals) on which to base its advice. In a novel situation, such trusted sources of evidence may be absent. In that case, CMOD can look to data from our own country, but can also rely on information that has been shared globally from other countries, based on their experiences. The overarching principle, as a clinical adviser to Scottish Ministers is first and foremost, whether the evidence under consideration is of sufficient quality for the purposes of decision making. There are three broad categories for assessing the quality of evidence: low, medium, and high

confidence. One of the functions of SAGE and other advisory bodies is to consider sources of evidence and their quality.

44. As more was learned about the virus, views within the scientific community could and did change, it was a dynamic process. The key to an effective scientific process is the ability to look at all the available evidence and form a consensus within the appropriate advisory structure, e.g., C19AG, SAGE, NERVTAG.

45. Though I do not remember the FM referring specifically to the phrase "following the science or scientific advice", there were occasions when decision makers openly engaged with the public around how decisions were made and the scientific evidence or clinical advice that underpinned them. As a clinical adviser working within the Scottish Government for over ten years, I have always felt that my advice was sought and was valued, and this was even more evident during the pandemic response. My view is that this approach was very important in managing public confidence, as were the joint media briefings held by Scottish Ministers and clinicians every day. Indeed, polling during the course of the response would seem to support this, with high and sustained levels of confidence being achieved during this time.

46. The policy response during the period covered in this module was informed by available scientific evidence and clinical advice. Decisions on a policy approach at a particular time may have been further influenced by the feasibility of those approaches and prevailing tolerance of risk, with balanced advice being formed through consideration by the Four Harms Group [GS2/012 – INQ000232945].

47. The key policies were intended to suppress the level of community infection to as low a level as possible, recognising that opportunities to achieve no community transmission became harder as the pandemic progressed. The driver to these policies was to restrict morbidity and mortality as a direct effect of Covid-19 as much as possible, whilst pharmaceutical treatments and vaccine mediated protection were developed and introduced at a population scale. These policies included approaches to mass testing, contact tracing and isolation of people with identified infection alongside other protective measures ranging from personal

hygiene measures, social distancing, use of face coverings and when necessary, restriction of gatherings or travel.

48. The fourteen territorial health boards in Scotland have corporate board-level responsibility for the protection and improvement of their population's health and for the delivery of frontline healthcare services. These boards have core functions under the Public Health etc. (Scotland) Act 2008. Each board has a public health team led by a Director of Public Health (DPH). The teams are responsible for providing services across all of the domains of public health and for working in partnership within the health board and with external organisations and communities to improve population health outcomes. In a few areas, the DPH is a joint appointment between the NHS Board (the Board) and the Local Authority (LA). Public Health Directorates within health boards vary in size, organisation and links.

49. The DPH role is central to the effectiveness of public health across Scotland, ensuring locally sensitive responses to national priorities and policies. Thirteen functions are agreed to be part of the role of DPH. They are as follows:

- Providing public health advice to the Board;
- Providing public health advice to the LA;
- Contributing to corporate leadership of the Board;
- Producing an independent annual report;
- Providing leadership and advocacy for protecting and improving health and reducing health inequalities;
- Managing the Board's specialist public health team and associated support staff and resources;
- Ensuring the Board and its staff have access to timely, accurate and appropriately interpreted data on population health;
- Ensuring the implementation of NHS components of Scottish Government public health or health improvement policies;
- Overseeing the coordination and effectiveness of screening programmes;

- Communicating with the public via the media on important public health issues;
- Contributing to emergency planning;
- Ensuring all appropriate infection and environmental surveillance and control measures are in place, and
- Ensuring health needs assessments are carried out.

50. DPHs meet collectively and have scope to ensure appropriate consistency of approach across Scotland. Throughout the pandemic DPHs engaged with Scottish Government officials and clinicians, including myself. This included regular check in meetings organised by the Covid Public Health Directorate, via the National Incident Management Team (NIMT) and through local management meetings.

51. From October 2020 through to April 2022 (and beyond), a Four Harms Group was specifically convened as a forum for discussing the various harms and potential responses to inform advice for decision making. The consideration of these harms encapsulated impacts on health, (both directly and indirectly), society and the economy. This supported Scottish Cabinet decision-making through the consideration of the current and potential future state of the epidemic and any measures proposed (including any legal restrictions or requirements). I was a core member of this group.

52. The Four Harms Group was not itself a decision-making forum nor did it have responsibility for Scottish Government policy. It existed to enable the development of well-rounded material, with inputs and evidence for each of the harms from their chief advisers to support Scottish Ministers' decision-making in Cabinet.

53. The purpose of the Four Harms Group, as set out in its Terms of Reference [GS2/012 – INQ000232945], was to support the Director General for Constitution and External Affairs in his role supporting the FM and Deputy First Minister (DFM) in leading collective decision-making through cross-government co-ordination:

54. As noted in the Terms of Reference, the core membership of the Group was formed from the key experts (Scottish Government professional advisers) for each of the four harms (referred to as the 'Harm Leads'), or their nominated substitutes. This enabled those individuals to ensure that any potential impacts on all four harms were considered appropriately in the Group's discussions, in line with the principles and purpose of the Group.

55. The Group also included the Chair of the Directors of Public Health, and representatives from LAs, Society of Local Authority Chief Executives (UK) (Solace) and Convention of Scottish Local Authorities (COSLA). The Group did not engage directly with the UK Government (or the other devolved administrations), but UK Government (and devolved administrations) proposals and measures would be discussed at meetings of the group.

56. We had constructive and transparent relationships between medical and scientific advisors/advisory bodies and key Ministerial decision-makers in the Scottish Government during the pandemic. Cooperation, locally, nationally and globally, is critical. From my perspective, throughout the Covid-19 pandemic, we enjoyed exceptionally good and productive professional relationships between clinicians and professional advisers in each of the four UK nations.

57. Throughout the pandemic, myself or a DCMO would be in attendance to provide clinical advice in SGoRR. Expert medical and scientific advice was sought, carefully considered and acted upon by Scottish Ministers. I attended Cabinet every week and gave an update of the epidemiology of the pandemic (including the latest data and modelling) and sought to explain and 'translate' clinical and scientific advice to enable Ministers to understand it and make their decisions.

58. Prior to the meeting, I would have discussions with senior clinicians so that a clinical consensus could be presented to Scottish Ministers to enable them to make decisions. There were sometimes wide-ranging views across the wider clinical and scientific community. I sought to formulate this advice on the centre ground where there was most confidence and agreement. It would not have been helpful or useful to present a wide range of different, often conflicting, medical or scientific advice

to Scottish Ministers; my role was to communicate the advice as clearly as possible to enable them to take decisions. Nonetheless, there were occasions when different stances within the wider scientific community were evident. I found Scottish Ministers to be aware and generally well informed with these discussions so that we often discussed the quality and nature of the evidence that informed different positions e.g. on the use of face coverings. As more was learned about the virus, views within the scientific community could and did change: it was a dynamic process. The key to an effective scientific process was the ability to look at all the available evidence and form a consensus within the appropriate advisory structure, e.g., C19AG, SAGE, NIMT.

Informal Decision Making and communication

59. Key briefings and information, e.g. the passing of knowledge or advice on health matters during Covid-19 was not communicated by me to Scottish Government officials or Ministers via WhatsApp or text message communications. There may have been some limited informal discussion with the FM, Deputy First Minister (DFM) or Cabinet Secretary for Health (CSH) such as before media briefings, but key advice would be given by way of submissions provided by policy areas and sent via email. To the best I can recall and/or from what I have been informed, I was a member of the following messaging groups: Health and Social Care Directors; CMO Private Office Staff; CMO and DCMO (Scotland); CMOs and DCMOs (UK); CMO Directorate Clinical Weekly Call; CMO Directorate Senior Management Team; CMO/DCMO/PHS; CMOs, HPS & Policy Lead; CMO / Scottish Academy / Medical Royal Colleges; Directors COVID; SAGE; LFD; Covid Outbreak Group; Quantum of Omicron; Star Chamber; COP ON!; The Incredibles; Care Home Vaccination Group. The messages have not been retained in line with SG policy (see paragraph 61):

60. Informal telephone or video meetings were not recorded or minuted because either the technology was not available to do so (e.g. via Skype) or due to the challenge of working remotely there would not be someone available from Scottish Government to take minutes. Informal communications did not affect the efficacy of decision making or the proper recording of decisions. Where it was necessary

to record formal minutes, actions, provide advice etc., this would be done via email and policy submission documents with records kept accordingly. The formal record would accurately record dissent or disagreement (if any) amongst participants, including Civil Servants, experts, advisers etc.

61. Further details on guidance, policies or frameworks which governed or guided any such communications, messaging and data retention can be found in the witness statement of the Director General Corporate in relation to records management and the use of private messaging services, raised by the Rule 9 notice dated 22 June 2023 and served on the Scottish Government, in connection with Module 2A [GS2/013 – INQ000215474].

Scottish Government C19AG and SAGE

62. The C19AG was established in March 2020 by direction of the previous CMO (Dr Calderwood) to consider the scientific and technical concepts and processes that were key to understanding the evolving Covid-19 situation and potential impacts in Scotland.

63. Questions relating to why the C19AG was not formed earlier, the time it took from Professor Andrew Morris being approached to chair the group, to it being announced and why the group did not hold its first meeting earlier should be addressed to Dr Calderwood as I was not involved in these discussions.

64. Whilst I cannot comment on early discussions between Dr Calderwood and the First Minister, it is not my view that it took overly long for the activities of the C19AG to commence once a decision to form the group had been made. Indeed, even before I took over as Interim CMO, it had already met on three occasions (26 March 2020, 30 March 2020 and 2 April 2020) with a further meeting taking place on the day I assumed the role of Interim CMO (6 April 2020). A letter to the First Minister (8 April 2020) outlines work of the C19AG to that date [GS2/014 – INQ0002174657. As this work developed, some additional members were identified to aid specific discussion (see below), but the core remit of the group and the relationship with other advisory structures, such as SAGE, were largely unchanged.

65. Members of the C19AG were chosen based on their scientific or technical expertise and agreed between myself and the chair Professor Andrew Morris.

66. As the work of the group progressed, further members with specific interests and expertise were identified to provide broader expert input and greater resilience to fatigue and illness should it arise. These members were as follows:

- Professor Devi Sridhar (since 30 March 2020);
- Professor Jacqui Reilly (since 23 April 2020), as Chair of the Covid Nosocomial Review Group;
- Professor Sir Harry Burns (since 15 June 2020), as Chair of the Public Health Threat Assessment subgroup;
- Chief Social Policy Advisor (since 19 June 2020), as Chair of the Education and Children's Issues subgroup;
- Professor Nick Hopkins (since 16 October 2020) to provide additional behavioural science expertise;
- Chief Social Researcher (since 11 August 2021) replacing the Chief Statistician; and
- Professor Nick Phin (since 7 December 2021) replacing Angela Leitch for Public Health Scotland (PHS).

67. There were no further areas considered but rejected.

68. At all stages, but particularly in the earliest months, there were hundreds of potential questions to answer about the pathogen, the disease, their impacts and possible effective interventions and these therefore required careful but rapid prioritisation. Doing so involved multidisciplinary groups and committees drawing on a range of scientific expertise.

69. Throughout the pandemic, ongoing collaboration between scientific experts (including SAGE), policy and operational teams, helped determine which questions were most needed to inform the response, as well as what science could

reasonably deliver to answer them; and with what degree of confidence, in a given timeframe.

70. SAGE had a central and very critical role in interpreting the latest research evidence and its relevance to UK policy, determining confidence in research outputs, summarising where consensus views were clearest, and highlighting further questions that needed research focus. The breadth of disciplines present at various SAGE meetings where new research was considered is notable; a list of participants is publicly available.

71. Alongside existing Sub-Groups of SAGE such as the Scientific Pandemic Influenza Group on Modelling Operations (SPI-M-O), further groups were set up to provide regular specialist advice on key topics such as, but not limited to:

- Children and young people;
- Care settings; and
- Environmental modelling.

72. Given the above I did not have any concerns regarding the adequacy or sufficiency of scientific and other expert advice (including where relevant, any underpinning data) on which decisions about the Scottish Government's public health response to Covid-19 were based.

73. During the pandemic, advisory group members were able, capable individuals, however reliance was placed upon these individuals for a long period. That challenged personal and organisational resilience. It is difficult to find a way around this, the need to have as many advisers as possible with experience in the particular area being considered and the relatively small pool of experts to draw on, but in the future, from my perspective, greater support requires to be given to both individuals and donor organisations. In addition, an appropriate supporting structure needs to be in place, including administrative support.

74. The system by which scientific advice was given was adequate between January and February 2020 but there was still scope for refinement and improvement. The

quality of the advice was clear and helpful, but in early interactions with SAGE, it proved difficult to directly ask questions as an observer in the meeting. However, this improved as the meetings matured, along with the constructive reciprocal relationship that subsequently developed between the C19AG and SAGE from late March 202 onwards.

Sub-Groups

75. The C19AG had a number of Sub-Groups. These were: the Advisory Sub-Group on Public Health Threat Assessment; the Advisory Sub-Group on Education and Children's Issues; the Advisory Sub-Group on Universities and Colleges; the Covid-19 Nosocomial Review Group; and the Scientific Advisory Group on Testing. All of these groups were chaired by members of the C19AG. The purpose of each Sub-Group is outlined in its terms of reference [GS2/015 – INQ000326365, GS2/016 – INQ000326364, GS2/017 – INQ000292485, GS2/018- INQ000326415, GS2/019 – INQ000326369] . Members of the Sub-Groups were chosen based on their scientific or technical expertise and agreed between myself and the chair Professor Andrew Morris.

76. The meetings of the C19AG and its Sub-Groups provided an effective role in giving advice which fed into Scottish Government decisions on Covid-19. However, the role of the C19AG and its Sub-Groups was purely advisory and they made no decisions in relation to the Scottish Government response to the pandemic.

77. A full list of meetings of the C19AG, including attendance, was provided in the statement [GS2/020 – **INQ000215468**]. The minutes, agendas and papers for the meetings and the publication dates of the C19AG and its Sub-Groups have previously been supplied to the UK Inquiry.

Operation of advisory structures

78. Strategic decisions relating to the response to Covid-19 were made by Scottish Ministers. As CMO I was amongst the advisers who attended meetings where advice was discussed, agreed and submitted to Scottish Ministers. Officials from

across the Health & Social Care Directorate (HSCD) provided a breadth of Ministerial submissions and advice across a wide range of key areas. Similarly, I provided input to advice for Scottish Ministers that originated from other departments of Scottish Government. In contributing to this, I provided evidence and professional clinical advice to officials alongside my personal opinion but I was not the policy or strategy lead.

79. The C19AG provided advice in writing to the Scottish Government in the form of papers setting out the consensus view of the members. Some of this advice was in response to requests, while other advice was provided on the C19AG's own initiative. If there was not a consensus on the issue or on aspects of an issue then the advice made clear where that was the case.

80. Communication channels were very clear, as the C19AG reported to me with excellent secretariat support, therefore ensuring effectiveness. It should be emphasised that the C19AG only provided advice to Scottish Ministers and officials, it did not make decisions. The C19AG did not produce bulletins, briefings or other written guidance for the Scottish Government other than their formal written advice.

81. The CMO is the most senior adviser to the Scottish Government on health matters. As a senior civil servant with statutory responsibilities, the CMO reports to and is a Director within the Health and Social Care directorates and also sits on the Health and Social Care Management Board. The CMO has a more independent status in Scottish Government than most civil servants. The key responsibilities of CMO are as follows:

- Providing policy advice to Scottish Ministers on healthcare and public health;
- Leading medical and public health professionals to improve the mental and physical wellbeing of people in Scotland;
- Providing clinical advice on professional standards and guidelines;
- Investing in research, particularly related to the NHS;

- Encouraging young people to take up jobs in the medical and public health sector; and
- Playing a key role in working with Directorate for Health and Social Care (DHSC) public health agencies and the NHS to convert scientific advice from expert committees into a policy response.

82. The CMOD seeks to achieve the best health and care outcomes for people by working with Scottish Ministers and stakeholders to protect and improve public health, and to oversee the effectiveness of healthcare services in Scotland. The role of the DCMO is to support the CMO in order to achieve the delivery of these outcomes and services. In some instances this will also involve deputising for the CMO at meetings or events when the CMO is on leave or otherwise unavailable.

83. DCMOs provide clinical advice clinical advice to the CMO, policy colleagues to inform related guidance and to support ultimate decision making by Scottish Ministers.

84. As members of the C19AG and Sub-Groups, the CMO, DCMOs and the Chief Scientist (Health) would normally have been involved in discussing and agreeing advice.

85. For the roles played by the CSA and NCD please refer to the witness statement [for Module 2 and 2A provided by the Director General for Health and Social Care on 23 June 2023 [GS2/021 – **INQ000215470**

86. To begin with, cross government co-operation within the Scottish Government was informal. After the Four Harms Group was set up in Autumn 2020 this became a formal process to consider each of the four harms that had been identified as having been caused or likely to be caused as a result of the pandemic. Those harms were: (i) the direct effect on society's health by the virus (ii) the indirect effect on health as a result of the virus (iii) social (including issues such as loneliness and education) and (iv) economic.

87. As CMO I sat on the Four Harms Group. As part of its deliberation, the Four Harms Group considered the impact of the pandemic on vulnerable and 'at risk' groups. This group considered the four harms in a rounded way and, as CMO, whilst my role was most concerned with advice in relation to harms (i) and (ii), those taking the decisions in Scottish Government were required to consider and balance all the identified harms. The structures and processes in place during the course of the response to the pandemic were generally effective and appropriately set up for the extent of knowledge of this novel virus at that given time.

88. More information on the four harms process and the Four Harms Group is provided within the Module 2A DG Strategy and External Affairs corporate statement, provided to the Inquiry on 23 June 2023 [GS2/022 – INQ000215495].

89. Policy papers were drawn up by the different teams within Scottish Government. Either I and/or the DCMOs would have input into those policy papers to confirm if interpretation of the evidence/data was correct and whether we agreed, on a clinical basis, with the suggested approach. The submission would often outline an approach with options for Scottish Ministers, who could ask me for my views or interrogate the evidence more deeply, so as to aid determination of which option might be most appropriate.

90. The papers are owned and held by the appropriate policy teams and are not retained by CMOD as per the agreed process.

91. At each meeting of the Scottish Cabinet I provided a verbal briefing to Scottish Ministers on the latest epidemiological data. In addition to this, I would provide a brief update on the health service response and any developments of note in relation to emerging evidence, the international picture and the wider response. Information for this briefing was obtained from a variety of different sources, including PHS, Scottish Government Health and Social Care Analysis (HSCA), Health Boards, NIMT, Cabinet Office, UK Health Security Agency (or predecessor PHE) and international collaborators [GS2/023 – INQ000326416].

92. I sought to focus my advice where there was most confidence and consensus within the scientific community. Over the course of the pandemic there were occasions when the scientific community had divided views on the importance of particular approaches or the interpretation of evidence. Conveying where the centre ground of opinion existed, whilst acknowledging that there were differences in opinion, was an important aspect of providing advice. In reality, Ministers were generally very aware and conversant with these issues to an extent where rational discussion around the evidence and confidence in its interpretation was possible.

93. The "Chief's Group" was a helpful group in conveying situational awareness and discussing emerging evidence between governmental chief advisers. It did not have a role in formulating specific advice [GS2/024 – INQ000292568] [GS2/025 – INQ000292569] [GS2/026 – INQ000292571] [GS2/027 – **INQ000292573** [GS2/028 – INQ000292572] [GS2/029 – INQ000292574] [GS2/030 – INQ000292575] [GS2/031 – **INQ000292576** [GS2/032 – INQ000292570].

94. The CSA Scotland established and co-chaired with me a regular meeting of 'Chief Advisers' across scientific and evidence-based disciplines, from summer 2020, to strengthen the co-ordination of commissioning and using science advice and evidence in connection with Covid-19. This was a way to share information and avoid duplication in terms of commissioning work, rather than a forum to discuss policy or that was part of the decision-making process. As well as the CSA Scotland and the CMO, members of this 'Chiefs Group' included the Chief Scientist Health and CSA Environment, Natural Resources and Agriculture (ENRA). Minutes and associated papers will be held by the CSA's office.

95. In terms of data this was supported through tools such as public dashboards for analysis and interpretation, publication of the SAGE papers and other advisory bodies, such as Scientific Pandemic Influenza Group on Modelling, Operational Sub-Group (SPI-M-O) and the Scientific Pandemic Insights Group on Behaviours (SPI-B).

96. There was a strong emphasis on explanation of the limitations of the data and modeling analysis, alongside any internally produced products or published

outputs. All four UK nations had their own advisory structures for seeking and adapting advice specific to their circumstances. C19AG for example, reported particular benefit in the reciprocity agreement it had with SAGE.

97. PHS own and maintain the Covid-19 & Respiratory Surveillance dashboard for Scotland. Surveillance of Covid-19 and respiratory infection is a key public health activity. The spectrum of respiratory illnesses vary from asymptomatic illness to mild/moderate symptoms to severe complications including death. There is no single respiratory surveillance component that can describe the onset, severity and impact of respiratory infections. This dashboard consolidates existing Covid-19 dashboards into a single product and summarises the current Covid-19 and respiratory data in Scotland, presenting statistics on infection levels and key healthcare indicators.

98. The dashboard (along with other data presented to me) was extremely effective and played a key part in the formation of clinical advice. The dashboard supported strategic decision-making, informed the pandemic response and updated the public and the media, reporting near real-time data on testing, cases, deaths, vaccinations and healthcare.

99. Throughout the pandemic, Scottish Government analysts were fully committed to transparency and worked at pace with partners to release as much evidence and analysis as possible to support decision making and provide the latest insights. This transparency was important and was integral to maintaining high levels of public trust and confidence. The work of the Scottish Government analysts alongside PHS analysts and epidemiologists was, in my view, of huge importance and to be commended.

100. Given the need to develop new data collections, analysis, modelling and research, much of the work undertaken was developed early on in the pandemic and regularly updated and enhanced throughout. Changes to datasets and the evolution of the analysis occurred in response to changes in understanding of the virus.

101. The data work undertaken during this period was concentrated in the Covid-19 Corporate Analytical Hub (C-19 Hub) and the HSCA Hub. It was essential to put in place quickly core data collections and core modelling to monitor and forecast the spread of the virus, to inform both operational responses and policy development in real-time and to keep the public informed via Ministerial statements and online publications. Developments moved quickly in the first three months of the pandemic with new data collections and analysis coming on stream regularly.

102. Advice was tailored to specific issues of note, known challenges or to inform responses within a specific strategic context set by Scottish Ministers. There was no set process in terms of who would identify the matters for discussion or decision. As science and evidence is largely agnostic to whether these approaches were palatable or not, this was not a significant consideration in providing this advice. However, it was relevant to consider all elements of scientific evidence when framing this advice, including very valuable insights from behavioural science experts, in order to give the most complete advice possible for consideration by policy and decision makers.

103. At all times information and advice provided to Scottish Ministers was made as transparent, clear and comprehensible as possible. As mentioned previously in this statement, the C19AG provided advice in writing to Scottish Government in the form of papers setting out their consensus view. Where it was not possible to reach a consensus on a particular aspect then the advice provided by the C19AG always made that clear.

104. If the FM or other core decision-makers wished to test or enquire more deeply into any of the medical/scientific advice provided to them, they would do this either by direct contact with me (or the CNO/NCD/CSA as appropriate) or they could request something referred to as a "Deep Dive" meeting.

105. Attendance at this meeting would be determined by the FM (or other requesting Scottish Minister as appropriate) and by the Lead Official for the Deep Dive. The meeting invitation would be shared with a limited group of Scottish Ministers and officials who were identified as key to the Deep Dive.

106. Deep Dives focused on issues of current interest to the Scottish Government where a better understanding of the science could be helpful to Scottish Ministers. Scottish Ministers would set the matters for discussion and agree the agenda in advance with the Chair and the secretariat.

107. In the case of the C19AG, these meetings provided the opportunity for the independent members of the group to speak directly to Scottish Ministers and for them to question experts directly about the science. Occasionally these meetings would be facilitated by SGoRR officials purely for logistical purposes. The usual format was short presentations by C19AG members, based on the briefing papers provided for that meeting, followed by discussion and questions from Scottish Ministers. Any decisions made in relation to the issues discussed at these briefings were made by Scottish Ministers and the C19AG's role, as with written advice, was only to advise, not to decide. A full chronology of the Deep Dives, including attendance, has been provided to the Inquiry: [GS2/033 – INQ000147306].

108. The strategic intent of the Scottish Government was to suppress transmission of the virus to as low as level as possible and in doing so prevent as much serious illness and death as a consequence of Covid-19 infection as possible across the population. Epidemiological and clinical expertise was therefore critical and of central importance to the decisions made by Scottish Ministers. Though modelling was often helpful in conveying a range of possibilities for given parameters, it was used appropriately in this context with knowledge of the uncertainty that existed around it. As previously stated, Scottish Ministers were generally aware and informed around the areas where there was scientific contention. Whilst advice given was centered upon the evidence where greatest consensus and confidence lay, contentions were often explored and tested too, especially in Deep Dive meetings.

109. "Group think" was avoided by engaging with peers from other UK and international nations with frequent discussions and presentations from notable experts from around the world and organisations such as the WHO. It became part of the

normalized process, especially within the C19AG to test thinking and look for exemplars internationally.

110. There were no key decisions that I recall being made contrary to the clinical advice given, though infrequently there were decisions made where the preferred option was modified by considerations or advice provided by other governmental advisers. In practical terms, this generally related to the precise timing or extent of Non-Pharmaceutical Interventions (NPIs) where minor deviations from advice were made. I do not recall an occasion when advice was not sought when it should have been.

111. As mentioned previously in this statement, during the pandemic, CMOD as part of HSCD contributed to the "four harms" decision-making process described in the Module 2/2A statement from the Director General (DG) Strategy and External Affairs provided to the Inquiry on 23 June 2023 [GS2/034 – INQ000184894] . This was the process by which medical and scientific advice could be weighed with other considerations when advising on key strategic decision-making in response to the pandemic. This covered the likely impact of decisions on the economy, non-Covid-19 related illness and its treatment, education, inequalities, vulnerabilities, mental health and societal issues.

112. During the course of the response I received significant amounts of both direct feedback from patients but also feedback through patient groups, and tools such as Patient Opinion. These, as you would expect, reflected the broad experience of people receiving care within the health (and care) system, both good and less good. However this feedback was generally very positive and contained insights which allowed a greater understanding of people's experience with non-Covid-19 illness and revealed a significant displacement effect, alongside a change in behaviours from many people seeking treatment.

113. The Four Nations Covid Recovery Group was chaired by the Chancellor of Duchy of Lancaster and I would generally attend the meeting with a Scottish Minister. In my absence, a DCMO would attend. My role as CMO consisted of supporting Scottish Ministers with availability of clinical advice or opinion when asked and

relaying epidemiological or clinical information that may have been of particular interest.

Mechanics of the provision of C19AG advice

114. At the outset of the C19AG, there remained large margins of uncertainty about many aspects of Covid-19 as a disease and SARS-CoV-2 as a novel virus. This was inevitable given the newness of the virus and sometimes apparently conflicting information that was being made available internationally.

115. The areas of advice within scope for the C19AG were agreed between the FM, the Chair of the C19AG and I. These were identified as priority areas through discussion, so as not to dilute the efforts of members across too many areas, when at this stage there was so much to learn generally about the virus and the disease. It was also necessary to prevent duplication of effort with work going on elsewhere in the advisory system, and so the Scottish context and application of evidence was of particular importance. As knowledge increased, there was scope to gradually evolve the commissioning process to be able to provide advice by structured approaches from officials in other parts of Scottish Government, often with Sub-Groups of the C19AG being formed specifically for this purpose (e.g. Education and Children's Issues). These approaches might be made to ascertain scientific evidence to inform a particular issue or to provide advice around a particular policy approach. Advice was provided to officials and Scottish Ministers in writing after plenary discussion at which lead officials could be present to observe and make any clarifying remarks necessary. This approach was effective and was popular with commissioners and members of the C19AG who welcomed the interactions.

116. Sir Jeremy Farrar, who was a SAGE participant, participated in a personal capacity in a Deep Dive meeting facilitated by the C19AG on 16 December 2020 [GS2/031 **INQ000292576**] The invitation for the session was issued by SGoRR. We don't hold a record of who invited Sir Jeremy, though Andrew Morris liaised with him ahead of the session in his position as Chair of the C19AG. The note from the meeting has previously been provided to the Inquiry [GS2/035 – INQ000326370].

117. Advice from the C19AG would be made available for discussion at the Four Harms Group via me (or a DCMO). This process facilitated debate around critical decisions in the context of the Scottish Government's framework for decision making which culminated in advice to Cabinet. The minutes of the Four Harms meetings or the subsequent Cabinet papers will express the constituent views in relation to the four harms.

118. The four harms are as follows:

I. direct Covid-19 health harms – primarily, the mortality and morbidity associated with contracting the disease;
II. broader health harms – primarily, the impact on the effective operation of the NHS and social care associated with large numbers of patients with Covid-19, and its displacement effects on the treatment of other illness;
III. social harms – the harms to wider society, in terms (for example) of education attainment as a result of school closures; and
IV. economic harms, for example through the closure of businesses.

119. For clinicians, this typically would mean discussion in relation to harms 1 and 2. However, as CMO, it was important to recognise that the Scottish Ministers were required to balance and consider all four harms including social and economic and that decisions would not be made exclusively on the basis of advice on health matters.

120. I have previously outlined the process by which Scottish Ministers or officials would request advice but occasionally, when there was emerging scientific evidence judged to be of importance, the C19AG would proffer advice based on their interpretation of this evidence in the Scottish context. This might be, for example, a response to a significant new study or clinical finding, or the emergence of a new variant. Advice offered in this way was largely indistinguishable to that commissioned by Scottish Government officials.

121. Advice from the C19AG was issued by the secretariat and routinely went directly to Scottish Ministers. How they considered this advice is a question best answered by Scottish Ministers themselves, but my general experience was that there would be at least a discussion with decision makers seeking my personal views after receipt of it.

122. As stated previously the C19AG provided advice in writing to the Scottish Government in the form of papers setting out their consensus. If there was not a consensus on the issue or on aspects of an issue then the written advice made it clear where that was the case.

123. On all occasions the advice provided by the C19AG reflected the best understanding of the position at the time the advice was given. Members of the C19AG were chosen based on the scientific or technical expertise which they could contribute. The C19AG's remit was to advise in particular on the scientific and technical aspects of the pandemic and more broadly, on the health impacts. Where those health impacts extended to the potential impacts on the population as a whole, or specific groups within the population, then the C19AG was able to draw on the relevant expertise within the group, from the Scottish Government and from other sources such as SAGE. The C19AG did not advise on economic issues.

124. The Chair of the C19AG and myself would always try to ensure that the right expertise was involved and weighted appropriately in the deliberations and advice and at no time were participants not invited to attend due to concerns they would disagree with the consensus view. It was important to create effective challenge to internal thinking and advice at pace and at scale. Indeed my observations of the working of the C19AG was that this challenge existed effectively and often between scientists within the same discipline.

125. The C19AG received a number of personal briefings at meetings from policy leads within the Scottish Government. These were in relation to specific areas of expertise from the different policy areas and gave members a better understanding of the policy as well as allowing all participants to ask questions. Details of such briefings would be captured as part of the minutes of the meeting.

126. All of the advice (including for NPIs) provided by the C19AG can be found in the minutes of the meetings previously provided to the Inquiry.

127. Other sources of information for the C19AG and Scottish Ministers could be data and evidence pipelines from PHS, NIMT, UKHSA (previously PHE), scientific journals, SAGE papers, HSCA (data and modelling), Health Boards, Cabinet Office and international collaborators.

128. For NPIs, as for other areas where it was asked to provide advice, the C19AG considered the scientific and technical concepts and processes that were key to understanding the evolving Covid-19 situation and potential impacts in Scotland. This included some consideration of the potential impact of proposed measures as part of the wider consideration of scientific evidence. The C19AG was not involved in impact assessments for policies and/or decisions of the Scottish Government.

129. Please see the later section in this statement relating to advice provided on travel and borders, which was commissioned regularly from different sources throughout the pandemic.

130. As stated previously the C19AG was established as an independent advisory group and it was not within its remit to be involved in policy or decision impact assessments. That is the role of Scottish Government officials for each specific policy area. CMOD do not hold policy or decision impact assessments, they are held by the policy teams.

SAGE

131. Questions about the operation of SAGE, including decisions about attendees and how meetings are organised, are for the UK Government to answer (SAGE Secretariat sits in the Government Office for Science, known as GO-Science). In my view there was ultimately sufficient Scottish representation in SAGE.

132. Representatives of the devolved administrations were not present at initial meetings of SAGE. My understanding was that the initial meetings had a very small list of attendees. In my view this did not have an impact on the Scottish Government's understanding of and initial response to the emergence of the pandemic as information emanating from SAGE was shared between the CMOs and devolved administrations.

133. However, a Scottish Official was present from SAGE meeting 1 on 22 January 2020 (and subsequent meetings); this was Dr Jim McMenamin (from HPS now PHS), Strategic Incident Director for Covid-19 and chair of the Covid-19 National Incident Management Team reporting to the CMO.

134. SAGE was unable to sufficiently consider the specific circumstances of Scotland in the advice that was provided, nor to address questions from observers from Scotland in the very early stages of the response as previously mentioned. This was in part understandable given that the significant majority of members lacked full understanding of the Scottish context and was one of the key factors in the establishment of the C19AG. However, matters improved as the working of the two groups and reciprocity matured. SAGE remained a critical part of the advisory machinery in addressing the more generic understanding of Covid-19.

135. The C19AG did receive information on the development of the pandemic and associated activity across the four nations. The similarities and differences to the situation and developments in Scotland were discussed, where that was relevant to issues being considered or where it helped inform the C19AG's understanding of the position in Scotland.

136. Advice from SAGE was frequently discussed at meetings of the C19AG and that input often contributed to the development of advice from the C19AG to the Scottish Government. Papers from SAGE provided valuable information and advice which contributed to the Group's understanding of the pandemic and which the C19AG's discussions helped interpret for a Scottish context. Where the Chair or other members of the Group, or officials who provided input to the C19AG, had attended SAGE or its Sub-Groups and heard the discussions on issues covered in

SAGE papers that often provided useful additional insight in interpreting SAGE papers and advice.

137. It was agreed with SGoRR that SAGE would be the single point of scientific advice and that work in Scotland should be based on their existing output and modelling. Contact was made with SAGE academics and attendance as officials at SPI-M commenced 9 March 2020. This attendance and relationship continued throughout the pandemic. I am not aware there was ever data, information or advice to which access was limited in Scotland.

138. The C-19 Hub in Scottish Government focused initially on:

- Developing population base models based on data from SAGE and SPI-M;
- Sharing of modelling between logistical modellers in NHS England and Scottish Government with each of the four nations coming together to form the 4 Nations Modelling Group by 24 March, which lasted the duration of the pandemic;
- Updating, controlling and sharing the central assumptions and parameters to underpin all other Scottish Government analysis;
- Producing daily and weekly modelling slide packs to monitor the spread of the pandemic and to underpin NHS logistical and capacity modelling. These packs were provided to Ministers, relevant senior officials and to SGoRR-M (Ministerial) and SGoRR-O (Officials);
- GIS mapping of populations and Covid-19 cases;
- Providing Scotland level slides for the Covid-19 XHMG DASHBOARD 7 days a week; and
- Commissioning Ipsos MORI to undertake a Scottish boost to their Global Advisor attitudes online survey.

139. I do not recall specific instances where there was consensus formed in the SAGE advice that was at odds with that emanating from the C19AG. Scientific debate was healthy and necessary and I observed appropriate challenge, but not to the extent that there was significant conflict of opinion. SAGE was held in high regard

and I believe that contributors to the C19AG, as experts in their field, were held similarly by members of SAGE. I am not aware there was ever information or advice to which access was limited in Scotland which it would have been helpful to see.

140. At those very early stages, and in the absence of actionable information about the particular characteristics of SARS-CoV-2 and its disease Covid-19, it was reasonable to plan using the structure and process laid out in the pandemic flu plan, as there were generic considerations and approaches applicable broadly to a pandemic respiratory pathogen. As is stated in the UK CMOs' Technical Report on the Covid-19 pandemic in the UK [GS2/036 - INQ000130955], no two pandemics are the same, even with the same pathogen. The H1N1 influenza pandemics in 1918 and 2009 were very different.

141. Having the structure of the pandemic flu plan was helpful whilst important knowledge was gained about the unique characteristics of SARS-CoV-2. Different pathogen epidemics using the same route of transmission can have very different impacts. Influenza, Covid-19, MERS-CoV and SARS-CoV-2 are all transmitted by the respiratory route but have very different transmission dynamics and mortality structure across the age groups.

142. The roles of the advisory bodies and their Sub-Groups and the provision of data, modelling and advice to the Scottish Government changed and was regularly updated and enhanced throughout the pandemic. Changes to and the evolution of analysis occurred in response to regular improvement reviews as well as changes in understanding of the virus.

143. Given that data, information and advice from SAGE was used in the Scottish deliberations related to the management of Covid-19, I am not aware of any instruction to members from Professor Andrew Morris that the Scottish Government ask members with dual membership of both the C19AG and SAGE not to raise questions related to Scotland at SAGE, so I cannot comment further on this.

144. However, my own experience was that in the early stages of the pandemic response, it was difficult to raise questions in SAGE as an observer, as I mentioned previously. I do not think this hampered the pandemic response in Scotland to any significant degree but was one of the considerations when forming the C19AG. My experience was that members from Scotland participated effectively in both the main group and its sub-groups and that data and modelling from Scotland was considered and utilised.

145. My view is that SAGE was constituted appropriately and due importance was given to the various disciplines represented. I do not think that epidemiology was given too great an emphasis, for similar reasons to my previous response about the C19AG.

146. The C19AG and SAGE advisory structures were of great benefit and importance to both professionals and policy makers responding to the pandemic. I am very grateful to the members and secretariat for the significant efforts that they contributed during this response and I am sorry for the personal toll that this had on many of them. The support available to future contributors and their donor organisations during a prolonged national emergency should be looked at in more detail. Whilst it is important that there is a semblance of order and control in the way that these large and complex groups run, ensuring that there are more well developed mechanisms for posing questions and queries when attending as an observer or broader constituent membership is an important learning point for future responses.

Data and Modelling

147. Data and modelling work was concentrated in the C-19 Hub and the HSCA Hub.

148. On 3 March 2020, in response to international epidemiological developments and early cases of Covid-19 within the UK, the four governments of the UK published a planned response to the pandemic, set out in the Coronavirus: Action Plan [GS2/039 – INQ000233560]. This led to the commencement of a Scottish Government wide organisation of analysis to focus on the pandemic.

149. Scottish Government has historically had a Resilience Room (SGoRR) Analytical Pool of trained analysts who could be activated if a civil emergency occurred which needed analytical support. On 4 March 2020, the analytical pool was commissioned by SGoRR and the COO of the NHS to provide mapping (including the vulnerable population) and modelling of the projected impact on Scotland based on assumptions made by SAGE in order to support NHS Mobilisation, SGoRR reporting and Cabinet papers.

150. A paper setting out the role of the C-19 hub and its products was sent round Directors and Heads of Analytical Services Division (ASD). At this time a weekly cross Scottish Government meeting of all senior analysts via the Analytical Leaders Group was established on 11 March to create a joined up collaborative approach to the production of analysis [GS2/041 – INQ000326373] This evolved over the course of the pandemic to become a weekly cross Scottish Government open call for all interested staff.

151. The first cabinet paper with analytical input from the SGoRR analytical pool was on the 9 March 2020 [GS2/042 – INQ000218290]. By the 18 March 2020 a modelling pack was cleared on a daily basis by the Chief Researcher and Director for Population Health, shared with the NHS Chief Operating Officer and circulated via SGoRR to Minsters, senior officials and analytical leaders across Scottish Government. This work was also shared with external trusted partners for NHS planning in late March.

152. At this stage new epidemiological models were developed using the Imperial College model curves which they supplied. This enabled the C-19 Hub to develop Scotland specific models, allowing for differences in populations, health status and spread of the virus. This formed the basis for modelling throughout the pandemic. Slightly later in March, Professor Chris Robertson (University of Edinburgh and PHS) provided outputs from a simple Susceptible-Exposed-Infected-Recovered (SEIR) model fitted to Scottish cases which he provided during much of the pandemic for cross checking purposes.

153. The C-19 Hub at this time comprised of thirteen technical experts within Scottish Government (a mix of operational researchers, statisticians, statisticians with epidemiological expertise and social researchers). Staffing was under constant review to ensure the unit itself had inbuilt resilience. Its work was co-led by the Scottish Government Chief Statistician and Chief Social Researcher to enable 24/7 coverage to be provided.

154. The C-19 Hub worked on the following:

- Developing the corporate logistical model for Scotland that provided scenarios of numbers of infections, estimates of hospital/ICU beds, and fatalities using assumptions/data from SAGE and SPI-M;
- Sharing the central assumptions and parameters that fed in (through SGoRR) to subsequent mobilisation planning, including planning at Health Board, Health and Social Care Partnerships (HSCP) and LA Levels;
- Linking with equivalent modelling leads in Whitehall and Wales to share assumptions and models;
- Producing the daily Covid-19 XHMG dashboard which provides a high-level assessment of the impact of Covid-19 across a range of social and economic measures;
- Commissioning and collating daily and weekly Scotland-wide public attitudes, opinions, compliance and social impact data. Starting on the 8 May 2020 a monthly round up of public attitudes was published. The first wave of a wellbeing telephone survey was also launched; and
- Commissioning necessary geographical analysis and mapping.

155. The core daily products of the C-19 hub were:

- Scottish Impact of Covid-19 model – slide deck and spreadsheet;
- Daily Covid-19 XHMG dashboard; and
- A “Ready Reckoner” allowing HBs, HSCP & LAs to estimate the scale of the effects for their areas.

156. All three products were signed off by the Chief Statistician or the Chief Social Researcher on a rotational basis and sent to SGoRR by 20:00 each day.

157. The data fed into other mobilisation planning across social care, primary care, and secondary care, as well as the wider public service impact. It was shared with technical experts working in other hubs within Scottish Government on issues such as the economy, transport and vulnerable communities. It was issued through SGoRR to trusted partners including the Chief Executives and Chairs of Health Boards, Directors of Public Health, Chief Officers, Health and Social Care Integrated Joint Boards, Chief Executives and LAs. The work supported estimation for fatality planning, medical devices and pharmaceutical requirements amongst other operational issues feeding into numerous submissions to Ministers on a wide variety of health and public service issues.

158. Using the very limited scientific advice available at the early stages of the pandemic, policy modelling commenced to show the potential impact of the initial NPIs put in place Scotland and the rest of the UK, namely:

- Home isolation of symptomatic cases;
- Whole household isolation;
- Social distancing for the whole population;
- More significant social distancing for those aged 70 and over;
- More significant social distancing for vulnerable people [people with an underlying health condition] under 70;
- Stopping mass gatherings; and
- Closure of Schools and Universities.

159. By 28 April 2020 the C-19 Hub had established a weekly rhythm. The core product of the hub was the weekly modelling slide pack containing two week and three month projections of cases/hospitalisations/deaths, updated information on the reproduction number (R) and infectious cases, including updates on hospital acquired infections and care homes. It also included three month projections for the relevant policy options being modelled each week.

160. In tandem, a set of modelling spreadsheets to be used by Scottish Government colleagues, was produced such as the health baseball card, estimates of excess deaths and equipment needs. Modelling spreadsheets for the wider public sector were produced if there were material updates.

161. The core modelling was run over a weekend based upon the most up-to-date assumptions and that week's policy options. The remainder of the weekly update materials were produced by Wednesday. These would be reviewed/signed off by officials no later than Thursday lunchtime so they could be shared with the C19AG ahead of its weekly meeting on Thursdays at 16:00.

162. The modelling pack was sent each Friday to Scottish Ministers, Special Advisors (SpAds), DGs, and other relevant colleagues. The accompanying spreadsheets were sent to Scottish Government colleagues following clearance on Thursday. Discussions took place on what to share with external public bodies and relevant material was shared on a Monday.

163. Further advice on policy modelling, i.e., producing scenarios to estimate the impact of specific policy actions or NPI changes was often provided over the weekend and early into the following week as part of the Four Harms process.

164. An important source of information used internally and also published transparently was the "Modelling the Pandemic" output from the C19 Hub. These reports were produced weekly from 21 May 2020 to 22 December 2022.

165. A science and international pack was produced each week to inform modelling assumptions but also to inform Ministers and policy officials working on Four Harms. The pack was circulated and cleared early in the week following the SPI-M and SPI-B meetings. It also incorporated the previous weeks SAGE material.

166. The C19AG's remit was to advise in particular on the scientific and technical aspects of the pandemic and more broadly, on the health impacts. Where those health impacts extended to the potential impacts on the population as a whole, or

specific groups within the population, then the C19AG was able to draw on the relevant expertise within the group, from the Scottish Government and from other sources such as SAGE. Whilst the C19AG had no remit to commission its own modelling it did advise Scottish Government to source this expertise from within the Scottish Government, from UK Government, from PHS and academic groups which it did as explained above. The C19AG needed to have a clear remit to make best use of the scientific and technical expertise available; involving the group in detailed modelling requests would not have been a sensible or suitable use of their limited time and expertise. The presence of officials and later on, analysts as observers, allowed direction of modelling resource appropriately.

167. A weekly analysis of public attitudes and compliance with NPIs was also undertaken during this period based on continual reviews of research by other external bodies and weekly polling by the Scottish Government. This was circulated to Ministers and officials across the office on a Friday and was particularly useful in understanding societal impacts and tailoring appropriate messaging.

168. A project to develop a public facing dashboard to provide measures across the four harms and signpost the public to other sources of information and data was also commenced at this time.

169. Other regular products consisted of daily sitrep input for Scottish Government at 16:00 and again later in the evening seven days a week and input to the Cabinet Office spreadsheet which fed the slides used to brief the Prime Minister seven days a week.

170. In addition, an open response survey about the experiences of the people and communities was distributed to organisations who work with the Scottish Government on community, neighbourhood and social justice outcomes. The research was conducted online, from Friday 15 May to Wednesday 27 May 2020.

171. The Covid-19 HSCA hub was established in March 2020 and led on work to collect, report and brief on Covid-19 data on a daily basis to track and inform the response

to the pandemic. The mainstay of this tracking was a suite of national level measures around cases, numbers in hospital and ICU and deaths.

172. HSCA worked rapidly with partners to develop comprehensive Covid-19 data. In the early stages, this included the release of the following data:

- Cumulative and daily confirmed Covid-19 cases quoted in FM speech from 20 March 2020;
- Confirmed or suspected Covid-19 ICU occupancy quoted in FM speech from 25 March 2020; and
- Confirmed or suspected Covid-19 hospital occupancy quoted in FM speech from 31 March 2020.

173. From 2 April 2020, arrangements were in place to allow regular publication of Covid-19 daily data on the Scottish Government website at 14:00 each day. Details of the specific indicators published and from what date, including the development of indicators and changes to reporting can be found in the HSCA paper.

174. Following rapid development at the outset, Covid-19 daily data reporting settled into a core indicator set updated daily. This included:

- Hospitalisations - covering both admissions (data provided by PHS) and numbers of patients in hospital and ICU with Covid-19 (data provided by NHS Boards);
- Cases and testing (data provided by PHS);
- Infection rates from the Office for National Statistics (ONS) Covid-19 Infection Survey;
- Vaccinations (data provided by PHS);
- Daily deaths (data provided by PHS);
- Weekly registered deaths (data provided by the National Records of Scotland (NRS);
- Number of delayed discharges (data provided by local authorities);
- Care homes data covering:

- Data on confirmed cases of Covid-19 amongst care home residents and staff;
- Number of adult care homes with a current suspected case of Covid-19;
- Covid-19 related staff absences in care homes; and
- Suspected cases in Care homes.

- Schools - data on attendance and absence for Covid-19 related reasons (data provided by Scottish Government Education ASD); and
- NHS staff reporting absent due to Covid-19 (data from NHS Education for Scotland (NES))

175. As mentioned previously in this statement, HSCA published the above suite of Covid-19 daily data each day on the Scottish Government website. This was published seven days a week up until 13 February 2022 and then it moved to five days (Monday to Friday) up until 8 April 2022. The seven day time series was maintained with catch-up reporting, covering data for Saturday and Sunday, taking place each Monday.

176. HSCA shared a summary brief covering the headline Covid-19 daily data internally with Scottish Ministers and officials in advance of publication each day. The latest daily data was used by the FM for updates on the state of the pandemic to the Scottish Parliament and as part of the daily media briefings and interviews. The Covid-19 daily data webpage on the Scottish Government website was also used extensively by external users, including the media and public to understand the latest position on the pandemic. It was also used to feed into Four Harms assessments and as input data for the 'State of the Epidemic' and 'Modelling the Epidemic' reports.

177. From 6 May 2020, PHS published the first Covid-19 statistical report, which was updated weekly and remains in place now. This provided an overview of the various Covid-19 datasets and tells the story behind the daily updates. HSCA analysts worked closely with PHS to develop and shape the content in the PHS weekly report and briefed Ministers in advance of publication each week.

178. From the start of the pandemic to 2 April 2020, Covid-19 deaths were recorded manually. From 2 April 2020 Scottish Government moved to a new process which led to quicker compilation of statistics. The new system still used the same laboratory positive test data from Health Protection Scotland (HPS), but these records were released when the death was registered with NRS. From 8 April 2020, NRS published weekly death statistics where Covid-19 was mentioned on the death certificate; the first registration happened in week beginning 16 March 2020.

179. Data on testing commenced in late March 2020. Reports were issued on the total number of NHS tests (processed through NHS labs), the total number of UK Government tests daily and the total number of tests carried out to date. This data was published as part of Covid-19 daily data reporting. More details on the testing analysis and modelling carried out can be found in the HSCA paper.

180. While the production of core data and modelling was developed at an early stage and continued throughout, evolving and improving, each phase of the pandemic brought its own particular challenges. Analytical work was continually revisited to meet those challenges.

181. In my view, the key decision makers in Scottish Government had a very good understanding of data and modelling and the way that it should be used, recognizing the assumptions made in forming these models and confidence intervals contained within them. I was not aware of undue emphasis being placed on these and feel that they were used appropriately and with adequate challenge to the assumptions used to form them. In effect, they were only one aspect of a range of data and information taken into account when decisions were made. I am aware that data and modelling was developed for economic, societal and educational factors, but it is for others, particularly decision makers to form a view as to whether these were sufficient for them. Data was regularly assessed around non-Covid-19 health harms and communication to the public tailored in response to this; an example would be there was a decline in urgent cancer referrals that triggered a messaging campaign about attending health services when concerns existed.

182. I had adequate and timely access to clear, relevant and reliable data and modelling to inform my advice to core decision makers throughout the pandemic. In my view, the data collection and modelling and the sharing of information internally within Scottish Government and externally between Scottish Government and other organisations (e.g. NHS, COSLA, LAs, care sector, business groups etc.) was generally very good once the systems were up and running and the reports in place. This was evident both within and across organisations in Scotland and between the four nations. Modelling was continuously developed and improved but in my view sufficiently covered other factors such as economic, societal, educational, non-Covid-19 health related, mental health related and vulnerable and at risk groups.

183. However, a frequent obstacle to developing data was governance permissions for the data, which often took disproportionate time and effort to navigate. Modelling outputs were helpful and SPI-M-O was an important and valued group in helping achieve consensus across the various teams who were developing these models. Data charts were used to illustrate trends in data and to show ranges of uncertainty; RAG (Red, Amber. Green) tables were often used to illustrate and identify particular areas of note or concern. Whilst this potentially added to the understanding of all involved in monitoring the data, my experience of working with decision makers was that they already possessed a very clear and sophisticated understanding of said data and its interpretation. In Scotland, there is considerable experience and deep knowledge across clinical, official and ministerial staff in handling and interpreting data and charts, borne from years of investment creating a culture of continuous quality improvement science and this undoubtedly aided the understanding.

International sources of information and advice

184. The UK has a seat as a member state on international organisations, such as the World Health Organisation (WHO) and the World Health Assembly (WHA). Whilst Scotland is not a member state in its own right, information provided by these relevant international organisations was provided to me as CMO. Though this

generally worked to an acceptable extent due to the excellent professional relationship with the CMO for England and his team, it was very dependent on this relationship and is a potential weakness in future devolved nation responses should these relationships not exist.

185. UK clinicians and scientists benefited from the experience of colleagues from China, Singapore, South Korea, Japan, India, the USA, many European nations and South Africa, among others. There is a difficult balance between learning from others who are most affected, and taking up their time when they are most under pressure, but the experience was that sharing of information worked well. Publications and group briefings (for example, via WHO) should wherever possible be the mechanism for doing this.

186. Science and medicine are international and pandemics by definition cross borders. Much of what we learned was from scientists, public health experts and clinicians in other countries. The experience of each country in the Covid-19 pandemic, facing the same pathogen but with dissimilar populations, is different, and all had their own scientific strengths. It would however have been unwise to have relied entirely on the scientific capacity of others and the UK was both well placed and provided a significant contribution to the global scientific output as well as insights specific to the UK experience. This, in my view, was a particular strength of the overall UK response and demonstrates the importance of having a strong and adaptable research science infrastructure.

187. Following the first official reports of pneumonia of unknown origin in Wuhan, China, at the end of December 2019, very early information about the pathogen came from China and other countries that experienced early imported cases [GS2/040-INQ000326372].

188. In the earliest stages, knowledge and expert opinion was reliant on accessible international data. Channels to access this rapidly such as the Global Initiative on Sharing Avian Influenza Data (GISAID) were key.

189. Internationally, case data was generally accessible but cross-country comparisons were unreliable because of biases such as differences in testing capacity, access, uptake and technologies deployed impacting data. On the other hand, in some cases close sharing of data and international comparison was helpful in understanding the rapidly changing epidemiology, for example, between Northern Ireland and the Republic of Ireland, where the epidemiological picture often looked similar. Case data was complemented by contact tracing data, including data from mobile apps informing individuals of exposure to confirmed Covid-19 cases.

190. During the period Jan to March 2020, advice to Scottish Ministers was coordinated by the former CMO; as DCMO, I did not have access directly to detailed information of the response in other countries and gave no advice to decision makers in relation to this.

191. A paper from Andreas Poensgen was circulated by Professor Devi Sridhar ahead of the C19AG meeting on 5 April 2020 [GS2/043 - **INQ000217491**]. Andreas Poensgen was invited to attend the meeting of 13 April 2020 and the minutes of that meeting have been provided to the inquiry [GS2/044 - INQ000217503].

192. Professor Devi Sridhar was contacted by a colleague in Norway working on schools and advising their government who was keen to learn about the Scottish Government Lateral Flow Test (LFT) plans. Via her contacts in Scottish Government, it was agreed the Norwegian public health offices would attend a meeting of the C19AG Education Sub-Group. The meeting covered school's policy in Norway and Scotland and in particular Norway's Red Amber Green (RAG) system, the use of LFTs in schools and experience in dealing with the 'new variant" (at that time), B.1.1.7 in Scotland.

193. Sir David Nabarro attended a Deep Dive meeting of the C19AG on 9 March 2022. The minutes of that Deep Dive David Nabarro meeting have been provided to the inquiry at [GS2/045 - INQ000218290]. Sir David Nabarro was invited to this meeting by the secretariat, following a conversation between myself and him [GS2/046 – INQ000326374].

194. There was no formal reason why more international participation was not more frequent. The C19AG benefited from the international connections of its members who could provide updates from their networks during meetings whenever they wanted. There was no formal policy regarding this.

195. As the pandemic progressed it was important to track changes in mortality rates overall as a result of the pandemic, not just directly from Covid-19 but also due to healthcare disruption, the impact of interventions to limit transmission and the wider social and economic impacts. For this, all-cause excess mortality aided in our understanding.

196. This analysis was produced by academic institutions and the ONS from 2020. The importance of excess mortality in national data is that it captured the indirect impact of Covid-19. These included the effects of highly stretched healthcare and changed healthcare seeking, the impact of lockdown and other indirect effects.

197. Further to this, Public Health England (latterly, the UK Health Security Agency) provided excess mortality estimates, and later the World Health Organization (WHO) produced global excess mortality estimates for 2020 and 2021. Such analyses enabled both an understanding of the full impacts of the pandemic, and also enabled more international comparisons which until that point had been difficult due to different methods of recording and reporting Covid-19 deaths globally.

198. Given the very different ways nations detected and recorded Covid-19 cases, age-adjusted all-cause excess mortality was in the view of the CMOs the most appropriate way to compare international data. Even this however is not easy or a perfect comparison, as the 'expected' mortality can be calculated in many ways.

199. As with other data sets outlined above, it remained important throughout to link deaths data with, for example, data sets on clinically extremely vulnerable or Covid-19 at-risk status, variants, vaccination status and demographic variables. This enabled us to understand which groups Covid-19 was impacting most severely as the virus evolved and new medical countermeasures became

available. In due course we managed to link deaths data to key variables of interest which facilitated vaccine effectiveness and waning immunity modelling. However, it remained the case that the data lacked the granularity to be able to analyse in detail the clinical impact of different comorbidities.

200. In England, the bronze, silver and gold local action committees were informed by comprehensive national and regional situation reports which were developed using the latest data visualisations and analysis. As CMO I had access to these reports and attended meetings as an observer, offering insights from Scotland's experience too. We had similar reports for Scotland as mentioned above.

201. The content of situation reports evolved to reflect the changing pattern and impact of the pandemic and to support decision-makers with relevant data to inform upcoming policy decisions. The situation reports also increasingly incorporated relevant data from Northern Ireland, Scotland and Wales to understand the progression of the pandemic across the UK, as well as relevant international comparators which were helpful for understanding emerging variants in spite of differences in case ascertainment and genomic surveillance. The situation reports were refined weekly in response to continual feedback, for example, refining how data was visualised to aid interpretation.

202. Cooperation, nationally and globally, is critical. From my perspective, throughout the Covid-19 pandemic, the four CMOs of Scotland, England, Wales and Northern Ireland enjoyed exceptionally good and productive professional relationships with each other and with international colleagues. The UK CMOs met virtually on a very regular basis and cooperation, support and sharing was very evident, very helpful and very productive.

203. In my view there should be sharing agreements and formal links to international data and knowledge (whether that is through UK Government, or directly between Scotland and international organisations, for example, the European Centre for Disease Prevention and Control). Currently there are links, but these appear to be more person dependent, in other words, about 'who knows who' and down to the individuals to arrange meetings between themselves.

204. I had some informal contact with World Health Organization (WHO), though in the main this contact was coordinated through the CMO for England. There were also regular evidence meetings with the Centers for Disease Control and Prevention (CDC) in the USA and the Israeli Health Ministry. These regular virtual meetings took place particularly in the post vaccination phase where evidence regarding the effectiveness of the vaccine was shared, amongst other things, such as latest intelligence on variants and viral properties. I had direct contact with colleagues in Denmark in connection with the concern around the virus within the mink population and also indirect contact via the UK CMO's group with South African clinicians. Such international co-operation was a very helpful part of the response to the pandemic.

205. I would like to see, to a greater degree, Scotland and those who work in Scotland, being formally adopted into international networks, or communities of practice. That would allow the rapid sharing of information and intelligence consistently and confidently across borders. The world is made an increasingly small place thanks to technology, and it is critical that we have good constructive and open health relationships across the globe, as incidents can move very quickly. The pandemic showed that such relationships across the globe are there to be explored.

206. In my view, core decision makers in Scottish Government valued WHO advice and incorporated this into pandemic strategies and public health guidance to a very significant degree. The production of technical documents by WHO was helpful and these were considered when response proposals were made to decision makers. Very occasionally, these were adapted to Scottish context, policy and population at later stages of the pandemic when vaccine coverage and pharmaceutical treatments were more widespread, e.g. thresholds for intervention by NPI in regional or localised outbreaks, but in my view this was appropriate. I do not recall a specific instance when WHO advice should have been followed but was not. Indeed, a deep dive was held with WHO Special Envoy David Nabarro to ensure that learning opportunities were maximised and he remains an external international adviser to the Standing Committee on Pandemic Preparedness.

207. Similarly, core decision makers were very keen to learn from the experience of other countries. This was achieved through deliberation and presentations formed into advice from the C19AG; materials such as those produced by Scottish Government HSCA and the International Comparators Joint Unit (ICJU), informal networks of CMOs and public health leaders alongside regular joint meetings held between UK, USA and Israel. All of these routes of learning were important and the ICJU was certainly very helpful. The mechanisms by which they were applied varied according to circumstances and confidence in the information as well as the applicability to the Scottish context and the severity of the threat. Generally, relevant information was discussed and formed into advice in policy options presented to decision makers, except when more urgent action was potentially necessary, such as the emergence of a Variant of Concern (VoC), e.g. Omicron. In circumstances such as this, rapid four nations meetings took place where oral briefing and discussion from clinicians and policy officials augmented written background briefings, so that decision makers could address these threats with necessary urgency.

Other sources of information and advice

208. The purpose of the C19AG was to provide advice to me and to the Scottish Government from external and independent advisers. The vast majority of members of this group were not affiliated to Scottish Government for these reasons. The provision of this advice from independent experts in a transparent way was very important and allowed me to access expert consensus opinion from a much wider group of experts. The most significant disadvantage was the substantial impact that this undertaking had on those who participated.

209. The evidence base evolved throughout the pandemic and it was important to keep an open mind and consider a wide range of feasible possibilities. The evidence base did not always give a definitive answer to support one option or another at the time a decision had to be taken. In such cases, there was a need to use basic epidemiological principles and be open and clear about what the evidence base did and did not say, and with what level of certainty any conclusions could be reached. Many of the important initial decisions in a pandemic must necessarily be

taken when key facts are unknown, or at least uncertain, and therefore providing advice with an honest appraisal of the confidence in which it is provided is an important aspect of conveying information and uncertainty. These decisions could then be taken by decision makers in the context of what information is usefully known, with what certainty, and with the tolerance for risk which generally presented from a number of different potential harms. Much more often than not, there were no risk free options but decisions where "less bad" choices could be made.

210. The pandemic necessitated the pausing of many clinical research studies supported by NHS Research Scotland (NRS) to prioritise research on Covid-19 (as well as to reduce infection risks to patients and staff, and to allow clinical research staff to be redeployed to support the NHS front-line). The NRS clinical research infrastructure supported a wide range of research including studies to: understand the nature of the Covid-19; characterise and identify risk factors for Covid-19 illness; track, characterise, and assess the potential impact of emerging Covid-19 variants; and trial treatments and the safety and efficacy of Covid-19 vaccines. Examples of studies supported can be found on the NRS website.

211. Over the course of the pandemic, data from NRS indicates that Scottish Health Boards supported 197 Covid-19 studies that involved recruitment of over 53,000 people (as at mid November 2022). CSO provided additional funding through NRS to support Scottish Health Boards to participate in this Covid-19 research. The CSO worked with National Institute for Health and Care Research (NIHR) and equivalents in Wales and Northern Ireland on the UK prioritisation process for urgent public health Covid-19 studies. The UK NHS Covid-19 Vaccine Research Registry that was commissioned by the Vaccines Taskforce and established by NHS Digital and NIHR was in collaboration with CSO and NRS and equivalents in Wales and Northern Ireland. CSO also issued two calls for research: a call for Rapid Research in Covid-19 issued in March 2020 and a call for applied research on the longer-term effects of Covid-19 infection in October 2020.

212. There were several clinicians who provided input to the C19AG, including myself, DCMOs and public health clinicians from PHS. Front line infectious disease

perspective was provided by Professor Tom Evans who also chaired the UK Advisory Committee on Dangerous Pathogens (ACDP), the NHS Scotland Clinical Cell and provided input from this multi-disciplinary advisory group of Scottish frontline clinicians. Additional clinical insights, experience and information to me and to the Scottish Government was provided from the frontline through regular meetings with the Scottish Academy (Medical Royal Colleges) and Scottish Association of Medical Directors.

213. I am aware of regular meetings with a variety of interest groups undertaken by the Scottish Government, but directly participated only in meetings with representatives from Scottish business. These meetings were largely to convey situational awareness and any concerns from these interest groups would be fed back in by the relevant policy area for deliberation as part of the Four Harms process. If appropriate, this would then be incorporated into advice for consideration by decision makers.

214. Information for decision makers was developed through the Four Harms process and submissions from policy makers, with clinicians asked to provide comment on these submissions and provide views when appropriate to do so. Clinical involvement in providing advice to decision makers was a consistent feature of the pandemic response. These submissions are retained by the relevant policy area and not by the clinicians who provided advice. Where there was contact with interest groups/stakeholders, their views would generally be incorporated into submissions by policy officials rather than clinicians. It is for decision makers to comment on whether they experienced information overload or not, but there were occasions when the development of huge amounts of information, data and insights was volatile and particularly rapid.

215. I was not at the meetings with Scottish Covid Bereaved and Humza Yousaf (then Cabinet Secretary for Health and Social Care) between 17 August and 24 November 2021 and so cannot comment whether nosocomial and care home deaths was raised.

216. In respect of both care home and nosocomial related deaths, they were a feature of the viral pandemic and were tragic occurrences for those families who experienced them. It is something that I saw in my own family experience too. However, from the data that is available, advice from analysts suggests that it is not possible to say that nosocomial deaths were greater than care homes deaths because of the definitions that were used around these.

217. The data published by Antimicrobial Resistance & Healthcare Associated Infection (ARHAI) Scotland on nosocomial deaths was based on 28-day all-cause mortality in cases of Covid-19 that were identified during an inpatient stay in an NHS hospital in Scotland, including those cases which are thought to have developed the infection as a result of nosocomial transmission. NRS published data on care home deaths. The specific measure was based on deaths registered in Scotland where Covid-19 was mentioned on the death certificate, with information published on location of deaths including care homes. Throughout the pandemic response, ARHAI, with oversight of the CNO, took a wide range of actions, data collection and research to reduce the impact of nosocomial infection, with advice from an expert group of clinicians working across the four nations.

218. The clinical criteria included in the case definition changed over time as data accumulated. For example, in Spring 2020, loss of taste or smell were included in the Covid-19 case definition. Robust estimates of the sensitivity and specificity of specific symptoms were not available until later in the pandemic, as much of the early evidence generated was affected by the following limitations: Many studies reported only the frequency of symptoms in persons infected with SARS-CoV-2 and no comparative data on symptomatic people testing negative. This allows assessment of sensitivity but not specificity. Research should include non-infected comparator groups. Many early symptom reports focused on people who were hospitalised, leaving it unclear whether symptoms would be similar in mild community cases. Data from national testing programmes may be biased as these programmes often specify the symptoms for which they want people to test. This leads to an overestimation of the sensitivity of the symptoms described in the testing criteria.

219. Throughout the pandemic there were frequent calls to include a wider range of symptoms in case definitions, but there was an ongoing need to balance the need for sensitivity (increased by a broader list of symptoms) with specificity (increased by a narrower list of symptoms). Early in the pandemic when the infection was emerging, the critical objective was to find as high a proportion of all cases as possible and reduce transmission through high impact public health contact tracing, so the strategic aim of the case definition was high sensitivity. Regular reviews of the sensitivity and specificity of specific symptoms and symptom complexes were undertaken to ensure that a reasonable balance was struck between the ability to correctly identify cases and the ability to exclude non-cases, in a pragmatic and clinically useful way. Algorithmic approaches to case definitions, incorporating both symptoms and epidemiological data, could theoretically have been used to optimise the balance between sensitivity and specificity, but may have been challenging to implement and communicate.

220. Throughout the pandemic, the public nature of case definitions for Covid-19 was to direct people to take actions such as self-isolation added complexity. Case definitions for public use (as opposed to use by clinicians) had to be sufficiently simple to be remembered by the general public so that they could take appropriate public health actions, while correctly identifying cases sufficiently frequently for public health action. Evidence suggested that very sensitive case definitions, including many symptoms, could lead to reduced compliance with public health actions (such as testing or self-isolation) especially if they were triggered too frequently. Clinical case definitions were more widely defined throughout the pandemic than the public ones, recognising the wide range of rarer symptoms that people with Covid-19 could present with. Testing on these grounds, when there was a suspicion of Covid-19 disease, was available to clinicians when they judged this to be necessary.

221. Engagement with clinicians and organisations around these symptom profiles, such as UKHSA, the CMOs, Senior Clinicians' Group and NERVTAG took place regularly and constructive discussion based on developed evidence was a readily apparent feature. More information on symptom profile, its development over time,

the evidence and the impact on testing is available within the UK CMOs' Technical Report [GS2/036 - INQ000130955].

222. Advice was largely developed from advisory structures such as SAGE, the C19AG and professional advisory structures such as the Scottish Government Professional Advisory Group and NHS Scotland Clinical Cell. Additional advice and discussion took place with public health and clinical experts within the broader NHS family in Scotland, such as PHS, the NIMT, the Scottish Association of Medical Directors and Directors of Public Health. Externally, a very important and valued contributor to advice was from Medical Royal Colleges, co-ordinated through the Scottish Academy. Academic institutes from across Scotland, who contributed significantly to the response, most notably through the C19AG, but also through research platforms such as Early Pandemic Evaluation and Enhanced Surveillance of Covid-19 (EAVE II).

223. I am not aware of any evidence that was made unavailable to decision makers nor occasions when evidence was absent but attempts were not made to try to develop it.

224. The Joint Biosecurity Centre (JBC) was very helpful in collating and presenting data and analysis for consideration by the CMOs, especially when setting the national alert level. However, their contribution was not confined to just this, with insights also being offered on prevailing epidemiology across the UK and also the threats posed by foreign travel and people entering the UK from countries with significant levels of domestic infection. The JBC provided UK CMOs with extensive expert analysis of data and trends across a range of parameters so that the UK threat level could be assessed. These were discussed at the JBC Technical Board, comprised of CMOs, CSOs (Health) from each of the four nations and members of the JBC. Reports were produced (generally) on a weekly basis or as agreed, after which CMOs would meet to discuss and consider the advice given by JBC analysts. Following this discussion, a recommendation would then be made to decision-makers on the level that the UK Covid-19 alert level should be set. In relation to the email (INQ000072320) to which you refer (the recommendation that the Covid-19 alert level in Scotland was raised from 4 to 5 in January 2021), this

advice was due to data and analysis associated with the Alpha variant; it showed continuing escalation of cases and a material risk, presented in modelling, that the NHS bed capacity in hospitals could be overwhelmed.

Intergovernmental working

225. To the extent within my knowledge, there was effective communication between core decision-makers in the UK Government and Scottish Ministers.

226. The four CMOs of Scotland, England, Wales and Northern Ireland enjoyed exceptionally good and productive professional relationships. There were regular meetings between the UK CMOs, often on a daily basis and over the weekends whilst seven day working was the norm for many months. These meetings were scheduled by the office of the CMO for England and they hold the minutes, dates and record of attendees, which I understand have already been provided to the Inquiry. The views of the CMOs for England, Wales and Northern Ireland and different experiences in those nations fed into the advice that I gave to core decision-makers in Scottish Government.

227. A further UK wide group meeting involved most senior clinicians, CNOs, CMOs and scientific advisers. This met twice weekly in evenings at the height of the pandemic, and weekly thereafter. These meetings were set up by CMO England's office and they would be responsible for the minutes. Evidence was carefully considered and clinical advice for colleagues and Scottish Ministers formulated by way of policy submission papers and through the Four Harms process. Both of these meetings were effective in assisting the Scottish Government in managing the pandemic in Scotland.

228. Generally there were diligent and conscientious attempts to convey information about responses through the CMOs group and for the majority of time, when professionals were adequately sighted on these announcements, this worked effectively. It was not, however, universally the case and there were occasions when proposals were first learned about through media reporting.

229. Medical advisers attempted to co-ordinate actions as much as possible when it was appropriate to do so, as there was a public health advantage to maintaining consistency in some of these messages across the UK e.g. symptom profile, testing criteria, vaccination and treatment announcements. On the whole, where there were clinical and professional messages to be conveyed, consistency in timing was achieved.

230. I did not have any direct contact with the Secretary of State for Scotland and I am unaware of any contact from their office during the response. I was aware of their presence in meetings during the pandemic but no direct engagement with me was ever sought.

231. I have no suggestions as to how cooperation between the UK CMOs could be improved. I found the interactions to be positive, supportive, transparent and professionally rewarding. They were appropriately challenging when they required the intense scrutiny that some evidence and advice warranted, but business was always conducted with the intent of developing the best evidence and advice possible. I record my personal thanks to the remarkable CMOs, DCMOs, and their support staff, for the quality of these interactions throughout the response.

Funding and competence

232. I did not experience any issues relating to resources and funding for the medical/scientific advisory structures (including C19AG) when providing advice during the pandemic. Turnover of support staff was at times significant because of the intense nature of work, long hours and lack of time off but there were generally always people who could be recruited into these positions.

233. However, there were issues in relation to the ability of advice developed to be both feasible and actionable and there was knowledge of the limitations of financial levers to do this across Scottish Government. This was evident most strikingly when waves of infection in Scotland rose above accepted risk tolerance levels and necessitated intervention, such as the introduction of more stringent NPIs and provision of furlough funding. The inability to access such funding led to occasions

when advice developed by the Four Harms Group, cognisant of the previously described balanced approach to harm, or decisions taken by Scottish Ministers, were less stringent than a purist health protection approach would have advocated.

234. The lack of financial levers and inability to have full border controls were, in my view, the most significant constraints in the devolution settlement that impacted on the pandemic response. When faced with these constraints, the various risks in play, including health harms, were balanced against each other through advice developed by the Four Harms Group; weighting towards health harms being particularly evident during the phase before widespread vaccination and available treatments provided more significant protection to the public.

Conclusions and lessons learned

235. In my opinion the procedures for preparing and communicating medical and scientific advice to inform core decisions made by the Scottish Government in connection with the management of the pandemic were fit for purpose, despite the incredibly challenging situation we all found ourselves dealing with. Throughout the pandemic there was a continuous review of processes and procedures across all aspect of the response to see if changes and improvements needed to be made.

236. Internal peer review and consensus forming allowed a significant degree of assurance in relation to the advice developed by the C19AG. Engagement with international contributors helped to strengthen this. When the Scottish Government Standing Committee on Pandemic Preparedness (SCOPP) was set up, I subsequently introduced a standing international advisory panel that could provide external scrutiny of the output and this is a potential area for exploration.

237. Advice developed by the C19AG was published on the Scottish Government website. Though advice given in submissions to decision makers was not generally published, I attended a daily media briefing televised live to the nation to update on the pandemic and be questioned about my views and advice given, enabling a greater degree of transparency in my view than publishing alone.

238. In relation to the response to Covid-19 between January 2020 and April 2022, I had no concerns regarding the performance of the FM, DFM, any Cabinet Secretary, Scottish Minister, Senior Civil Servants (SCS), Special Advisers or individuals in regards to their understanding and appropriate use of medical and scientific advice provided to them.

239. In relation to the response to Covid-19 between January 2020 and April 2022, I had no concerns regarding the performance of any of my counterparts in the UK Government or the devolved administrations.

Initial understanding of and responses to Covid-19 in the period from January to March 2020

240. I first learned of an interest in unusual cases of pneumonia that had been identified in China during a routine conversation with a Senior Medical Officer (SMO) in health protection, Dr Andrew Riley, whilst I was DCMO, just prior to New Year in December 2019. Health protection teams continued to evaluate and monitor the risk at that time through information derived from their professional networks.

241. I was aware that Professor Mark Woolhouse had contacted the CMO (Dr Calderwood) and had seen the content of an email which provided his view of a potential scenario. I was also aware that the CMO arranged to discuss this further with Professor Woolhouse and though I do not know the content of those discussions, I recall her taking these assessments, alongside information she was receiving from elsewhere, with a particularly significant gravity.

242. The reality is that much of this information was confirmatory rather than new, allowing triangulation of information and assessments from a variety of sources, and as you can see from Professor Woolhouse' s emails there remained significant uncertainty within a rapidly evolving situation. These sources included the CMO's own professional networks, and work being done in HPS (in collaboration with PHE and other UK public health agencies) and they fed directly into discussions Dr Calderwood was already having to escalate the importance of preparation. I am

aware that there were discussions between UK CMOs during this early period, but this was not something that I was involved in at that stage.

243. In these early stages of the response, Dr Calderwood undertook the majority of engagement with Scottish Ministers and senior officials herself but as the threat and amount of work required became clearer through to the end of January and early February, I gradually became more involved when released from dealing with other winter pressures and priority work.

244. The earliest sources of information for the establishment of case definitions were case reports, case series and information shared by national health agencies in East Asia and the WHO. In December 2019, the Wuhan Municipal Health Commission reported a cluster of pneumonia cases in Wuhan, Hubei Province, China. By mid-January 2020, the WHO had issued a report describing the clinical symptoms and signs associated with the pneumonia cluster. The first surveillance case definition for human infection with novel coronavirus followed soon afterwards. Throughout January 2020, reports describing the clinical signs and symptoms associated with SARS-CoV-2 infection continued to emerge, including the first published case reports and case series. By the end of January 2020, NERVTAG, SAGE, PHE and the DHSC had agreed the first epidemiological case definition in the UK, the geographical element of which expanded over the following weeks. In the UK, the First Few Hundred Cases Study (FF100) provided early insight into the symptom profiles of local cases, but these were generally younger and healthier cases.

245. Existing surveillance studies provided useful negative controls against which to compare the symptom profile of positive cases. The capacity and capability to provide mass testing for surveillance purpose was not yet available at this time but work began to enable this through development of initial confirmatory tests and the infrastructure to support serology and genomic sequencing on a remarkable industrial scale that subsequently became such a significant part of the wider UK response.

246. My experience of the 2009-2010 H1N1 pandemic was as an operational medical director working within the NHS. Undoubtedly there were aspects of this response that could have been improved, but I do not agree with the assertion that Scotland was not one of the better prepared responses and I do not agree that the prediction was accurate. Though these two pandemic responses are not comparable, as they were driven by two wholly different pathogens with different characteristics, there were however generic principles that could be applied whilst greater clarity about these intrinsic viral and disease characteristics were learned. As stated before, no two pandemics are the same, with even the H1N1 pandemics of 1919 and 2009 being significantly different. Therefore preparation for these as far as is possible, allied to an adequate and agile scientific infrastructure to support rapid learning and response are both necessary. I believe that this wide scientific and clinical response from the UK was a particular strength and led to key developments of global significance as a result.

247. Information about the reproduction number (R number) and routine calculation of case fatality rate (CFR) from Professor Woolhouse was helpful, but my recollection is that this was information that was already being discussed and triangulated from other sources too and did not come as a surprise. In this early stage, in particular, I recall there was great uncertainty about the case fatality rate and infection fatality rate which subsequently settled at a much lower level that the figure proposed by Professor Woolhouse. Work being done and discussed through NERVTAG and SAGE was especially important in informing the gravity of the threat that this coronavirus might pose. There is significant detail on how this work proceeded nationally and internationally and the emergence of greater clarity in the UK CMOs' technical report.

248. The information given in Professor Woolhouse's emails was helpful and I'm aware that all these were taken into consideration, alongside discussion and advice from SAGE, when options for responses were proposed by Dr Calderwood. Further information may be available from the Dr Calderwood in relation to these discussions.

249. Throughout the pandemic response, models were used to assess the range of possibilities that may lie ahead, but there was a full awareness by decision makers that these contained assumptions and often were associated with wide confidence intervals. They were useful at examining the range of possibilities for given parameters, but I did not witness over-reliance on their content. In fact, it was quite the reverse with an appropriate level of curiosity and challenge being offered when these models were discussed.

250. In the early stages of the pandemic the models produced were generally UK models that were discussed through SPI-M and SAGE. They served to illustrate the likely macro-effects of infection across the UK, but it was considered likely that these effects would be felt heterogeneously in time, most likely as a factor of concentration of populations and behaviours. The advice emanating from SAGE was very important at this time and remained so throughout the pandemic response. Professor Woolhouse's advice was considered alongside that emanating from other epidemiologists and advisory structures.

251. Throughout the pandemic, I believe that Scottish Ministers took decisions that were relevant to the epidemiology and risk tolerance of the Scottish Government. Though there was value in communication of a consistent message to the population up to a point, it was evident that decision makers in Scotland were willing to take decisions different to those of their counterparts in other nations even in the period prior to the national lockdown.

252. Due regard was paid to the societal and economic costs of counter-measures and this was a regular part of discussion between advisers and with decision makers even before the formal introduction of the Four Harms Group. However, the broad approach adopted at that time of delay, containment then mitigation necessitated a lower risk tolerance and actions to prevent direct health harms and deaths in a wholly naïve population due to Covid-19.

253. I was not involved in providing advice to Scottish Ministers as a result of Professor Woolhouse's contact. This question is best directed to the previous CMO, Dr

Calderwood, who had regular and very involved dialogue with Scottish Ministers during that period.

254. The Scottish Government has no formal route of liaison with the WHO. All UK liaison is undertaken by UK Government. There was dialogue between UK CMOs during the early stages of the pandemic response but I do not know the regularity or timing of these meetings and I was not involved as the DCMO.

255. It was my view in January 2020 and especially by February 2020 that we were most likely to be dealing with a threat of global significance that was different to that posed by SARS-CoV-1 or MERS and would inevitably have significant health impacts across the UK. There was much uncertainty about the timing of its arrival and severity of morbidity and mortality, but general clinical consensus was that it was inevitable given the emerging global patterns of spread.

256. I was personally not provided with any information from China other than that which was publicly available from published reports and scientific papers. There was uncertainty about the methodology used to derive some of this information and its reliability as a consequence of that. The Chinese Center for Disease Control and Prevention (CCDC) published weekly papers that by mid-February 2020 was beginning to establish a clearer picture of the CFR.

257. In mid-February 2020, the CCDC weekly bulletin [GS2/038 – INQ000326367] provided a CFR estimate of 2.3% from 72,314 cases identified using either polymerase chain reaction (PCR) testing (63%) or clinical diagnosis (37%). Of this group only 1.3% were thought asymptomatic. Of the PCR confirmed cases, 81% were classified as mild (which included non-pneumonia or mild pneumonia) and 19% were described as severe or worse (which was classified as dyspnea, low oxygen saturations and/or greater than 50% lung infiltrates on imaging). The CFR for those with severe disease was high at 49% and increased substantially with age (though the age distribution of this cohort was relatively young compared to the UK, with 68.8% of patients under 60). It was initially difficult to interpret such studies for a UK context, in part because denominators and numerators varied and

in part because their source populations differed from the UK in several important ways (such as age distribution).

258. Scientific articles from the period January and February 2020 were an important source of information and remained so throughout the pandemic response. There were numerous articles and I do not retain records of them. It was evident from these that this was a pathogen of significant consequence likely to be of global significance in its impact.

259. The previous CMO, Dr Calderwood, engaged with Scottish Ministers and Cabinet. I do not hold information on the content of this engagement and this question should be directed to her.

260. The transmission of the SARS-Co-V-2 virus is dealt with in detail within the UK CMOs' Technical Report [GS2/036 - INQ000130955]. It is true to say that this was an exceptionally complex journey with involved and at many times unclear scientific evidence. At the onset of the Covid-19 pandemic, when information on SARS-CoV-2 itself was limited, initial risk assessments and hypothesis generation for research drew upon what was already known about similar pathogens. Fortunately, identification and initial characterisation of the causative virus came swiftly. This early virological information fed into risk assessments about the nature of the virus and its risk to the population, when and whether it would be imported into the UK, as well as supporting the development of a diagnostic molecular test. It is likely that future pandemics and significant epidemics will see similarly rapid dissemination of initial information about the pathogen, particularly if they emerge and establish in countries with significant scientific capacity but, even given this, the speed of international information flow from the start of 2020 was impressive.

261. As data about SARS-CoV-2 accumulated with time, it became apparent that SARS-CoV-2 was different from SARS-CoV-1 in several aspects, such as in its pre-symptomatic infectiousness, levels of asymptomatic or subclinical infections, and routes of transmission. In the early stages of the pandemic, before robust data on SARS-CoV-2 itself became available, prior experience and knowledge about these related pathogens guided early understanding and public health actions.

Evidence on routes of transmission was important for guiding the pandemic response, especially in the early stages where NPIs were the only interventions that were available. Evidence of this kind has been important in previous pandemics and recent epidemics, such as HIV (sexual and intravenous), Ebola virus (touch) or Zika virus (vector), and it will be for any future pandemic or major epidemic.

262. It was established early that the likely principal route of transmission for Covid-19 was respiratory, although secondary routes including faeco-oral were not excluded. From early in the pandemic, three components have been considered potentially important for Covid-19: fomite, droplet and aerosol spread. However, global scientific consensus on the relative importance of these different transmission routes, and the potential role of other routes, shifted as new evidence emerged, and evidence has been continually reviewed as new variants of SARS-CoV-2 have become established.

263. There were important complexities in understanding transmission routes. First, transmission depends on multiple factors including: pathogen dynamics, such as viral load; environmental factors, such as temperature and ventilation; host-related factors, such as behavioural adaptation, immunity and contact patterns; wider contextual factors, such as prevalence of the disease. Second, some routes of transmission were easier to measure than others. It was relatively rapidly identified that close contacts were at elevated risk and from that it was inferred that close range droplet transmission was likely to be important. It was less easy to identify the most likely pathway in those with more distant exposure, where respiratory particles will have been diluted by distance, as a contact event was often harder to identify. Third, there was a need to balance the level of infection risk from a given transmission route with the frequency and likelihood of exposure to this route in day-to-day activities. Aerosol transmission across a room, for example, may present a low risk from any single exposure, but the ability for one infectious person to expose multiple people at the same time means it could present a higher population level risk in some settings than for close direct contact with an infectious person.

264. Given the challenges inherent in attempting to determine the relative impacts of different routes of transmission, it was important to retain an open mind as understanding evolved over the course of the pandemic. It was also important to ensure that absence of evidence was not interpreted as evidence of absence, and that important transmission routes to which there were potential countermeasures were not ignored. Expertise in public health, clinical medicine, microbiology, physics, behavioural science, built environment and data science was helpful to interpret a range of evidence on routes of transmission.

265. Initially, inference was drawn from studies of transmission routes for other respiratory viruses. Phylogenetic studies helped identify similarities to known viruses within the same family, in particular SARS-CoV-1. In retrospect, this provided mixed early indications, on the one hand, the airborne transmission capabilities of SARS-CoV-2 are similar to SARS-CoV-1; on the other, there are a number of important differences such as in timelines of transmission and the much greater role of asymptomatic transmission seen with SARS-CoV-2. As a respiratory virus SARS-CoV-2 carried the potential for transmission via droplets and aerosols, direct physical contact, and indirect (fomite based) physical contact. Existing evidence suggested that close contact with a person with acute respiratory infection carried more risk than a more physically distant contact, implying the importance of close-range droplet and, as now understood, short-range aerosol transmission. Pre-pandemic research into other acute respiratory infections also showed the importance for transmission of exposure in public spaces including public transport, shops, restaurants, parties, theatres and places of worship, suggesting an additional potential role for more distant, primarily aerosol based, transmission. Existing systematic reviews showed that regular handwashing can reduce incidence of respiratory infections, implying a possible role for direct contact and/or fomite based transmission. This helped guide early control strategies, but the relative importance of these transmission routes for SARS-CoV-2 was initially unclear and required further investigation.

266. Early retrospective cohort studies were helpful in generating hypotheses about modes of transmission. In January 2020, for example, a retrospective cohort study of 41 patients in Wuhan, China, provided initial evidence of human transmission.

The authors of the study suggested further investigation to exclude major alternate routes of transmission such as faeco-oral and recommended the use of precautions against airborne transmission [GS2/047 - **INQ000326417**

267. Outbreaks, especially super-spreading events also provided valuable opportunities to understand transmission dynamics at the outset of the pandemic, particularly when background prevalence was low. Well-designed outbreak investigations conducted during times of low prevalence could identify transmission from a single index case and describe the risk of infection according to proximity of contact. For example, early outbreaks in restaurants in China showed the highest risk of infection was for those with closest proximity to the index case. They also showed infections among people at distant tables, implying that some aerosol transmission had occurred, video evidence later discounted the role of fomite transmission. Similar findings were seen for outbreaks on coaches and trains. An early outbreak investigation in Germany in March 2020, combined with similar studies from China, also suggested the importance of pre-symptomatic transmission as some of those infected had only been exposed to the index case prior to that person becoming symptomatic. Gaining access to outbreak sites to gather samples, however, proved challenging, and at the outset of the pandemic protocols on containment levels hampered efforts to rapidly move samples. Having pre-approved emergency protocols for access and sample transportation, as well as adequate resources to investigate and take samples from outbreaks will be important in a future pandemic. Adequate resource to undertake reviews of outbreaks occurring internationally is also important.

268. Systematic studies of contacts of known cases, such as the FF100 approach [GS2/037 - INQ000326371 , provided valuable evidence in the early stages of the pandemic. In order to describe secondary attack rates according to the nature and setting of exposure, these studies needed carefully to define the nature of the contact in terms of proximity, type of contact, duration and setting, to follow up both close and distant contacts, and to undertake regular testing of contacts regardless of symptoms.

269. Environmental studies were also important. One environmental study with air and surface sampling, conducted over a period of 2 weeks in a Singaporean hospital with Covid-19 patients, found environmental contamination suggestive of droplet spread, and possible faecal shedding. However, sampling live virus is difficult and it remained unclear whether shedding in this study indicated transmission risk.

270. Alongside the above relatively rapid investigations in the early months of the pandemic, there was a need to establish surveillance programmes across multiple settings to provide real-time information and therefore early warning signals on transmission by different routes in household, community, health and social care settings. However, this relied on large scale availability of testing, which was limited in early Spring 2020 in the UK, as testing capacity struggled to meet rapidly rising demand.

271. The WHO-China Joint Mission analysis in early 2020 triangulated findings from phylogenetic and laboratory studies, outbreak analyses, in-depth analysis of disease progression and published literature to outline what was known and not known with respect to Covid-19 in order to make recommendations for both China and the international community. This suggested that SARS-CoV-2 was likely to be primarily transmitted through respiratory droplets during close unprotected contact and also by fomites, an assessment that did not change in their follow-up briefing in March 2020.

272. In recognition of the need to maintain an up-to-date overview of emerging evidence the SAGE Environment and Modelling group (EMG) was established in April 2020 to bring together a range of scientific experts to explore these issues in depth. The group continuously monitored best available evidence on transmission routes, in particular the growing evidence for the significant role of aerosol transmission.

273. Based on a further review of the existing evidence in July 2020, the WHO continued to recommend that direct or close contact with infected people via droplet remained the most likely principal route of transmission, and uncertainty remained about the fomite route. Multiple environmental sampling studies demonstrated presence of viable SARS-CoV-2 virus and/or RNA on surfaces for

hours to days, however, there was an absence of case reports or outbreaks robustly demonstrating fomite transmission (most people who came into contact with infectious surfaces had also had close contact with an infectious person). A year into the pandemic, the WHO noted that high-quality research was still required to understand routes of transmission, infectious dose and settings in which transmission might be amplified.

274. As the pandemic progressed the importance of airborne transmission was increasingly recognised. It was established early on in the pandemic that transmission was far more likely indoors than outdoors, suggesting a role for the environment and particularly dilution by air (but also the effects of sunlight), in influencing transmission. Some transmission events were reported to occur after an infected person had left a setting, indicating likely airborne transmission of the virus. Although the fact that the respiratory route was dominant was established very early, teasing out the relative contributions of close range and longer distance airborne spread, and of fomites, presented significant challenges. Super-spreading events and rapid epidemiological studies made an important contribution to understanding transmission routes, however, relying solely on these at times led to misleading conclusions about transmission, especially because aerosol and fomite transmission were and remain harder to measure robustly than close range transmission. Even transmission at close range was subject to prior assumptions, with the belief that the risk was posed by large droplets rather than more concentrated small aerosols, resulting in reduced focus on masks for protection against inhalation for people at close proximity.

275. From the outset, asymptomatic infection and transmission were considered possible, but the extent of each was not understood. Existing knowledge of other related human coronaviruses suggested that asymptomatic infection and transmission were possible, but it was difficult to extrapolate directly, and work was needed to clarify: the proportion of infections that were asymptomatic the role of asymptomatic transmission. These parameters are complex and quantitative, and their estimation required the continual balancing of multiple types of emerging evidence. Continual reassessment of this evidence was also required, as the immunity profile of the population changed due to infection-induced and vaccine-

derived immunity, and as new variants emerged. There was conflation of asymptomatic infection and asymptomatic transmission in some public reporting, and it was necessary to highlight that asymptomatic infection does not necessarily lead to asymptomatic transmission (though it was a prerequisite). Knowing the proportion of infections that were asymptomatic was important for case detection strategies and determining the infection fatality rate. Understanding the role of asymptomatic transmission was important for identifying which public health measures would likely bring R below 1. Transmission of infection from asymptomatic cases can be difficult to control, and the infectious timeline is difficult to establish in the absence of symptoms as a marker of infection or infectiousness, adding complexity to disease control. Asymptomatic cases cannot be detected in the absence of testing, and in the early pandemic the global and UK constraints on test availability significantly slowed the estimation of asymptomatic cases.

276. The proportion of SARS-CoV-2 infections that were asymptomatic was defined using two different numerators: PCR positivity and antibody positivity. PCR positivity was technically easier to assess but had a shorter duration, which may have resulted in undercounting of infections in some studies. Serology was more labour intensive to collect and analyse, but has a longer duration, providing a more accurate estimate of infection proportions. There was difficulty in identifying asymptomatic cases as the majority of testing took place in those who were symptomatic, particularly in the early stages of the pandemic when limited tests had to be prioritised. Simpler study designs (such as cross-sectional studies) were unable to differentiate between asymptomatic and pre-symptomatic infections. Although these produced estimates of the proportion of asymptomatic infections at pace, they were likely inflated by the inclusion of some pre and post-symptomatic individuals. It was likewise challenging to distinguish between asymptomatic, pauci- symptomatic and pre-symptomatic transmission. Where studies had designs which did not enable the differentiation of pre and asymptomatic transmission, there was a tendency to over-report cases resulting from asymptomatic transmission. Transmission from one person to another depends on a number of factors including shedding of viable virus and behaviours and contact patterns, noting that asymptomatic people may be more likely to be unaware of infection than symptomatic people.

277. For SARS-CoV-2, the asymptomatic proportion and the relative infectiousness of asymptomatic individuals varied substantially depending on the setting and characteristics of the individuals involved. In addition, they changed over time as the population gained protection from prior infection or vaccination and viral variants with different biological properties emerged. Early case and cluster reports raised the possibility of asymptomatic infection and transmission but often with poor differentiation between asymptomatic and pre-symptomatic transmission. At this stage, robust data on asymptomatic infections and whether they may be infectious to others was lacking, and estimates of the asymptomatic proportion varied widely. After a few months, outbreak studies in closed or institutional environments provided early estimates of the asymptomatic proportion of PCR-confirmed cases, but may have included pre-symptomatic cases. Descriptive reports of transmission chains and clusters described apparently asymptomatic transmission. Over time, evidence of positive tests in asymptomatic individuals mounted, and more robust data on asymptomatic transmission emerged. Estimates of the asymptomatic proportion were high. Cross-sectional studies were conducted which were unable to differentiate between pre and asymptomatic transmission.

278. By mid-2020, further estimates of the asymptomatic proportion in closed and/or institutional settings had been published, and the first evidence that infectious virus could be recovered from asymptomatic individuals emerged. Early systematic reviews and meta analyses of asymptomatic proportions followed, with wide variation in the estimates of the asymptomatic proportion, and lower estimates from studies that were better able to differentiate between pre and asymptomatic cases. Around this time, early data comparing cycle threshold (Ct) values between asymptomatic and symptomatic individuals became available, though the link between Ct values and infectiousness was not firmly established. Eventually, large random-sample swabbing studies, such as REACT and those led by the ONS, were established and provided robust estimates of the asymptomatic proportion on a regular basis.

279. By mid to late 2020, studies of household transmission had been established that were able to robustly identify asymptomatic infections and transmission, and the viral load dynamics in asymptomatic individuals had been characterised. Establishing that asymptomatic transmission occurred was well in advance of establishing what proportion of transmission was from asymptomatic people, and whether, if all symptomatic transmission ceased (for example, due to case isolation) asymptomatic transmission alone was capable of sustaining the reproduction number (R) above 1.

280. The first person to test positive for Covid-19 in Scotland was on 1 March 2020. This person was a returning traveller. Subsequently, the first person to test positive through evidence of community transmission (i.e. no exposure to known contact or returning traveller) was 11 March 2020. This was significant because it implied that Covid-19 was already spreading within communities and so the geographic element of the case definition was removed. It also heralded the move to delay phase of the response.

281. During periods of exponential growth, marked acceleration of cases was expected with the R number greater than 1.0; this growing number of infections was known to be associated with greater volume of ill patients requiring hospital care and to place pressure on service resilience across public services. Keeping the R rate below 1.0 did not suddenly stop new infections from appearing but reduced the likelihood of growth for the population being measured.

282. Over time, initial estimates of the incubation period of between 2-14 days became more refined as further studies were conducted, particularly household studies and understanding of Ct values and the link to viable virus were developed. With early viral types, peak infectiousness was estimated to occur at around 5-7 days after exposure with viral shedding particularly high at or just before the outset of symptoms but this knowledge and information took time to develop. From onset of symptoms, initial evidence with wild-type virus suggested that infectivity declined with duration of symptoms so that by day 7 the risk of infectiousness, though not absent, was small.

283. There is substantial consideration of CFR and infection fatality rate (IFR) in the UK CMOs' Technical Report. Population-wide surveillance (positive tests, syndromic surveillance) linked to outcomes (hospitalisation, deaths) provided high quality data for the routine calculation of CFRs in particular by providing a robust denominator. In the UK this was initially done using serology, which was difficult to interpret due to waning antibody levels, and after late Spring 2020 by large scale surveillance studies such as the ONS Covid-19 Infection Survey (CIS), Real-time Assessment of Community Transmission (REACT) and Early Assessment of Vaccine and anti-viral Effectiveness 2 (EAVE-II), and in cohorts such as SARS-CoV2 immunity and reinfection evaluation (SIREN) covering healthcare workers and Vivaldi (care homes). The calculation of an accurate IFR required serological testing of a representative random sample of the population, and establishing a regular serological survey allowed us to estimate the severity of disease on a regular basis. However, this took time to set up and for results to indicate severity more clearly and CFR was available much more quickly.

284. Early establishment of data storage and linkage systems was important for the timely calculation of these statistics. Securely sharing data with academic groups facilitated rapid analysis. Investigations of large outbreaks of Covid-19, similar to previous experience with H1N1 influenza, also supported CFR and IFR estimates early on, as well as giving signals on the proportion of asymptomatic infections.

285. An outbreak on the cruise ship Diamond Princess in February 2020 provided early data on outcomes for 3,711 passengers and crew, and gave a CFR of 2.6% and an IFR of 1.3%, likely due to testing across the ship picking up asymptomatic cases. Studies of Wuhan residents outlining the likely delay distribution between onset and death were critical in estimating both CFRs and, as testing and surveillance expanded, IFRs. Other opportunities for screening were passengers on flights from affected areas. However, these figures needed to be interpreted in context, and could not readily be applied to different population groups with different demographic characteristics.

286. It was not until late spring 2020, when many countries were experiencing high transmission and testing was being ramped up alongside surveillance studies, that

a shift from CFR to IFR occurred and estimates converged towards an overall IFR of around 1%. The presence of asymptomatic cases and asymptomatic transmission for Covid-19 was particularly problematic in early mortality rate estimates, and this had not been the case for the closely related SARS-CoV-1 (for which peak infectiousness matched peak clinical symptoms). Many early studies missed asymptomatic cases in the absence of widespread testing and community surveillance, and in the UK in February to April 2020 a number of cases due to Covid-19 occurred in the community without confirmatory testing. This was likely the reason behind higher early CFR estimates: Collated data in England from 31 January to 22 April 2020, for example, recorded 99,137 cases with 16,271 deaths, a crude mortality ratio of 16.4%. Around the same time, adjusting for age and using serological data alongside case data gave an IFR of 1.6% for the UK.

287. As noted above, global comparisons proved difficult as hospitalisation criteria, testing availability and case definitions varied over time and across different health jurisdictions. Mortality itself also varied significantly from country to country, likely due to different age structures of populations as well as differences in a range of other risk factors such as obesity, levels of social deprivation and important comorbidities. A study in Italy, where 37.6% of cases were aged 70 years or older, gave an estimated CFR of 7.3% up to 15 March 2020, compared to a much lower CFR in a Chinese study where just 11.9% of cases were over 70. Understanding of how these complex and interacting demographic factors influenced severe disease evolved throughout the pandemic and underscored the importance of continual evaluation of variation in severity.

288. Early case reports and epidemiological studies on outbreaks provided some important early signals about potential disparities. As early as January 2020, reports from China indicated that Covid-19 led to worse outcomes among older patients and men. Over the next 2 to 3 months, additional data emerged, primarily from China and Italy, suggesting that people with certain underlying health conditions and immunosuppression were at increased risk of disease and death. Early data from China also suggested low skilled workers were at increased risk of progression to severe disease. As cases began to appear in the UK, the FF100 enhanced surveillance protocol was commissioned, following WHO protocols and

in line with previous pandemic response for MERS-CoV and H7N9 influenza. This provided basic demographic data and enhanced surveillance of clinical presentation on the first few hundred cases of SARS-CoV-2 infection, allowing for an initial detailed description of people affected.

289. Early indications of key populations most affected were highlighted, for example, the increased clinical risk in people with underlying health conditions. However, it is worth noting that FF100 investigations are prone to biases (for example, where the first few hundred cases may be returning travellers with similar socio-economic status or health status). Several surveillance systems and routine data sets were in place before the pandemic, such as the Second Generation Surveillance System (SGSS) laboratory monitoring and the ONS death certification. These systems indicated early on that exposure and infection risk were disproportionately high for those working in frontline care or other in-person service occupations, such as transport and cleaning. Although the systems were unable to provide detailed reasons for this, they were likely to be multifactorial and possibly include some non-work risk factors in addition to occupational ones. Some bespoke surveillance systems were also designed from scratch, for example, to count Covid-19 deaths in hospitals and Covid-19 attendances and admissions to NHS hospitals. Hospital admission data then rapidly began to produce signals on potential disparities: by February 2020 there was evidence of increased risk of hospital admission for older adults, men and those with certain underlying health conditions.

290. The regular publication of intensive care data also supported a rapidly growing understanding of ethnic disparities in the UK; in the first wave, statistics highlighted high rates of hospitalisations among patients of black and Asian ethnic groups compared to white ethnic groups. However, ethnic disparities were often confounded by deprivation and living in areas with high prevalence. As the pandemic went on, patterns of risk for both infection and severe disease changed as the epicentre shifted to areas with different ethnic makeup and as vaccines were rolled out with differing levels of uptake across different communities. Testing data also supported understanding of disparities.

291. Public engagement exercises were used throughout the pandemic to understand the experiences and drivers of observed disparities in Covid-19 health outcomes. For example, an in-depth public engagement exercise with representatives of key affected groups alongside a rapid literature review and qualitative analysis culminated in the publication of another report 'Understanding the Impact of Covid-19 on Black and Minority Ethnic (BAME) Communities' [GS2/048 –INQ000217693], which produced a series of recommendations on how to better understand and mitigate the impact of the pandemic on ethnic minority groups. This included a clear ask for improved data collection on ethnicity, occupation and faith in all routine clinical data and death certification.

292. Finally, several studies established in the early phases of the pandemic response provided an invaluable contribution to the understanding of Covid-19 disparities. These included the ONS Covid-19 Infection Survey, which provided weekly estimates of infection and immunity and enabled detailed analyses of disparities such as occupation, ethnicity and deprivation. The Vivaldi study [GS2/049 – INQ000343803], meanwhile, collected qualitative and quantitative data on care homes to understand working conditions and the spread of infection and immunity in care home populations. Its findings have been used to inform the ongoing policy response, including vaccine recommendations. Other studies on specific groups and settings, such as for children and adults with learning disabilities, homeless shelters and prison populations, were helpful in exploring the impact of the pandemic on these groups. Information about these studies were freely shared between the senior clinicians during regular meetings between CMOs and/or the Senior Clinicians Group.

293. During my time as interim CMO in the early months of the pandemic, new and emerging information about the virus and its disease were regularly shared with the First Minister during daily meetings and with Cabinet weekly. Further information regarding this aspect before I became interim CMO is best answered by my predecessor Dr Calderwood.

294. The essential features of the virus and its disease were necessarily and understandably only understood over time, as research began to confirm

hypotheses and evidence of these characteristics globally. This was a situation not unique to the United Kingdom and it is my view that it will occur in future pandemics too. Ensuring that there is adequate scientific infrastructure to develop the evidence quickly and effective global scientific connections to share information is the best way to reduce the real and predictable risks.

295. I consider that necessary and appropriate steps were taken on the information available by the medical and scientific advisory community across the UK in January 2020. Similarly, I believe that the First Minister Cabinet and other departments reacted appropriately and that the seriousness of the situation and the spreading of the virus in China and to European countries such as Italy, was appreciated by all concerned.

296. Within the Scottish Government, there was an understanding that Covid-19 was the result of a respiratory virus subsequently named SARS-CoV-2 and that in this respect it was similar to influenza. However, it was far from being determined whether it would have similar characteristics to influenza other than in some of the clinical responses and complications that might be respected. No assumptions were made that it would be the same as influenza but there were some generic principles, particularly in response, that could be followed as a respiratory pathogen mediated pandemic.

297. I had no contact with the WHO in relation to making a declaration of a Public Health Emergency of International Concern (PHEIC). Clinical contact with WHO in the UK is only available through CMO England. I am not aware if Dr Calderwood had any contact, so questions on advice issued by WHO and discussed with the First Minister for dates prior to April 2020 are best directed to her.

298. I was not involved in discussions with the First Minister and other core decision-makers to consider WHO advice, for example the guidance issued on 9 January, 4 February and 28 February 2020, applied to the UK, though I was aware of it. Again, this question is best directed to Dr Calderwood.

299. I was not involved in the UK CMOs discussion on 30 January 2020 to increase the UK risk level. Again, this question is best directed to Dr Calderwood.

300. The case fatality rate and infection fatality rate was not understood with certainty by late January 2020 and there were wide estimations of what these rates might be.

301. I was not involved in testing during this period. Again, this question is best directed to Dr Calderwood.

302. By the end of January 2020 I was aware that a potentially fatal new respiratory diseases was spreading through the UK as per my previous answers in this statement. However, I was not involved in discussions with the First Minister and other core decision-makers. Again, this question is best directed to Dr Calderwood.

303. From my perspective as DCMO at the time, it appeared that Covid-19 was foremost amongst HSCD priorities in Scottish Government, alongside the management of winter pressures in the first part of January. I did not have contact with other areas of Scottish Government at that time as DCMO, so I am unable to offer a view of where Covid-19 fell in the wider sense.

304. During February 2020, the models predicting extremely high levels of population infection (in the UK and Scotland), both at peak, but particularly over the first year, appeared plausible to me. The Reasonable Worst Case Scenario (RWCS) was useful for planning purposes but was of course dependent on many of the assumptions that informed the model. As information used in these assumptions became more robust and confidence improved, the RWCS became even more important, but was generally used as part of a package of information to inform a response rather than solely by itself; in this respect it was indicative for those assumptions, rather than predictive.

305. In February 2020, I was not involved in discussions with the First Minister and Cabinet about RWCS and likely numbers of infected people within Scotland . Again, this question is best directed to Dr Calderwood.

Pre-lockdown response

306. Guidance on the frequency, duration and technique of hand and environmental cleaning to reduce fomite transmission was available in the UK from early in the pandemic using existing infection prevention and control guidance. This was considered adequate at that time and there was no difference to the measures implemented by the Scottish Government compared to that for the rest of the UK.

307. As the pandemic progressed, and in particular as public settings reopened after the first lockdown, there were further measures to widen access to cleaning facilities such as hand sanitiser in public spaces and sprays to clean common touch surfaces.

308. Scientific consensus on the relative importance of hand and environmental hygiene shifted throughout the pandemic as evidence developed indicating more limited viability of virus in the environment than initially suspected, and strengthening evidence for the proportionately more significant role of airborne as opposed to droplet transmission. Of course, the likelihood of transfer is greatest the shortest amount of time since a surface has been touched, and so hand cleaning was generally more important than environmental cleaning.

309. Hand and environmental cleaning no doubt played a role in reducing transmission risk across a range of settings, but it is important to remember that transmission in these settings also depended on proximity, types of contact and other mitigating measures (such as ventilation).

310. Nevertheless, hand and environmental hygiene advice remained in place, not least because it has had the additional benefit of reducing transmission for some other infectious agents and, besides, is part of routine advice to many settings. Importantly, this measure also had almost no downsides except the impact of regular cleaning on operations (for example, in schools and businesses), some costs (such as installing basins or buying sanitiser), and on people for whom regular hand washing aggravated skin conditions. It was also a relatively

straightforward intervention to implement, though the capacity to make facilities available for cleaning varied across different settings, areas and communities.

311. There was existing flu and respiratory surveillance in the UK during the period January to March 2020 but I am not aware of any surveillance for Covid-19 specifically. As there was not yet the ability to test for Covid-19, or differentiate it from the substantial winter respiratory pathogens already in circulation, it was not possible to assess to what degree Covid-19 was spreading during this period. Early case definitions, particularly before mass testing was available, relied on symptoms common to other pathogens but with geographical exposure to the possibility of Covid-19 in countries where it was known to be circulating.

312. Population-wide surveillance (positive tests, syndromic surveillance) linked to outcomes (hospitalisation, deaths) provided high quality data for the CFR in particular by providing a robust denominator. In the UK this was initially done using serology, which was difficult to interpret due to waning antibody levels, and after late spring 2020 by large scale surveillance studies such as the Office for National Statistics (ONS) Covid-19 Infection Survey (CIS), Real-time Assessment of Community Transmission (REACT) and Early Assessment of Vaccine and anti-viral Effectiveness 2 (EAVE-2), and in cohorts such as SIREN (healthcare workers) and Vivaldi (care homes).

313. The calculation of an accurate IFR required serological testing of a representative random sample of the population, and establishing a regular serological survey allowed the severity of disease to be estimated on a regular basis. However, this took time to set up and for results to indicate severity more clearly and CFR was available much more quickly.

314. In the UK, the First Few Hundred Cases Study (FF100) [GS2/037 - INQ000326371] provided early insight into the symptom profiles of local cases, but these were generally younger and healthier cases. Existing surveillance studies (such as flu watch) provided useful negative controls against which to compare the symptom profile of positive cases.

315. With the passage of time, more sources of data were established. National surveillance data, with symptom surveys linked to test results, provided useful insight into symptom frequency in cases throughout. By mid to late 2020, systematic reviews and meta-analyses with large sample sizes had produced detailed summaries of symptom profiles in different age groups. Non-traditional academic sources, such as healthcare worker symptom reporting, symptom-tracker apps (such as the ZOE app) and social media, also provided information on symptom frequency, though many of these sources were not sampled in a randomised way and were therefore not representative of the population as a whole.

316. Population-wide or nationally representative case-control studies and longitudinal studies, and later systematic reviews and meta-analyses, ultimately provided the best insight into symptom profiles and case definitions, though they took time to establish. Studies that tested people regardless of symptoms (such as REACT and those coordinated by ONS) and compared symptom profiles in symptomatic test negative and symptomatic test positive people provided robust estimates of the sensitivity and specificity of specific symptoms, while avoiding the biases often present in national testing data.

317. Early establishment of data storage and linkage systems was important for the timely calculation of these statistics. Securely sharing data with academic groups facilitated rapid analysis.

318. As the first Covid-19 cases in Scotland were identified I took part in Problem Assessment Groups and Incident Management Team meetings alongside the CMO Dr Calderwood, but I had no formal role in the testing or tracing procedures themselves.

319. Testing in the pre-lockdown period was largely for diagnostic purpose with further tests being offered to identified contacts through enhanced surveillance and tracing by health protection teams. These were the responsibility of local Health Boards. Subsequently when Test and Protect was introduced in late May 2020,

once there was sufficient capacity within testing and tracing, these local teams were augmented by central national resource coordinated through PHS.

320. Demand for testing largely outstripped availability to the general population in the period March and April 2020, but capacity building, to include all NHS laboratories and introduction of Glasgow University's Lighthouse lab, further strengthened the ability to offer testing to broader groups, including introduction of enhanced outbreak investigation and sampling in residential care environments. At the beginning of May, a target of 3500 tests per day had been exceeded and expanded to 8350 tests, allowing a more expansive approach to the way that testing was used.

321. From a very early stage in the pandemic, as preparations began, planning assumptions were based around RWCS. This was a dynamic process, as assumptions which underpinned RWCS models evolved as greater understanding about the underlying assumptions within these models became clearer through SPI-M and SAGE.

322. I do not recall personally that the WHO increasing the global alert risk level to "very high" had any material effect on preparations. That's not to say that it didn't have an impact, or perhaps accelerate work in some areas, but in practical terms there was already significant insight into the seriousness of the situation that was faced. Again, this question is best directed to Dr Calderwood.

323. I do not recall any difference in views between myself, the CMO or other government clinical advisers during that period. It was very clear that the CMO was taking the threat very seriously and engaging fully, capably and broadly with others in Scottish Government for the response to it. At no time did I form a view that she was taking an overly cautious approach.

324. I was not directly involved in giving advice to core decision makers during the period January and February 2020. Again, this question is best directed to the former CMO, Dr Calderwood.

325. I had no contact with representatives of other countries as DCMO during the period January to March 2020. Again, this question is best directed to the former CMO, Dr Calderwood.

326. Although some countries, especially in East Asia, promoted widespread use of face coverings or masks from an early stage, the global and UK scientific consensus on the appropriateness of face coverings or masks for preventing transmission evolved during the early stages of the pandemic.

327. It was not until April 2020 that SAGE advised on balance there were benefits in widespread use of face coverings, though as the country was under a national lockdown at the time this was unlikely to be instrumental in reducing community transmission. In the same month, interim WHO guidance advised against the use of face masks for healthy (uninfected) people in community settings.

328. Evolving recommendations on face covering or mask use in the community from the WHO, the UK Government and other governments worldwide were at times difficult to communicate. At the outset of the pandemic, for example, demand for face masks globally was extremely high and there was concern that widespread use of medical-grade face masks in settings where they were thought to have marginal or no effect would impact supply lines for health and social care professionals who were in close contact with infectious and vulnerable people.

329. Widespread face covering use had some potential negative impacts on social and educational interactions, such as for younger children, those with dementia and those who rely on facial expression or lip reading for communication. Some groups were exempted from guidance to use face coverings. There were strong and opposing views on the best approach to face coverings in public, alongside scientific discourse on the topic. All of the evolving information and recommendations would be presented to Ministers for their consideration as decision makers.

Flattening the curve

330. The early strategy regarding the need to prepare for a second wave is contained within the UK Coronavirus Action Plan. This plan is characterized by 4 phases of response: Contain; Delay; Research; Response. As DCMO, I was not directly involved in the creation of this plan and questions about it are best directed to the former CMO.

331. Minimising peak incidence and prevalence of infection, or "flattening the curve" was a response discussed through pandemic influenza plans and SAGE. It relates especially to the delay and mitigation phases of respiratory pathogen action plans, such as the Coronavirus Action plan discussed above. In the absence of effective medical countermeasures or population immunity, it is very probable that any new respiratory pathogen such as SARS-CoV-2 would eventually infect the majority of a population in which it was circulating in one or more waves. By minimizing peak incidence and prevalence, this approach seeks to preserve sufficient capacity in healthcare for this and other medical need, sustain public services and minimize absence from work at a concentrated point in time whilst allowing research and preparations for definitive countermeasures such as medicines or vaccines to continue. Alongside this approach, it was important also to identify those more at risk and to put in place additional protective measures for them such as shielding. Subsequently, the approach to mitigation in Scotland became one of more aggressive suppression of community transmission to as low as level as possible, by using NPIs and balancing the harms (as outlined elsewhere in this statement) until medical countermeasures were widely available and implemented. This approach was influenced by learning about viral characteristics, especially transmissibility and pathogenicity, and the evidence base and learning as it emerged for NPI effectiveness. Tracking the epidemic curve of Covid-19 was possible, but in the early stages, before mass testing was available, it relied much more on lagged data and modelling and was less responsive as a result of that. As more testing became available, there was significant improvement in the flow and confidence of epidemic data.

Herd immunity

332. There was no herd immunity strategy in Scotland. What was discussed in the early stages of the pandemic and how to respond was the potential compromise on the NHS's ability to cope if high numbers of the population were infected with Covid-19. At meetings of SAGE, the extent to which the NHS would be able to cope and how that would need to be controlled was discussed very early on.

333. The notion of herd immunity was one of many issues discussed by the C19AG. They did not provide formal advice on this issue and did not make decisions about the Scottish Government's strategic response to Covid-19.

Pre-lockdown developments in March 2020

334. On 12 March 2020 the Prime Minister announced the publication of guidance advising those with Covid-19 symptoms to self-isolate at home for at least seven days. The guidance applied to Scotland [GS2/050 – INQ000326375].

335. The guidance to isolate at home for seven days when people developed symptoms consistent with Covid-19 applied in Scotland from 13 March 2020. The timing of introduction of this guidance and duration was based on advice received from SAGE and NERVTAG. I am not aware whether there was further refinement of this timing influenced by further discussion between CMOs at that time or the nature of that discussion.

336. I do not know what advice was specifically given about whether isolation should be guidance or a legal requirement. The period of seven days isolation was based on balance of risk, recognizing there were pros and cons to longer and shorter durations of isolation based on knowledge at that time. Subsequently it became clearer that there was some evidence to support longer period of isolation, to ten days, though the gain at that time was modest and perhaps more influenced by evolving strategic response and risk appetite. The CMO, Dr Calderwood, wrote to health services on 15 March 2020 outlining the implications of the move to delay phase of the pandemic [GS2/051 – INQ000326376].

337. Subsequent to the email chain [GS2/052- INQ000130909], a meeting took place with the First Minister where content considered at SAGE was discussed. At this time, it was clear that there was a shared unease about continued deliberation on timing of the implementation of measures and that public fear and anxiety was already changing behaviour. Allied to this, there was disappointment at the continuing difficulty experienced by observers at SAGE, especially when not in the room, to be able to easily probe and ask questions. I do not recall the exact content of the discussion but recall that steps to move on these suggested interventions more quickly, and of necessary unilaterally, were subsequently initiated.

338. On 15 March 2020, the Scottish Government judged that containment of the virus was no longer possible and that the country should be moving into the delay phase. This was based on the same medical/scientific advice as the rest of the UK following an emergency Cobra meeting.

339. After the WHO declared coronavirus a pandemic, the UK Government moved the UK from the "containment" phase into "delay". This also moved the testing strategy to one where people are no longer tested, but anyone with a temperature or a continuous cough was advised to stay home for seven days, to reduce the number of people they will infect.

340. The scientific advice that all four Governments in the UK received showed that we were on the cusp of a rapid escalation in the spread of Covid-19. That meant far more stringent steps were required to suppress as far as possible the spread of the virus and protect and scale up the capacity of the NHS; and by doing these things, save lives.

341. Announcing Scotland's decision to ban public gatherings of more than 500 people the FM said it was not based on scientific evidence, but would help for consistency of messaging and to alleviate pressure on the emergency services being stretched by the pandemic.

342. At FM's Question Time in the Scottish Parliament on 12 March 2020 [GS2/053 - INQ000326377] the FM said *"Let me be clear on one thing. I have said all along that it is important that we are informed by the scientific advice, and that continues to be the case. The scientific advice tells us that cancelling mass gatherings will not in itself have a significant impact on reducing the spread of the virus. That does not mean, of course, that that would have no impact, but the health secretary and I have come to the view that there are wider issues to take account of. Mass gatherings require to be policed and to have emergency ambulance cover, and they require the services of our voluntary health services. At a time in which we need to reduce the pressures on those front-line workers in order to free them up to focus on the significant challenge that lies ahead, it is inappropriate that we continue as normal. The health secretary and I decided this morning that we are minded—we will seek views on this decision from others at COBRA—that we will advise the cancellation of mass gatherings of 500 people or more from the start of next week. That is principally to protect the resilience of our front-line workers. We will continue to take other decisions on issues such as schools in collaboration with the other nations of the UK in the future, and they will be very much driven by the scientific advice."*

343. On 18 March 2020 the FM announced schools and nurseries were expected to close to pupils from the end of this week [GS2/054 - INQ000326378. The statement said that "SAGE – our expert scientific advisers – are examining new advice that is very likely to tell us to close schools. We also know more and more schools are approaching a point where they have lost too many staff to continue as normal."

344. The minutes from the Seventeenth SAGE meeting on Covid-19, 18 March 2020 states the following: "SAGE advises that available evidence now supports implementing school closures on a national level as soon as practicable to prevent NHS intensive care capacity being exceeded" Questions regarding the medical/scientific information and advice presented should be addressed to the SAGE Secretariat which sits in the Government Office for Science, known as GO-Science.

345. The Scottish Government told businesses including cafes, pubs, and restaurants to close, along with nightclubs, theatres, cinemas, gyms and leisure centres on 20 March 2020 [GS2/055 - INQ000326429]. The measures followed a meeting of the UK Government COBRA committee, attended by the First Minister, and were implemented across the UK, not just Scotland. Questions regarding the medical/scientific information and advice on which that decision was based should be addressed to the UK Government and/or the previous CMO Dr Catherine Calderwood.

346. Scotland, like the rest of the UK, locked down two weeks later than Italy (which instituted a national lockdown on 9 March 2020 having promptly placed the most affected areas under quarantine during February), nine days later than Spain (14 March 2020) and six days later than France (17 March 2020). Questions regarding why the Scottish Government did not implement more aggressive suppression strategies before the first lockdown, the need to follow a consistent four nations strategy approach and upon what medical/scientific information and advice this was based, should be addressed to the previous CMO, Dr Calderwood.

Super-spreader events

347. Other than the three events listed below I am not aware of any others identified to the Scottish Government as having the potential to cause significant spread of the Covid-19 virus between January and March 2020.

- The NIKE Conference in Edinburgh, 26 to 27 February 2020;
- The Scotland v France rugby international at Murrayfield, Edinburgh on 8 March 2020; and
- The Wales v Scotland rugby international due to be held on 14 March 2020.

348. The Nike Conference took place in Scotland in February 2020. The first case of Covid-19 confirmed in Scotland was not until 1 March 2020. On that date, there had been no positive cases in Scotland linked to the conference. HPS alerted Scottish Government on 2 March 2020 that an individual who was now overseas, but who had been at the conference, had tested positive. On 3 March 2020, HPS

recorded a positive case in Scotland of an individual who had been a conference delegate. That case and the details of the potential outbreak was confirmed to Scottish Ministers on the evening of 3 March 2020. Details of that case were then included in a news release issued on 4 March 2020 and included in the Scottish Government's normal case reporting schedule.

349. Twenty three primary cases were linked to the conference and sixteen secondary cases were subsequently identified. HPS led on the management of this outbreak which included an International Incident Management Team (IMT), and they subsequently undertook an assessment of the event, providing a detailed report on 5 October 2021 [GS2/056 - INQ000147454]. This concluded that following Whole Genome Sequencing (WGS) of the severe acute respiratory syndrome, coronavirus 2 (SARS-CoV-2) virus identified a particular sub-lineage B-S16 associated with the conference. Sub-lineage B-S16 has not been detected in Scotland since April 2020. They concluded that the '…WGS results strongly suggest that the actions taken by the incident management team (IMT) to manage the outbreak were successful in curtailing onward transmission.'

350. The decision making on the Nike event was led by HPS, NHS Lothian and Edinburgh City Council, CMO (Dr Calderwood) and officials from the Health Protection team (which became Covid-19 response Team). An IMT was established and led by HPS, which included representatives from Scottish NHS Boards, NHS Lothian, West of Scotland Specialist Virology Centre (WoSSVC), Public Health England and PHE National Incident Coordination Centre (NICC).

351. An IMT report on the Nike conference outbreak was published in October 2021, as previously submitted [GS2/056 - INQ000147454].

352. In advance of the national lockdown, the risk around particular events were discussed primarily in SGoRR meetings. This included the Cheltenham Festival 10-13 March 2020, and the Six Nations Rugby including Scotland v France 8 March 2020.

353. The advice was based on the very best evidence we had at the time and discussed through the governance in place, covering both health protection operational oversight (through IMT) and also policy oversight through both the SGoRR-O (Officials) and SGoRR-M (Officials and Ministerial) meetings.

354. The C19AG's advice on Physical Distancing and Superspreading was published on the Scottish Government website [GS2/057 - INQ000217729]. The group was advisory, and considered papers produced by World Health Organisation (WHO) and other international organisations. However, they did not have a decision-making role. They produced advice on superspreading events on 2 July 2020, this advice was commissioned by the First Minister and Chief Medical Officer. A copy of this advice has previously been submitted to the Inquiry. These strategies did not fully eliminate super spreader events, but where adherence with the advice was high, I believe that they greatly reduced the frequency of occurrence of these events and number of people impacted by them.

355. I was not directly involved in discussion about these events, therefore questions regarding cancellation of rugby matches in other countries, communication of the positive cases (from these events) to the public and the medical/scientific information and advice should be addressed to Dr Calderwood, SGoRR officials, the former First Minister, the former Cabinet Secretary for Health & Sport and PHS.

356. In relation to the Nike conference, I became involved in one email conversation where I expressed my view that it was reasonable to disclose further information to the public. The question appears to imply that the Nike conference was significant in the spread of the virus. However, as has since been shown by the PHS IMT report and genomic sequencing of cases, this was unfounded and the actions of the local health protection team and PHS were very effective in restricting spread in Scotland.

Testing

357. As CMO I was amongst the advisers who attended meetings where advice was discussed, agreed and submitted to Scottish Ministers. I provided professional clinical advice to officials responsible for testing and tracing strategy.

358. As mentioned previously in this statement, the C19AG had a number of sub-groups including the Scientific Advisory Group on Testing chaired by CSO (Health). Throughout the pandemic officials in the Testing and Contact Tracing Division engaged with CMOD and their counterparts from the devolved nations through the range of structures/meetings. In addition to this, infrequent communication by email took place to discuss matters relating to testing, contact tracing and isolation both to understand decision making and evidence base(s) in other nations and to ensure that officials could brief Scottish Ministers on decisions and the response that was being progressed in relation to testing.

359. Throughout the pandemic, the capacity and effectiveness of laboratory processing, delivery and distribution routes and global demand and supply of materials continually changed. Testing strategies were continually adapted in response, and as the epidemiology changed and wider pandemic strategies also adjusted (for example, where routine testing enabled strategies supporting the labour market).

360. Testing strategies also evolved as new technologies became available and as evidence emerged on the potential needs, use cases and population responses to different testing options – such as self-testing, as opposed to that undertaken by a health professional or in clinical settings only, or accessibility of public testing centres. Testing evaluation initiatives were important throughout in understanding this and helped shape government policy.

361. For a detailed statement on all aspects of testing from my perspective (and the other UK CMOs), please refer to Chapter 6 in the UK CMOs' Technical Report [GS2/036 - INQ000130955].

362. Surveillance, testing and tracing varied over time. At the beginning of the pandemic, after tests had been identified and developed, there were only two laboratories in Scotland able to perform and assure around 350 tests each day. By the end of April, each Health Board lab had adapted to be able to do this and Glasgow Lighthouse laboratory was also up and running, creating capacity for over 8000 tests per day and allowing an expansion of testing criteria and greater use in sampling, for example in asymptomatic care homes residents and staff. In addition to this, serological surveillance was now available by this point and able to identify those with past exposure in the population. I did not have a direct role in this service but advocated the importance of testing, contact tracing and surveillance as a key intervention in managing the pandemic, encouraging the maximal provision as soon as capability and capacity allowed.

363. In respect to the email from Professor Mark Woolhouse (INQ000103476) I do not think either my views, those of the Scottish Government or Professor Woolhouse differed in relation to the importance of testing or increasing testing capacity.

364. A reasonable definition of the Scottish Government's overall aim throughout the emergency phase of the pandemic (lasting until April 2022 in Scotland) was to minimise the harms that it would cause. The First Minister, in her Foreword to the Framework for Decision Making (April 2020) [GS2/010 – INQ000131025], stated that:

- Our challenge therefore is to work out if and how we can continue to suppress [the virus] and minimise its harms, while restoring some semblance of normality to our everyday lives. We will always take a careful approach that seeks to protect life and reduce harm.

365. Delivering the Test and Protect scheme required building sufficient capacity to ensure people with Covid-19 symptoms could access testing. From March 2020 until the inception of Test and Protect, Scotland was in lockdown and 'Test, Trace, Isolate' was part of a range of public health measures to minimise community transmission and the harm caused by Covid-19.

366. At the early stages of the pandemic, in addition to advice coming from structures like SAGE and NERVTAG, medical/scientific information and advice in Scotland on the role of testing and strategy came from the office of the Chief Scientific Adviser (Health). The Chief Scientific Adviser (Health) established and chaired a Scientific Advisory Group on Testing which formed part of the wider advisory landscape including the C19AG. In addition, international best practice was taken into consideration, for instance World Health Organisation (WHO) guidance on contact tracing.

367. Because Health is devolved, responsibility for most of the management of the pandemic in Scotland fell to Scottish Ministers. However, for Test & Protect and in particular the development and application of testing capacity and technologies, Scotland was part of the UK Four Nations National Testing Programme (along with Wales and Northern Ireland), which significantly impacted the approach to testing taken at all times in the pandemic.

368. Scottish Ministers were open to coordinating measures across the four nations where that was appropriate, but would ultimately take decisions that best addressed Scotland's needs. This meant that at times there were differences in the detail of the approaches taken (for example, the ability to contact trace on the back of a positive LFD result, or the options around phasing to a steady state towards the end of the emergency phase of the pandemic), overall though, and at a high level, the approaches to testing policy were broadly similar across the four nations.

369. In April 2020 as part of the initial response to the pandemic, Scottish Ministers agreed plans to build on the existing testing system expertise and capacity by scaling services and delivering this under a 'hub and spoke' model. Central resource, digital innovation and development alongside a central call centre function all sitting with NHS National Services Scotland (NSS) and each territorial health board scaling local capacity to deliver the service in their area under one central approach. Flexibility to respond to changing demands was built in to the service model via the hub and spoke approach and through access to additional capacity if needed, e.g. call-off contracts.

370. This core contact tracing service was delivered from May 2020 and flexed in response to a range of case number increases throughout the pandemic as well as changing public health guidance. Digital tracing evolved throughout the pandemic to reflect the requirements of responding to an infectious disease with a nearly exponential growth rate within a pandemic situation. Development of digital tools was undertaken in line with WHO guidance on the use of digital tracing.

371. Generally, four nations collaboration on testing was effective and enabled each nation to deliver public health measures in line with their Ministerial priorities, but leveraging a central, bulk function for access to testing kits for example.

372. However, there were consequences of decisions made by the UK Government, for example, on the total budget available for Covid-19 response. This meant that Scottish Ministers had more limited options to design a solution in areas of devolved responsibility within a cost envelope set by the UK Government. The option of diverting resources from the wider Scottish Budget into Covid-19 related activities was of course available, but doing so would have negatively impacted on the delivery of wider Scottish Government priorities and activities during the pandemic.

373. On 1 May 2020 a further expansion of Covid-19 testing in Scotland was announced as it was confirmed that the target to reach capacity for 3,500 tests a day across NHS labs has been exceeded [GS2/058 - INQ000326380]. On 18 May 2020 testing for was opened out to everyone who is symptomatic over the age of five. Children under the age of five who were displaying potential coronavirus (Covid-19) symptoms became eligible for testing from Wednesday 22 July [GS2/059 – INQ000326379]. Efforts to reach testing targets did not interfere with the building of the Test and Protect system and did not require resources to be diverted.

374. On 14 September 2020, the FM said that there were "very serious concerns" about Covid-19 testing backlogs, and that she was seeking "urgent discussions" with UK Government Ministers about the issue.

375. Other parts of the UK were experiencing similar issues with the backlog of test results being faced by the UK laboratory network, which the Glasgow Lighthouse laboratory is part of and it was starting to impact on the timeous reporting of Scottish results.

376. Scottish Government had been raising these concerns with the UK Government and over the weekend of 12 and 13 September 2020 the CSH managed to resist a move to limit access to testing slots at mobile testing unit and regional testing centres. However, this apparent delay in turnaround was causing concern and therefore the Scottish Government escalated these discussions with the UK Government over the course of that day.

377. The FM stressed that Scottish Government were keen to play their full part in addressing the issues and finding solutions to them urgently, but it needed the UK Government to share the full scale and nature of the issues they are facing and the impact that they are having on Scotland so that everyone could collectively, and very quickly, find solutions.

378. The issues being experienced related to capacity constraints within the UK wide system. For Scotland, this was not an issue of access to testing slots, regional testing centres or mobile testing units but instead it's was one of access to sufficient lighthouse laboratory processing. It was this that led to a backlog in the system and longer turnaround times for tests.

379. This was a UK wide system, so Scottish Government was not able to resolve this on its own, and the issues were impacted by demand elsewhere in the UK. The FM had a constructive conference call on the evening of 14 September 2020 with Matt Hancock, UK Health Secretary and Dido Harding, who was head of the UK testing system, to seek firstly assurances that Scotland would continue to get fair access to the UK wide laboratory capacity and also to discuss how to resolve the issues.

380. The Department of Health and Social Care said at the time the Test and Trace system was working and that the capacity was the highest it has ever been.

Laboratories were processing more than a million tests a week and they announced new facilities and technology to process results even faster. Questions on the resolution of the issues experienced should be addressed to DHSC.

381. In May 2020 the Scottish Environmental Protection Agency began exploratory work to pinpoint fragments of coronavirus ribonucleic acid (RNA) in local wastewater samples. Further information is available in the article SARS-CoV-2 RNA levels in Scotland's wastewater published in Scientific Data [GS2/060 – INQ000326381].

382. Historically, wastewater surveillance has been helpful in detecting viruses excreted through the gastro-intestinal system. Whilst wastewater surveillance is not yet able to reliably estimate the number of new infections, it has allowed the early detection of re-emergence of diseases, including Covid-19 in previously disease-free regions, and has been used to monitor changes in levels of Covid-19 infections over time, providing a reasonable understanding of the effectiveness of disease control and mitigations efforts.

383. Wastewater surveillance can provide an insight into viruses circulating in Scottish communities or in particular geographic areas or settings without having to conduct more resource intensive and invasive testing programmes. Wastewater data have informed essential modelling work in Scotland, especially as population-wide access to testing has reduced. As part of its overall respiratory surveillance programme activities, PHS will undertake work to further validate the usefulness of wastewater as a surveillance programme and then work with partners to extend this as required.

Decisions in relation to non-pharmaceutical interventions ("NPIs")

384. In terms of effective Covid-19 public health interventions, NPIs were considered second only to vaccination, which was not available in the early stages of the pandemic. NPIs can be defined as measures to reduce transmission that do not depend on drugs, vaccines or other medical countermeasures.

385. Scottish Government's overall aim and approach to managing the pandemic, and hence using NPIs, was set out in the Framework for Decision Making (April 2020). Scottish Government's approach to NPIs evolved over time, particularly as various aspects of the Covid-19 crisis changed. Following the March 2020 'lockdown', it covers three broad phases:

- The 'Route Map' approach to easing NPIs in place during mid 2020;
- The 'Levels' approach implemented from November 2020 to August 2021; and
- The 'Baseline Measures' in place from August 2021 until the end of the emergency phase of the pandemic in April 2022, including the temporary, targeted response to the Omicron variant.

386. Scottish Government's approach to NPIs sought to suppress the virus, including consideration of how much and how fast to adjust measures. This included geographical considerations in the use of NPIs and the role played by travel measures. NPIs were part of the Scottish Government's broader approach to pandemic management as set out in the Covid-19 Strategic Framework publications. Many other countries, including those within the UK, were pursuing approaches with varying degrees of similarity to that pursued in Scotland.

387. Within the UK, there was regular dialogue on the use of NPIs and, at times such as the initial lockdown and run-up to Christmas 2020, a significant degree of co-ordination. A shared basis for expert advice (e.g. SAGE, four nations CMO meetings, the Joint Biosecurity Centre) and UK-wide approaches in related areas (e.g. on the 'furlough' scheme and in following JCVI advice in the vaccine roll-out) were factors tending towards consistency in approach across the four nations. A summary account of the use of NPIs across the four nations can be found at chapter 8 in the UK CMOs' Technical Report [**GS2/036** INQ000130955].

388. I am not aware of any direct contact with Mr Thomas Pueyo and had no direct contact myself. There was no specific advice to follow the 'hammer and the dance" concept, but elements of the response already taken and discussion amongst

advisers and decision makers increasingly alighted upon the core components of this approach. I'm not aware of any dissent amongst advisers to this approach.

389. The threat posed by Covid-19 in Scotland in the period between the imposition of the first lockdown in March 2020 and the announcement of steps to ease the lockdown in May 2020 was well understood and evident in the significant morbidity and mortality being experienced by people across the country. Given that this was a pandemic virus in an immune naïve population, placing health services under enormous pressure, the gravity of the situation was clearly recognised. As community testing was not feasible at this time, tracking the spread across Scotland was dependent on measuring later stage indicators of the infection, such as hospital admissions and deaths and extrapolating this data to give indication of the epidemic curve.

390. International responses were helpful in that they tended to be broadly confluent in their approach, deploying varieties of similar NPIs to suppress chains of infection. There were differences that were influenced by individual government's risk appetite, population characteristics and levers, but this generally led to reduced mixing in order to create less opportunity for viral spread. This suppression allowed greater opportunity to deploy other countermeasures such as test and trace to further reduce community transmission and so allow eventual consideration of easing of measures to open up society. Observing other countries responses was helpful in learning some impacts of certain NPIs, but seldom did it point to any single new approach that was not already under consideration.

391. Non-Covid-19 health related harms, such as displacement, urgent cancer referrals, Emergency Department (ED) attendance for major conditions and non-Covid-19 activity were monitored within HSC; Scottish Government campaign messaging tailored to try to increase people's attendance for other health conditions and symptoms of note was undertaken during the pandemic. Quantifying longer term health related harms during this emergency phase was much more difficult.

392. I was not directly involved in the audit of lockdown and NPI-related harms but work conducted by other areas of the Scottish Government on impacts to society and the economy was fed into deliberation at the Four Harms Group and assimilated into advice for decision makers.

Long-Covid

393. From January 2020 to April 2022, the Healthcare Quality and Improvement (HQI) Directorate had overall responsibility for Long Covid-19 which included briefing and advice to Scottish Ministers regarding the establishment of Scotland's Long-Covid service and of a strategic network to have oversight of the service.

394. The CSO issued a call for applied research on the longer-term effects of Covid-19 infection in October 2020.

395. By the summer of 2021, it was becoming apparent that many patients had ongoing symptoms after recovery which persisted for longer than 3 months. One prospective study of 431 individuals testing positive for Covid-19 in Switzerland, published in July 2021, cited in Technical Report on the Covid-19 pandemic in the UK [GS2/036 - INQ000130955] found that 6 to 8 months after infection 55% of the cohort reported ongoing fatigue, 25% had some degree of breathlessness, and 26% fulfilled criteria for depression. Since that time, the range of chronic symptoms recorded for cases of Covid-19 has expanded greatly. A diagnostic definition of the condition has been made as post-Covid-19 syndrome by the National Institute for Clinical Excellence (NICE), more commonly referred to as 'Long Covid' by sufferers and clinicians, although in reality it is likely to represent several overlapping syndromes.

396. The exact number who have experienced longer-term symptoms after Covid-19 is likely substantial but remains unclear, as does the aetiology of the syndrome, including whether it was one or (perhaps more likely) a number of different overlapping syndromes. In July 2022, the ONS CIS estimated that 1.4 million people in the UK were experiencing Long-Covid symptoms that adversely affected their day-to-day activities in the four weeks ending 4 June 2022.

397. Understanding of disease management evolved with the progression of the pandemic, as did recognition of rarer and/or delayed or long-term sequelae of Covid-19 infection. A diverse number of chronic symptoms were reported by approximately 2% of the population weeks or months after their initial acute infection. Long-Covid encompassed multiple symptoms (and, it is thought, syndromes), and the disabling symptoms experienced by some patients challenged their ability to return to normal life. Long-Covid likely includes a combination of conditions including organ damage by severe or milder Covid-19 infections, perhaps disease caused by persisting infection, persistent clotting and more traditional post-viral syndromes. Research into the causes, pathophysiology and management of this disorder is ongoing, with recognition and understanding improving over time. However, currently prevention (through vaccination) represents the only evidence-based approach to the condition.

Specific Measures

398. Places of religious worship were one of many locations where it was recognised that risk of transmission was higher, due to the congregation of people in close proximity indoors, for prolonged periods and where the scientific evidence suggested risk of transmission was higher. Examples of other similar places were locations such as hospitality settings, cinemas and indoor sports venues. In places of religious worship, this risk was compounded through some of the identified acts of worship that involved activities such as singing, identified as a likely higher risk again, and physical contact. A risk based approach, overseen through the Four Harms process, was therefore taken to try to mitigate risk of transmission but allow the important social and spiritual ritual of worship to take place as close to normal as the risk allowed.

399. The rationale and science that underpinned the use of face coverings (distinct from face masks) is covered in detail within the UK CMOs' Technical Report [GS2/036 - INQ000130955], an excerpt of which I enclose below. It is important to emphasise that the most important aspect of the use of face coverings was in source control,

though there was also some less strong evidence that they offered protection to wearers too.

400. Although some countries, especially in East Asia, promoted widespread use of face coverings or masks from an early stage, the global and UK scientific consensus on the appropriateness of face coverings or masks for preventing transmission evolved during the early stages of the pandemic. In April 2020 SAGE advised that on balance there were benefits in widespread use of face coverings, though as the country was under a national lockdown at the time this was unlikely to be instrumental in reducing community transmission. In the same month, interim World Health Organization (WHO) guidance advised against the use of face masks for healthy (uninfected) people in community settings. However, as evidence on the routes of transmission and the effectiveness of face masks evolved, this was updated in June 2020 to recommend their use in the community. In late July 2020, as the national lockdown in the UK gradually lifted, face coverings became mandatory in a range of public settings across the UK, such as on public transport or in shops (though this differed slightly across the UK nations). There was variation in enforcement across the UK's 4 nations and across different settings that needed to adapt rapidly to a number of new requirements.

401. Evolving recommendations on face covering or mask use in the community – from the WHO, the UK government and other governments worldwide – were at times difficult to communicate. They were, however, a reflection of a developing evidence base and also of operational realities at different stages of the pandemic and the need to continually balance multiple risks. At the outset of the pandemic, for example, demand for face masks globally was extremely high and there was concern that widespread use of medical-grade face masks in settings where they were thought to have marginal or no effect would impact supply lines for health and social care professionals who were in close contact with infectious and vulnerable people.

402. The type of face covering was not mandated in the UK outside healthcare settings, and there was widespread use of cloth face coverings by the public. There was some evidence outlining differences in effectiveness across different types of face

covering. Alongside this, face covering quality and correct wearing were both important. However, in the context of high case rates and a proportion of asymptomatic and pre- symptomatic transmission, logic follows that it is more important to have more people wearing some form of effective face covering correctly rather than fewer wearing high-grade respirators. Feasibility of implementation was important – face coverings were relatively cheap and widely available (once global shortages had cleared) and relatively straightforward to implement with public guidance.

403. In general, face coverings were advised or mandated in the UK during periods and areas of high transmission and in higher risk settings or situations where distancing and sufficient ventilation were not feasible. In contrast to some countries, they were never recommended outdoors except in very crowded environments. Their purpose has primarily been as source control, with some protection to uninfected wearers – however, in reality adherence varies across different settings, situations and individuals, and studies still give widely varying estimates of their impact on transmission. Widespread face covering use had some potential impacts on social and educational interactions, such as for younger children, those with dementia and those who rely on facial expression or lip reading for communication. Some groups were exempted from guidance to use face coverings. There were strong, and opposing, views on the best approach to face coverings in public alongside scientific discourse on the topic.

404. In relation to the letter to health boards about provision of face masks to GPs, I was keen to ensure that they were able to access face masks at a time when masks were not generally mandated because they were much more likely than the average person to encounter people with the potential to transmit infection as part of their clinical role and required a higher degree of protection than face coverings offered.

NHS capacity

405. As set out in the Scottish Government document Covid-19 – A Framework for Decision Making published in April 2020 [GS2/010 – INQ00131025], one of the

key approaches was to suppress the virus through compliance with physical distancing and hygiene measures, ensuring that the reproduction number remains below 1 and that our NHS remains within capacity. One of the key principles on which decisions were made was that of safety; to ensure that transmission of the virus remains suppressed and that our NHS and care services are not overwhelmed.

406. Whilst suppressing the virus to reduce harm experienced as a direct result of infection and prevent the NHS from being overwhelmed were the primary aims of this response, there were wider considerations that were taken into account by decision makers when assessing options for intervention. These are also set out in the document Covid-19 – A Framework for Decision Making [GS2/010 – INQ000131025]. My role was to give the best advice available, based on the balance of evidence where this existed, to reduce the direct harms and the likelihood of the NHS from being overwhelmed and unable to address unmet clinical need.

407. The COO of the NHS in Scotland routinely monitors performance information collated from across the system. This includes measures from across both hospital and community based systems and available bed capacity. These data were used, alongside other epidemiological data and modelling to assess likelihood of the health system becoming overwhelmed. Here, the initial challenge became understanding the pathway of disease presentation, and conversion rates to people requiring hospital or intensive care admissions. Discussion at SAGE and NERVTAG, examining studies such as those produced by the International Severe Acute Respiratory and Emerging Infection Consortium (ISARIC) were critical in aiding this understanding but admissions were still unpredictable within broad parameters during these early stages [GS2/061 – INQ000326382].

408. The key decisions prevented hospital and community-based responses to illness from being overwhelmed, but the level of activity and workload experienced by clinical teams cannot be over-estimated. In many local instances, it is down to their extraordinary efforts, whilst hospitals and treatment centres operated above normal capacity, that prevented this.

409. I had no involvement with the decisions and the construction of the NHS Louisa Jordan at the SEC in Glasgow [GS2/062 – INQ000326383]. I was listed as a board member originally but was unable to attend any of the meetings due to other Covid-19 priorities Questions regarding this facility should be addressed to the CNO and NCD.

410. "Protect the NHS" was not used as part of the public messaging around the way that pandemic was managed in Scotland. This was used by UK Government. The Scottish Government replaced its original "stay at home" message with "stay safe" as the country entered the second phase of its lockdown easing plan in June 2020.

411. In April 2020, a new Directorate for PPE was established to provide strategic and coherent co-ordination in relation to all aspects of the provision of pandemic PPE in Scotland. The Directorate for PPE then became a Division of the Health Finance, Governance and Value Directorate in July 2020. It later became a Unit in Health Infrastructure, Investment and PPE Division in January 2021.

412. Paul Cackette, as Director of PPE, was responsible for delivering the Directorates remit to draw together five strands of corporate priorities:

- PPE for Health and Social Care staff and patients, with a focus on supply and distribution to frontline health and social care staff for Pandemic Preparedness Response (PPR) in accordance with professional advice;
- PPE for non-health and social care users, supporting wider public service workforce supply and distribution of PPE in accordance with professional advice;
- Co-ordinating Scotland's involvement in a four nations approach to PPE;
- Working with Scottish companies on our own PPE manufacturing capacity; and
- Enhancing stakeholder consultation and communications both across Scottish Government and with wider partners including COSLA, Society of LA Chief Executives and Senior Managers (SOLACE) and resilience partners.

413. Social care providers received PPE support during the pandemic through: (i) recouping pandemic-related PPE costs from Scottish Government funding; and (ii) accessing PPE free of charge from local and national PPE Hubs when supply routes failed. The PPE Hubs were supplied by NSS, with governance arrangements set out in a Memorandum of Understanding (MoU) which was co-signed by Scottish Government, COSLA, NSS, Health and Social Care Partnerships, Coalition of Care Providers Scotland (CCPS), Scottish Care and National Carer Organisations.

414. The Covid-19 PPE Strategy and Governance Board was formed in May 2020 to be accountable for delivering the PPE Sustainability Strategy across all sectors in Scotland, as a result of the pandemic [GS2/063 – INQ000326384]. I was not a member of this board.

415. The board was accountable to Scottish Minsters to provide assurance on the supply and demand of PPE. As a result, the Futures Programme was created to assist in a new approach to pandemic PPE which would ensure that Scottish Government learn from experience, promote innovation and have strong, sustainable foundations for any future epidemic or pandemic.

416. An Adult Social Care PPE Steering Group was established, which was chaired by Scottish Government officials and whose membership consisted of the representatives from the organisations that co-signed the MoU. The Steering Group monitored the use of the PPE Hubs and levels of supply and demand, in addition to addressing ad hoc issues of concern raised by Steering Group members. I was not a member of this Steering Group.

417. Scottish Government published a Covid-19 PPE plan in October 2020 [GS2/064 – INQ000326385]. The plan was to ensure that the right PPE of the right quality gets to the people who need it at the right time. The Plan's scope included health, social care and other workplaces and settings where Covid-19 could put people at risk.

Schools

418. As mentioned previously in this statement, the C19AG had a number of sub-groups and these included the Advisory Sub-Group on Education and Children's Issues and the Advisory Sub-Group on Universities and Colleges. Details of agendas and minutes from these meeting have previously been passed to the Inquiry.

419. I was not a member of these two Sub-Groups. However, I received copies of the minutes and anything of major significance was brought to my attention by Professor Marion Bain, Deputy Chief Medical Officer who was a member of both Sub-Groups.

420. Throughout the pandemic, there was evidence from observational studies and tracking data that viral transmission reduced during school holidays and increased when schools returned. However, the considerations behind these decisions were much more complicated than this alone and are covered in detail within chapter 8.1 on educational settings in the UK CMOs' Technical report [GS2/036 - INQ000130955].

421. An excerpt, drawn from this report, demonstrates how advice was approached in relation to educational settings and is useful context: Children and young people were initially assumed potentially to be effective transmitters of respiratory infections in general. Pandemic flu models, utilised to inform early advice during Covid-19, considered education and childcare settings as key contributors to spread. There was however significant debate about whether school closures or attendance restrictions would be needed for the initial wave in addition to other NPIs.

422. Early discussions on the relative contribution of school closures to community transmission in SAGE highlighted uncertainties around their impact and flagged that due to a relatively long serial interval for Covid-19, any closures would need to be longer than for previous epidemics to achieve the same impact on delaying the first wave or peak, with models suggesting closures of eight to twelve weeks being required for maximum reduction of peak incidence. Debate centred on the

role of schools in linking households, recognising that children and young people also mixed in other settings, and that the response of parents to any closures or attendance restrictions were a significant factor in their effectiveness.

423. Early attention was given to the societal costs in terms of parental absenteeism and missed education. In March 2020, the consensus SAGE view was that while school closures constituted one of the less effective single measures to reduce the epidemic peak, they may be necessary to manage NHS capacity. The first attendance restrictions were initiated on 20 March 2020, just prior to national stay at home orders. Schools remained open for face-to-face learning for vulnerable children and the children of essential workers. At this time, the overall attendance of students who normally attend school in England was around 3% to 4% for primary school and 1% for secondary school children.

424. The subsequent early signals from China were indicative of a mild clinical phenotype of Covid-19 in children and young people, with higher levels of less symptomatic infection. There was uncertainty regarding their role in transmission and the subsequent impact this may have on families, staff and communities. It was initially hoped that it would be possible to achieve a reproduction number (R) below 1 without school closures, but the speed of the initial wave and relatively high R0 made this uncertain with modelling implying it was unlikely that control would be achieved without school closures or attendance restrictions.

425. Widespread attendance restrictions were therefore implemented during the first wave of Covid-19 in Spring 2020, with face-to-face provision retained for vulnerable children and the children of essential workers throughout. Attendance restrictions in education occurred alongside widespread restrictions across wider society including a stay-at- home directive as part of a package of measures. These measures were preceded by a level of behaviour change in the population that had already impacted on attendance and the ability of education settings to maintain staffing. As the pandemic progressed, UK paediatric surveillance studies helped to monitor the course, progression and outcomes of Covid-19 in educational settings. Initial findings were suggestive of a low prevalence rate of Covid-19 infection in schools with the risk of outbreaks increasing as community

incidence increased and limited transmission from child to teacher or vice versa, a lower secondary attack rate observed in schools compared to households, and low infection rates in school-based close contacts.

426. Over time, the evidence strengthened to support a mild clinical phenotype for children and young people; however, Paediatric Multisystem Inflammatory Syndrome temporally associated with Covid-19 (PIMS-TS). PIMS-TS was seen in a small number of children requiring specialist care.

427. The long-term impacts of post-acute infection were poorly understood and there remains at the time of writing some uncertainty about the prevalence of Long Covid in paediatric populations, though high-quality studies suggest this to be low.

428. Evidence of the likely wider impacts of widespread attendance restrictions were not immediately apparent, but in the first wave evidence also started to emerge of the harms associated with widespread attendance restrictions with lost learning, inequalities in the ability of children and young people to learn from home and a marked reduction in the number of child protection referrals being made.

Vulnerable and at risk groups

429. Scotland's Ministers were first approached to give authorisation to the broad approach to protecting those considered most vulnerable from Covid-19 in our society by officials, based on clinical advice from the Chief Medical Officer, on 21 March 2020, three weeks after the first confirmed case of Covid-19 in Scotland [GS2/065 – INQ000249500].

430. The four UK CMOs jointly identified certain health conditions which could, based on risk from respiratory illnesses such as flu, mean someone was potentially at higher risk of negative outcomes if they contracted Covid-19.

431. It was the clear and stated policy intent from that point onwards to identify, protect and support people considered to be at highest risk of severe illness or death from Covid-19.

432. The initial crisis response Shielding Programme was a major exercise which ran from 26 March 2020 to 1 August 2020 involving collaboration among a range of stakeholders. Identifying the criteria for the Shielding List was based on expert clinical opinion provided by the Clinical Advisory Group for Scotland, chaired by Dr John Harden, Deputy National Clinical Director. The programme aimed to provide individuals with guidance to help minimise interaction between them and others and ultimately to reduce the risk of infection, severe illness and death. The programme sought to provide individuals with the necessary support to enable them to follow the Shielding guidance, including, for example, priority access to online supermarket delivery slots.

433. The Shielding List, (which later became known as the Highest Risk List as Scottish Government policy moved away from the strict self-isolation of the first few weeks of the pandemic), was a list of people identified as having those health conditions through their medical records or by their GP or clinician. In total, approximately 185,000 people were on Scotland's Shielding List at any given time.

434. As we approached the 'pause' in the Shielding programme on 1 August 2020, the Shielding policy area became an established Division within the Population Health Directorate. Policy in relation to people at highest risk from Covid-19 moved away from the concept of strict shielding from this point and over the course of the pandemic, given:

- The harms we knew prolonged strict self-isolation could cause, particularly in terms of mental health and physical deterioration;
- The roll-out of an effective vaccination programme which prioritised those at highest risk;
- The emergence of evidence relating to the course and impacts of the virus, and the risks to certain groups; and
- The development of new treatments to decrease the risk of severe illness and fatality.

435. The Shielding Division responsible for policy in relation to people at highest risk continued working to support this group until, and beyond, the ending of the Highest Risk List on 31 May 2022.

436. Hospital admission data rapidly began to produce signals on potential disparities: by February 2020 there was evidence of increased risk of hospital admission for older adults, men and those with certain underlying health conditions. The regular publication of intensive care data also supported a rapidly growing understanding of ethnic disparities in the UK: in the first wave, statistics highlighted high rates of hospitalisations among patients of black and Asian ethnic groups compared to white ethnic groups. However, ethnic disparities were often confounded by deprivation and living in areas with high prevalence. As the pandemic went on, patterns of risk for both infection and severe disease changed as the epicentre shifted to areas with different ethnic makeup and as vaccines were rolled out with differing levels of uptake across different communities.

437. In my view, we (and the FM and Scottish Cabinet) gave sufficient consideration in the decision making throughout the pandemic to the impact of NPIs on 'at risk' and other vulnerable groups in light of existing inequalities. It is for others to comment on UK Government decision-makers in respect to this area, as I provided no direct advice to them and did not participate in any discussions in relation to this.

438. Identifying the vulnerable is also an inexact science and the level of vulnerability and associated numbers of those affected changed through the pandemic. Ultimately the most effective way to reduce risk for the vulnerable was to reduce overall community transmission. Many of those shielding lived in households or settings with others who could be at risk of introducing infection when community rates were high, and those requiring care and support services also had regular contacts from outside the home.

439. NPIs have complex impacts and involved balancing multiple known, potential and unknown harms and benefits. On several issues evidence and scientific consensus in the UK and globally evolved over this pandemic, such as on the relative contribution of asymptomatic and aerosol transmission, and this had to be

continually reviewed and clearly communicated to decision-makers and the public. There were challenges developing the evidence base on the impact and effectiveness of individual NPIs, especially in real-world settings.

440. The UK CMOs' Technical Report [GS2/036 - INQ000130955] gives reflections and makes recommendations on measures to protect those who may be more vulnerable or at risk in any future pandemic.

Vulnerabilities relating to pre-existing health conditions

441. Since the start of the pandemic, age has been the strongest risk factor for Covid-19 hospital admission and mortality, with older adults at high risk and children and young people at very low risk of severe outcomes. Mortality rates from Covid-19 in the most deprived areas of the country were more than double that found in the least deprived areas, with differences remaining after adjustment for age, sex, region and ethnicity. As a single group, ethnic minorities experienced higher all-cause death rates and death rates from Covid-19 compared to those of white British ethnicity, with relative differences varying throughout the pandemic and across different ethnic groups. In the working-age population, Covid-19 death rates were consistently and markedly higher for men than women throughout the pandemic.

442. Another group at particularly high risk for severe disease and premature mortality were those with a disability. Research based on the learning disability register found a persistent, marked increased risk in Covid-19 hospitalisation and mortality for people with a learning disability, though it is important to note that there are major limitations with the learning disability register as a robust assessment tool, with wider coding for learning disability, and that not all analyses adjusted for underlying health conditions.

443. Co-morbidities such as diabetes, severe asthma and obesity were identified as risk factors for poor outcomes, and were more prevalent in more deprived and in some ethnic minority groups. Linked primary care records of over 17 million adults with over 10,000 deaths between February and December 2020 found that while

comorbidity did explain some of the different death rates by ethnicity, people from black and South Asian ethnic groups were both more likely to test positive and more likely to die from Covid-19 during the first wave compared with people from white ethnic groups after adjustment for deprivation, age, sex and comorbidity. Analysis of the second wave found that while differences in testing positive and higher death rates among South Asian ethnic groups remained, they were far less stark for black ethnic groups.

444. Disentangling the principal drivers was often complex because of the overlapping nature of many of the risk factors. For example, some South Asian populations might have higher probability of being in contact professions such as taxi driving or care work, higher rates of diabetes, more multigenerational households and being in an area of enduring transmission such as in the north-west of England. Some populations may use care and testing differently or face barriers in their access. Working out which was a risk factor and which was a confounding factor was inevitably complex and some residual confounding was likely.

445. The first and second waves of the Covid-19 pandemic had a profound impact on the health of residents of care homes for older people, with high attack rates. In this pandemic, residents of care homes for older adults were particularly vulnerable due to their age, the presence of multiple high-risk co-morbidities, and the transmission potential inherent in frequent close physical contact through care (which resulted in large numbers of outbreaks).

446. Emerging understanding of case fatality rates by age and other factors such as dementia, physical frailty and co-morbidities informed differentiated approaches, particularly in care homes for people of working age in which residents have different patterns of needs and co-morbidities to older age homes. In homes for people of working age, case fatality was much lower than care homes for older people, but in some groups (such as those with Down's Syndrome) there was a high risk of severe outcomes.

447. Obesity was also an important driver of mortality rates. A BMI of 40 was associated with about a 2-fold increased risk of death. Geography, level of social deprivation

and the presence of co-morbidities, often linked to ethnicity, played an important part in understanding rates of severe Covid-19 and disease outcomes overall. Gender, too, has been flagged as a risk factor for mortality: in the working-age population, Covid-19 death rates were consistently and markedly higher for men than women throughout the pandemic. Early reports during the pandemic were often not able to link and adjust for all relevant variables.

448. The UK CMOs' Technical report [GS2/036 - INQ000130955] describes the approach to identifying those felt to be most clinically vulnerable: The first iteration of a list of clinically vulnerable people across the country was supported by an expert panel review of current epidemiological and clinical data, alongside routine data sets (a particular strength of the UK NHS) which were used to identify those considered most vulnerable. This was updated throughout the pandemic in order to establish and maintain as accurate a 'Shielded Patient List' as possible given current knowledge, which was then flagged in GP records and used to support shielding policy and associated initiatives across the system as well as direct communication with patients. GPs themselves also supported this process by flagging which of their patients had specified health conditions (though people could also opt out of being on the list by contacting their GP, shielding was not compulsory).

449. The 'Shielded Patient List' evolved as understanding of the disease and data on vulnerabilities grew, and in October 2020 a risk prediction model called QCovid® [GS2/066 - INQ000326386] was released that estimated a person's combined risk of catching coronavirus and being admitted to hospital, as well as their combined risk of catching coronavirus and dying.

450. As the pandemic continued, the approach to development of a list varied slightly across the UK. Scotland, for example, did not apply QCovid® to population records, though findings in England from use of QCovid® such as the identification of vulnerability in adults with Downs Syndrome and people with chronic kidney disease stage 5 resulted in these groups being added to Scotland's clinically vulnerable list. Scotland did not use QCovid® for clinical decision-making, for clinically vulnerable group vaccine prioritisation in January 2021 (when Scotland's

Shielding List itself was used as a proxy), or for the Shielding List update in February 2021. This was partly due to QCovid® not being compatible with Scottish data structures (such as Cancer Care records, or measures of deprivation), and the requirement for separate validation of the model for the Scottish population. It was also partly due to data gaps in earlier iterations of the QCovid® model with early data used to develop the model not accounting for protection from vaccination or for newly established variants.

451. There were three potential approaches to supporting those with heightened risk of severe disease during this pandemic: 1: To identify those at higher risk (who in this pandemic at the outset were thought to number in the millions) and inform them so they would be able to better manage their own risk. 2:. To put a programme in place with guidance on managing risk, and support to do so, alongside a wider package of NPIs to reduce transmission in the community. 3: To put measures in place only for those at higher risk, without a wider package of NPIs to reduce community transmission. In the pandemic, the first two options were adopted.

452. Some people promoted targeting NPIs to the vulnerable group alone or implementing only shielding as a viable option to reduce overall severe disease and deaths, allowing the infection to spread in all others. There were serious questions about the practicalities, ethics and indeed effectiveness of such an approach. For a highly transmissible infection with often minimal symptoms it was extremely difficult to target specific people or groups successfully. Identifying the vulnerable is also an inexact science and the level of vulnerability and associated numbers of those affected changed through the pandemic. Ultimately the most effective way to reduce risk for the vulnerable was to reduce overall community transmission. Many of those shielding lived in households or settings with others who could be at risk of introducing infection when community rates were high, and those requiring care and support services also had regular contacts from outside the home.

453. It is currently difficult to quantify the impact of shielding on either SARS-CoV- 2 transmission, Covid-19 outcomes or wider impacts, because its early and universal application for relevant groups left no control groups, nor would it have been

considered ethical to do so. Given what we know about validated links between QCovid® tool and mortality, it is my view that shielding undoubtedly protected many of the most clinically vulnerable from death and serious illness, but as is the case with many choices associated with the Covid-19 response, this was not risk free to other aspects of their health.

454. Protections were maximised for these individuals through shielding, but as has already been signalled, specific targeting of the use of NPIs only for the most clinically vulnerable would have a questionable ethical basis and low confidence in preventing harm. Sustained high levels of community transmission would, in my view, ultimately have more greatly exposed them and others still at risk of infection to harm.

455. I was not directly involved in engagement with stakeholders in relation to shielding policy and do not have knowledge of what engagement took place or when. This question is best answered by Scottish Government policy officials in the corporate statement of the response.

Decisions relating to the first lockdown

456. The first Covid-19 lockdown in the United Kingdom was a series of stay-at-home orders introduced by the British and devolved governments in response to the pandemic. On 23 March 2020, the Prime Minister announced a nationwide lockdown to curb a widening outbreak of Covid-19, closing many sectors and ordering the public to stay at home. This was based on medical/scientific information provided by UK Government but the decision had agreement from the other three heads of government.

457. I did support the decision to impose a national lockdown. Like so many other decisions that were made during the pandemic response, it is my view that there was no risk or harm-free response at that time, but it was recognised that this response would be the "least bad" option in terms of immediate serious illness and loss of life. The lockdown in March 2020 was highly effective in reducing community transmission and the level of infection, serious illness and death in the

UK, reducing estimated R from 2.5-3.0 to 0.5-0.7, but it was not without consequences on other aspects of health, including mental health, loneliness and isolation, and physical activity.

458. In implementing a lockdown strategy, it is my view that there were significant advantages, especially in the effective communication and achievement of effect, by acting on a four nation basis. The timing of such a dramatic ask of the public was a matter of significant discussion at SAGE, where there were a range of views offered by modellers and behavioural experts as to when this was optimal. In my view, based on the evidence available at the time, it would have been difficult to gain this consensus sooner. At the point that there was broad consensus about optimal timing, it was evident that the population had already started to alter behaviours and large proportions were now limiting contact with others or attending public places. The impact that this ultimately had on transmission is largely unknown as is the additional effect an earlier formal lockdown may have had. With experience and evidence that is now available, it would have been my preference to have moved to lockdown slightly earlier. However, it is unknown to what degree this would have been supported and adhered to by the public, and it is only through the remarkable actions of the UK public in adhering to these difficult measures that lockdown had its desired effect.

459. I do not think that a national lockdown could have been avoided, given the characteristics and transmissibility of the SARS-CoV-2 virus. In the absence of any medical or vaccine mediated interventions for an immune naïve population, it is not conceivable that widespread community transmission and resultant harm could have been avoided or reduced to a tolerable extent with a virus that showed such a significant basic reproductive rate.

460. Lockdown was the most intensive measure taken to reduce spread of Covid-19 and was highly effective even in the face of more transmissible variants. This pandemic was the first time in living memory that lockdowns were implemented across so many countries worldwide, so extensively and for such a long period of time. Variations of them were, however, well documented throughout, and the principles behind lockdowns follow the same epidemiological logic as settings or

events closures, working from home and limits to contacts. Definitions and implementation varied worldwide and throughout the pandemic, but broadly lockdowns consisted of:

- Travel restrictions;
- Closure of all non-essential settings; and
- Stay-at-home orders.

461. Lockdowns were highly effective in reducing transmission of SARS-CoV-2. SAGE concluded that the lockdown introduced in March 2020 was associated with a reduction in the reproduction number (R) from an estimated range of 2.5 to 3.0 to an estimated range of 0.5 to 0.7 though with an initial period of continued high case rates due to ongoing household transmission. This was due to high adherence and significant sacrifices by the public who went to great efforts to follow guidance and protect one another from exposure.

462. There was a range of possible wider impacts arising from lockdown, such as on mental health, levels of physical activity and levels of domestic abuse and safeguarding concerns. These are explored in more detail on pages 250 and 251 in the UK CMOs' Technical Report [GS2/036 - INQ000130955].

463. As detailed before, it was not felt ethical, nor plausible, that limiting the response to protection for the most medically vulnerable would have the desired effect. More information is contained in other sections of this statement and in the UK CMOs' Technical Report [GS2/036 - INQ000130955].

464. A wide range of alternative responses to full lockdown were considered and modelled by SAGE and are available to view in their publication repository. No singular response was sufficient to reduce transmission to the desired extent. The UK CMOs' Technical Report [GS2/036 - INQ000130955] examines this in more detail and the broader use of individual NPIs or NPI packages.

465. In the early part of the pandemic, the force of transmission was such that extensive use of multiple NPIs used together was needed to get the reproduction number

below 1. In reviewing different combinations of NPIs to achieve this, there were some important considerations. First, the ratio of harms and benefits looked different for individual NPIs. For example: hand washing has few downsides but was unlikely to be sufficient to bring community transmission of Covid-19 down significantly; mass closure of settings may contribute substantially to bringing down community transmission but at a significant societal cost. Second, the appropriateness of NPIs was different for different groups, for example, 'shielding' advice for those with high clinical vulnerability. Similarly, differing local circumstances as well as varying levels of population movement across different areas were important when considering localised interventions. Third, the blend of NPIs chosen was important as different interventions can mitigate the risk of exposure via different routes (such as close-range droplet versus longer range aerosol transmission).

466. Although modelling was used to help determine appropriate bundles of interventions, this was complicated by the fact that individual NPIs were not additive but interacting. For example: widespread working from home also impacted travel patterns, social contacts and hospitality use; school closures reduced mixing of children, but also of parents. Some NPI packages may also have had impacts beyond the sum of their parts.

467. Many NPIs used in this pandemic were also not mutually exclusive, such as regulations or guidance to work from home and closure of settings (most of which were workplaces). This had implications for communication and implementation of NPIs, public interpretation and acceptance, and also for generating and analysing evidence on the impacts of individual NPIs or NPI packages.

468. Attempts to separate the effectiveness of individual NPIs were therefore both difficult and potentially misleading, as NPIs will likely always be implemented in packages and in a particular epidemiological context. There were also wider considerations in the deployment of NPIs. First, there is always a need for societal consent for NPIs, especially the most potentially damaging ones. There is also a major potential for NPIs to create or exacerbate inequalities and have widespread impacts across society in health, economic and social terms.

469. Decisions on whether and how to implement such wide-ranging interventions go well beyond health and rightly sit with elected Ministers on behalf of society. Evidence from observation and behavioural sciences shows that major interventions like NPIs must be felt by the public to be fair, and suspicions that some and not others were following rules was damaging to adherence. It was also important to work closely with local areas and with different communities to ensure NPIs were feasible and appropriately communicated, to understand how they were being interpreted in practice and to understand any barriers to adherence. This was not always in place at the outset of the pandemic and is an important consideration for future pandemics.

470. It was evident that material presented to SAGE, including the "report 9" [GS2/067 – INQ000326387], was increasingly identifying the need for multiple NPIs with a broad impact on reducing transmission in order to suppress the growth of cases which were in an exponential phase. Concerns remained about the timing, duration and potential for rebound growth after they were removed however and whilst the report was important it was one of many pieces of information and evidence considered at that time. Detail on the specific clinical advice given to Scottish Ministers at that time is best obtained from the previous CMO, Dr Calderwood. However, as already stated, as DCMO I was supportive of the principle of this approach (as the "least bad"" option) for reasons stated earlier in my statement.

471. On 21 May 2020 Scottish Government published a document Coronavirus (Covid-19): Scotland's route map through and out of the crisis [GS2/068 – INQ000078400]. The Route Map gave an indication of the order in which Scottish Government would carefully and gradually seek to change current restrictions. This document covered the current position (at that time), a framework for decision making, the phased approach to varying restrictions and the Scottish Government partnership approach.

472. The resignation of Dr Catherine Calderwood as CMO did not impact the Scottish Government's understanding of the pandemic or its response, other than the workload became higher for the remaining clinicians for a short period of time.

473. In the first three months of 2020, as Covid-19 moved from being a localised disease in China to a pandemic, basic epidemiological and clinical data were urgently needed to inform public health and clinical advice. Key variables included:

- Mortality by age and other characteristics;
- The basic reproduction number (R0) and doubling time; and
- Probable routes of transmission and their relative importance.

474. Much of this was initially from Chinese scientists and clinicians, and then replicated in other countries, especially Italy with a more similar age structure and health service to the UK. Having the genotype publicly available early on due to the work of the Chinese and other scientists was essential to the development of PCR tests and the initial work on possible vaccine candidates, including in the UK. The global sharing of genotype information has been a critical part of the response to Covid-19 throughout the pandemic.

475. Studies to develop a vaccine for Covid-19 started within weeks of the genotype being published. It was supported by clinical trial data within 9 months and available from midway through the second wave in the UK. The one general point it is worth making here is that the extraordinary speed of development and effectiveness of viral vector and RNA vaccines was a surprise to almost all scientists. On the positive side this demonstrates how fast a vaccine could be developed for the next pandemic, if it is achievable. There is a danger this falsely reassures some policymakers that a vaccine can be produced at this speed for the next pandemic. The last major pandemic was HIV where there is still no effective vaccine, despite decades of serious investment and scientific effort.

476. Close working between government experts and academics was important in targeting resource to high priority research in both directions. There were routine updates – for example, between the National Immunisation Schedule Evaluation Consortium (NISEC) and UKHSA, the Joint Committee on Vaccination and Immunisation (JCVI), the Deputy CMO (DCMO) and the Vaccine Task Force to keep NISEC's clinical research relevant to the UK Immunisation Programme. The

New and Emerging Respiratory Virus Threats Advisory Group (NERVTAG) also worked closely with the UK's major platform trial for repurposed therapeutics, RECOVERY. It was also helpful to communicate regularly across all four nations of the UK, and joint UK GCSA and CMO forums supported this.

477. Wider practical coordination across government, the private sector, the NHS and academia was also needed, for example, to ensure sufficient tests were made available to support vaccine trials and key observational studies at a time when testing capacity was under pressure. These relationships and processes helped keep researchers apprised of policy and operational challenges so that their work adapted as necessary throughout the pandemic, and kept government clear on what research could realistically deliver, when, and where the blocks to doing this might lie. Research for vaccine scaling, high-tech manufacturing and production required industrial as well as academic scientists.

Continuation of the first lockdown

478. "Zero COVID" was considered during summer 2020 by the Scottish Government. [GS2/069 – INQ000326388]

479. In my view, it would have been impossible to achieve a "Zero COVID" strategy without strict controls of every land, sea and air border alongside quarantine and high levels of co-operation of the public in adhering to restrictions in place. Regional co-operation in trying to achieve this aim (and most likely a wider degree of co-operation than UK nations alone) may have made this slightly more likely, but with a high dependency on these borders for essential goods and materials it would have been very difficult even with this.

480. The concept of super-shielding referred to in Professor Woolhouse's email (INQ0000103441) was presented to the C19AG on 6 and 9 April 2020. It was, essentially, taking the concept of shielding and introducing very intensive screening of all people in contact with those who were identified as vulnerable, whilst allowing wider society greater freedoms. It did not prevent infection in wider society, but Professor Woolhouse argued that these people in wider society could

cope with infection and morbidity and mortality would be minimised as a consequence. There was not wide support for the concept during discussion, with questions being raised about many of the practicalities and feasibility of such an approach.

481. Ethically, there were challenges in restricting part of society because of their underlying health status. The scale of testing necessary to run such a programme and the onerous nature of the frequency of testing required to ensure these safeguards were in place were, particularly at that stage of the pandemic, impractical. There were also clinical concerns in that the groups most likely to be at some degree of greater risk were as yet still ill defined by available evidence. It was only at that point, for example, that the increased risk associated with raised BMI (Body Mass Index) was beginning to be understood and with the ubiquitous nature of that characteristic across society, protecting this group should this approach have been deployed would have been extraordinarily difficult to achieve.

482. It also presented ethical challenges in allowing infection to increase across wider society in general when the consequences of Long Covid were only beginning to emerge in literature, therefore clinicians were generally not in favour of the approach given this risk. As an academic theorem it was helpful in exploring broader exit approaches and testing their robustness in real world policy, and it is worth noting that elements of the theorem were implemented to improve safeguarding of those known to be at higher risk with additional screening of e.g. care workers and clinical staff for asymptomatic or paucisymptomatic infection as society began to open up further.

483. Decisions to extend the first lockdown were taken by the FM/Scottish Government Cabinet. As stated at the time, a decision was taken by all four governments across the UK to extend the current lockdown rules. In Scotland, this decision of the Scottish Government was in accordance with advice from the CMO and from the scientific advisory group, chaired by Professor Andrew Morris. Please refer to the Cabinet meeting minutes and C19AG minutes previously supplied to the Inquiry.

484. On 23 April 2020 the Scottish Government published details of its strategy for ending lockdown, the document "Covid-19: A Framework for Decision-Making" [GS2/010 – INQ000131025]. This document set out the challenges Scotland faced and outlined the approach and principles that guided the decisions about transitioning out of lockdown. The stated aim of this strategy was to suppress the virus so that the reproduction number remained below 1, demands on the NHS did not exceed capacity and people were able to return to some semblance of normality.

485. As stated in the document it was important that there was clear criteria to guide decisions on whether to maintain, tighten or relax the lockdown. The process in place to guide those decisions was to follow the advice from experts across science, public health, the economy, and beyond. This included advice from the C19AG (as previously supplied to the Inquiry), in alignment and discussion with the advisory structures in other parts of the UK including SAGE as previously stated above.

486. The 'four harms' process set out the process for assessment used to establish when coronavirus restrictions could be safely lifted after lockdown and the scientific evidence underpinning the decisions [GS2/070 – INQ000131028].

487. The rationale that lay behind A Framework for Decision Making is explained within the document and its accompanying supporting evidence paper, published 6th May 2020.

488. The strategy was on of suppression of transmission in order that exponential growth (associated with and R >1.0) is prevented, allowing as much of society to function as near to normal as possible without tipping over into growth and widespread societal harm again. This was necessary until definitive pharmaceutical and vaccine countermeasures were available and which could then begin to replace the use of NPIs as primary layer of societal protection.

489. These principals were based on well-established approaches to managing outbreaks, epidemics and pandemics. An accompanying supporting evidence

paper was published at this time in order to inform the public and demonstrate transparency about the data and evidence that lay behind this strategy. In addition to this, the UK CMO's Technical report [GS2/036 - INQ000130955] notes that "NPIs of some form have been used in almost all pandemics, from case isolation and contact quarantine during plagues in medieval Europe to public advice on safe sex in the HIV pandemic. NPIs had also been a standard part of pandemic planning since 2004, but they were not needed at scale in the 2009 H1N1 influenza pandemic. This pandemic was the first time in living memory that NPIs were used so extensively and at such scale in the UK. As medical countermeasures came on stream the relative contribution of NPIs decreased, but this was a gradual process."

490. The gradual approach was necessary as it remained unclear the contribution each NPI made in real world circumstances, whilst gaps between changes were necessary in order to analyse the impacts of each prior change in the lagged data available. This meant each one of these changes in effect, took two to three weeks minimum to reveal their impact in epidemiological data.

491. The concept of the four harms was important as it recognised that action to mitigate the impact of Covid-19 through suppression of transmission, also had impacts in other aspects of society as well. These four hams (direct covid health harm, indirect covid health harm, societal harm and economic harm) allowed evidence to be gathered, discussed and presented to decision makers in a balanced assessment of the options and where risk of harm fell with each of these.

492. The four harms process was developed organically through natural discussion in the approach during the earliest part of the pandemic, but formalised as the framework was introduced and governance approaches evolved. There was very close co-operation and understanding between the government chief policy advisers around health, economy and social policy and of the interlinked nature of these issues. Inequality was not specifically a separate domain, but in my view was intrinsic to the approach across each domain. Meetings of the Four Harms Group or sub-sets of its membership took place on a minimum of a weekly basis and advice was presented to Cabinet giving this rounded view, thus decision

making and formulation of policy was directly influenced by this combined advice. I believe that this was a very important approach and critical to gaining a much more balanced view to the range of harms that the pandemic caused, allowing holistic interpretation of the advice within the risk appetite of Scottish Government as a whole.

493. On 28 April 2020, the Scottish Government recommended that people cover their faces while in some public places such as shops and on public transport. This recommendation was based on the same scientific advice that was being examined by SAGE. At that time UK Ministers were considering the scientific evidence for introducing similar advice but Scottish Government Ministers simply took the decision before they did.

494. The key factor in the Scottish Government decision was asymptomatic transmission, people who are infected but not showing symptoms passing on the virus to others. In March 2020 the US government assessed the latest research into this risk and concluded that the public should cover their faces when in confined spaces. A study in Singapore had found evidence that Coronavirus had been spread by people who had not realised they were infected. In particular scientists had identified the possibility of the virus being passed in a two-day period before symptoms started to show.

495. As the FM said at the time, evidence about the usefulness of face coverings was "limited", but that there may be "some benefit in wearing a face covering if you enter an enclosed space where you will come into contract with multiple people and safe social distancing is difficult". The FM went on to say: "To be clear, the benefit comes mainly in cases where someone might have the virus but is not aware of that because they are not experiencing symptoms and thus not isolating completely. Wearing a face covering in those circumstances may reduce the risk of that person transmitting the virus to others."

496. It was made clear in the messaging to the Scottish public that the guidance was not mandatory and would not be enforced by the authorities.

Effectiveness of the first lockdown

497. I am not aware of any specific assessment of the effectiveness of the first lockdown in controlling the spread of Covid-19 just for Scotland, however there has been numerous research and case studies which have shown that lockdowns were generally effective at reducing the spread of Covid-19, therefore "flattening the curve" [GS2/071 – INQ000326418], [GS2/072 – INQ000326419] and [GS2/073 - INQ000326389].

498. "Scotland's Wellbeing: The Impact of Covid-19"[GS2/074 - INQ000182937] openly and transparently reports on how Covid-19 has affected progress towards Scotland's National Outcomes.
It brings together a range of evidence sources, as well as analysis and insight, to show the impact of Covid-19 across Scotland to date and its potential future impacts.

499. Our weekly published modelling showed the pattern of transmission, hospitalisations and deaths from which it is possible the see the impact of lockdown.

500. As already stated the Scottish Government created a four harms approach which was used throughout the pandemic. In addition, post Covid-19 activities such as the work of the Covid-19 Learning and Evaluation Group [GS2/075 - INQ000326390] chaired by Professor Linda Bauld looks at the wider consequences.

Conclusions and lessons learned

501. The SCOPP published an interim report in response to the First Minister's Commission to the Committee [GS2/076 - INQ000103005].

502. The Covid-19 pandemic created a unique and challenging set of circumstances for the NHS in Scotland. The 2020 Audit Scotland report NHS in Scotland [GS2/077 -

INQ000148761] outlines the response to the pandemic by the NHS in Scotland and presents an overview of its financial and operational performance for 2019/20.

503. Throughout the pandemic there was a continuous review of processes and procedures across all aspect of the response to see if changes and improvements needed to be made. Such changes were carefully considered and implemented if appropriate. There were no specific systems put in place for this, it was very much part of everyday embedded processes in the overall response to what was happening.

Decisions relating to easing the first lockdown in the period from 29 May 2020 to 7 September 2020

504. The decision taken by Scottish Ministers to lift the first lockdown in Scotland and to ease the restrictions was taken in line with the rest of the United Kingdom, based on the medical and scientific evidence at the time provided by SAGE and the other advisory groups.

505. The rationale behind the various strategies and NPIs which were implemented by the Scottish Government over this period are detailed in the NPI narrative written by Dominic Munro.

506. It is my view that the differences in approach between UK nations were in part influenced by clinical and demographic considerations (Scotland has an older population, with greater levels of multimorbidity and therefore greater risk of harm from Covid-19) and in part by national tolerance of risk and harm in each of the four harm domains. This national tolerance of risk, in my view, is not as simple as saying Scottish Government's tolerance of risk, as population polling and attitude surveys were used extensively alongside other sources of information to inform that understanding more fully.

The steps taken to ease the first lockdown

507. There was a continual review of evidence and opinion to determine what options were available to prevent further full lockdowns. This information and advice was

sought from a wide variety of sources, including the C19AG (which Professor Woolhouse was a part of), SAGE and opportunities to learn from other countries as has been detailed elsewhere in this statement. The harms were weighed through recognised governance structures, such as the Four Harms Group. Importantly, during the phase following lockdown, Test and Protect, the combined testing and contact tracing approach in Scotland was operating at a much greater scale than before and with further expansion planned too. The ability to test at a much greater scale and deploy contact tracing and isolation were absolutely critical to a successful strategy where the risk of lockdown was reduced for the future, until medical countermeasures were widely available and implemented.

508. At that point in time (June 2020), the school year was about to end in Scotland and children were about to begin their prolonged summer holiday. This allowed time to more fully collate evidence in relation to school closures, but it was reasonable to state that there was concern amongst decision makers and advisers alike of the ongoing impacts on this sector. A specific Sub-Group of the C19AG was formed to provide advice on education issues in preparation for the new school year to optimise control within this environment and consider the wider impacts on children. In August 2020, the CMOs and DCMOs of England, Scotland, Northern Ireland and Wales issued a joint statement on schools re-opening in order to improve public confidence in the risk associated with this environment and ensure that their views on the available evidence were widely known [GS2/078 – INQ000326391].

509. I do not agree with either of Professor Woolhouse's assertions that the risks were concentrated on the frail and the elderly and that messaging should have concentrated on this. This misrepresents the reality experienced by very many families and clinicians across the country who experienced first-hand the loss of people in neither of these categories. It is true to say that there were greater risks to people in these categories but foolhardy to believe that risk was confined only to these groups. It ignores the additional risk to those with other characteristics, for example ethnic origin or raised BMI and also the impact on people of Long Covid. This is one of several reasons why broader societal approaches to protection were necessary than the narrow focus advocated by a minority of scientists.

510. On 21 May 2020, the Scottish Government published a more detailed four-phase "route-map" [GS2/068- INQ000214275], laying out the order in which restrictions would be relaxed. The details of these plans were revised on 18 June (phase 2), 2 July (phase 2), 9 July (phase 3) and 20 August (phase 3), as further evidence emerged of the effectiveness of restrictions on reducing transmission. As stated previously decisions were based on scientific evidence received from SAGE and other advisory groups.

511. On the 19 June 2020 the Scottish Government replaced its "stay at home" message with "stay safe" as the country entered the second phase of its lockdown easing plan. As explained at the time the FM said the new advice reflected the fact that the virus was now "firmly in retreat" and this was based on the UK's official coronavirus alert level being downgraded from four to three. This meant the virus was now considered to be "in general circulation", and transmission was no longer thought to be "high or rising exponentially" and therefore Ministers felt the new message was the appropriate one to be communication to the public at that time.

512. As Scotland entered phase 3 of the route map on 10 July 2020 **GS2/079** –INQ000246522], the wearing of face coverings became mandatory in shops in Scotland. This was part of a number of protective 'baseline measures' that were retained as they were considered both necessary and proportionate to achieve the strategic intent of suppressing the virus to a level consistent with alleviating the broader harms of the crisis. As stated previously decisions were based on scientific evidence received from SAGE and other advisory groups.

513. The FM stated in her speech at the media briefing on 10 July 2020 [GS2/080 - INQ000326392] that it is was compulsory to wear a face covering in shops, as well as on public transport, and the NCD talked more about that in the same briefing.

514. The FM stated the reason was quite simple – "we are now starting to go out and about a lot more, and that, as I have said a moment ago, brings much greater risks of the virus spreading. So we have to put in place mitigations now that weren't as

necessary when we were all staying at home all of the time to reduce the risk of that happening."

515. On 30 July 2020, the First Minister Nicola Sturgeon announced that schools would be allowed to reopen on 11 August 2020, with all pupils expected to be in class full-time from 18 August. Guidance issued to councils said children should return to school as quickly and as safely as possible.

516. The rationale and scientific basis for this decision was based on advice from the Scientific Advisory Sub-Group on Education and Children's Issues chaired by Professor Carol Tannahill, Chief Social Policy Adviser to the Scottish Government. Details on the remit of the Sub-Group advice and the advice can be found in the July 2020 minutes [GS2/081 - INQ000326393] which have been previously supplied to the Inquiry.

517. The fifth WHO criterion was: "Manage the risk of exporting and importing cases from communities with high risks of transmission"[GS2/082 - INQ000326394]. Importation of new chains of infection of the dominant strain of the virus, or of new and potentially more infectious strains or strains that might undermine the effectiveness of vaccines, could occur as a result of international travellers from overseas entering Scotland directly by air or sea or of travellers arriving directly in Scotland from other parts of the Common Travel Area (England, Wales, Northern Ireland, Ireland, the Channel Islands and the Isle of Man – the "CTA"), or indirectly via the land border with England. Minimising this risk was therefore an important element of the strategy as domestic restrictions were relaxed following the original lockdown, on the same principle as the use of travel restrictions within Scotland with the aim of reducing the risk of importing the virus from areas with high levels of cases to those with lower ones.

518. Given, for example, the need for cross-border movements of food, medical and other supplies it would never have been practicable to impose a complete ban on travel to and from Scotland, or to and from Great Britain or the UK. In terms of overall strategy, even if Scotland had succeeded in completely eliminating the virus at a particular time, essential travel to and from Scotland would enable the virus, if

still circulating elsewhere, to be reintroduced to Scotland. The implication of this is that a 'zero Covid' strategy in Scotland would ultimately have been unlikely to be sustainable. This would particularly have been the case if the UK Government were not also pursuing such a strategy for England, given that complete closure of the land border with England was never a feasible proposition because of the volume of freight traffic crossing the border daily.

519. What the Scottish Government did do, like other governments elsewhere in the UK and beyond, was to put in place measures to limit non-essential travel to and from areas of high prevalence in Scotland and elsewhere.

520. Within Scotland, at times where restrictions were in place but not full 'lockdown', Intra-Scotland travel restrictions took the form of guidance relating to specific areas during localised outbreaks in the summer and autumn of 2020, and then from late 2020 to mid-2021 national guidance and then regulations restricting non-essential travel between areas of Scotland that were subject to different levels of restrictions. This approach was necessary to complement the geographically variable "levels" approach to NPIs within Scotland. Travel was of course never banned completely, but rather travel was permitted with a reasonable excuse and the regulations set out a range of examples of such reasonable excuses.

521. Restrictions were also applied to travel to and from other parts of the CTA, at times applying to the whole territory of one or more of the other CTA administrations and at times to specific parts thereof. Other CTA administrations restricted travel to and from Scotland or parts of Scotland. The four UK nations collaborated on guidance to the public on the interaction of these evolving regimes. The Scottish Government published comprehensive guidance on its website and drew attention to the rules and guidance in its public information campaigns.

522. Detailed explanations of the travel restrictions policy, provided: [GS2/083 – INQ000131044], and its intended impact were published in November 2020. This includes an Equality Impact Assessment, provided: [GS2/084 – INQ000131045], Business and Regulatory Impact Assessment, provided: [GS2/085 – INQ000131046], and Islands Assessment Impact, provided: [GS2/086 –

INQ000131047]. The policy note, provided [GS2/087 – INQ000131048], and accompanying impact assessments were refreshed in April 2021.

523. Although there were challenges in managing international travel restrictions across the four nations, there was a broad level of consistency in their application over the period they were in force. Particularly earlier in the pandemic, Scotland at times adopted a more restrictive stance on foreign travel than the UK Government did for England, for example easing restrictions on travellers from Spain after the UK Government had done so for England or Scotland's stricter approach to quarantine hotels (known in Scotland as "Managed Isolation") when it was first introduced.

524. In those cases, international passengers were able to circumvent tougher restrictions in Scotland by travelling via England. Where this happened, it would have reduced the efficacy of Scotland's restrictions to a degree. However, the tougher stance in Scotland, based on feedback from the aviation sector, had a negative impact on passenger numbers travelling directly to Scotland so would still likely have served to reduce importation and hence transmission, even if some lower level of importation continued from international travellers entering Scotland via England or elsewhere in the CTA.

525. On 8 July 2020 the Scottish Cabinet discussed Border Health Checks [GS2/088 – INQ000214409]. At that point, blanket restrictions were currently in place (with only a few exceptions) requiring 14-day quarantine on return from all countries outside the CTA. The UK Government had, however, announced that, with effect from 10 July, it would exempt travellers from specified countries from the requirement to self-isolate, and it had published a list of those countries (which it had rated 'green' and 'amber'). In light of this, the FM had requested further analysis, based on the latest data provided by UK Government from the JBC and PHE, in order to identify those countries with a point prevalence significantly above Scotland on which to base a judgement about exemptions for travel to Scotland."

526. The FM's preferred option, subject to Cabinet's views, would be to exempt all the countries on the UK Government list with effect from 10 July (both 'green' and 'amber'), with the exception of Spain and Serbia. This appeared to be the most

proportionate option, albeit one which would raise a number of diplomatic issues and which had the potential to generate some opposition within the travel industry. Cabinet agreed to this and to three weekly review points.

527. In terms of the scientific advice at the time, within the same cabinet papers [GS2/088 – INQ000214409] the CMO updated that "a representative of the WHO had made an equivocal statement regarding the possibility of airborne transmission of the SARS-CoV-2 virus, although further, urgent research was required before a definitive position could be reached. The WHO's position remained that the virus was spread by droplet transmission, but a WHO official had now acknowledged some evidence to suggest that airborne transmission could not be ruled out in crowded, enclosed or poorly ventilated spaces."

528. Travel restrictions then continued to be considered during the summer of 2020. For example, on 29 July the then Cabinet Secretary for Health advised Cabinet that "the latest data from the UK JBC had flagged an increased risk of Covid-19 being imported by people travelling to Scotland from Luxembourg, and it would therefore be consistent with the clinical advice to remove Luxembourg from the list of destinations exempted from quarantine requirements". It was noted in discussion that efforts should be made to implement this change simultaneously across all four UK nations but that, if this could not be achieved, it would be appropriate for the Scottish Government to proceed on its own account that day.

529. During late summer 2020, there were several substantial outbreaks of infection that were localized in their significance. These were managed by local HPTs, often with assistance from PHS and in close consultation with the Scottish Government Outbreak Management Division. Sizeable or complex outbreaks occasionally required a degree of co-ordination or consideration that necessitated activation of multi-agency response meetings, coordinated through SGoRR. The use of specific social restrictions remained an option and when these were considered they were discussed through the Four Harms process before advice on the balance of risks was presented to decision makers [GS2/089 - INQ000326425, GS2/089a – INQ000326426 and GS2/089b – INQ000326427]

530. The response to local outbreaks over this period (and throughout the pandemic) was directed by PHS. The management of public health incidents in Scotland resides with Public Health Scotland (PHS) as detailed in their Management of Public Health Incidents (MPHI) guidance document [GS2/090 – INQ000241756].

531. In July 2020 a dedicated Scottish Government Outbreak Management Response Division for Covid-19 was set up within the Outbreak Management Directorate. The purpose of the Response Division was to work closely with Public Health Scotland, Directors of Public Health and NHS Board Health Protection teams (HPT) who were all responsible for managing local outbreaks of Covid-19 across Scotland.

532. The original objective of the Response Division was to give reassurance to Ministers that Health Boards were receiving the necessary support from Scottish Government and that all local outbreaks were being managed effectively, without the need to constantly invoke the SGoRR process.

533. The Response Division allowed for direct feedback from PHS, Directors of Public Health and the "on the ground" incident management teams to the Outbreak Management Strategy and Policy Divisions teams, to assist with their thinking and development of future policy and strategic planning.

Eat Out to Help Out

534. I had no involvement in the Eat Out to Help Out scheme. This was not within my locus of influence and I was not supportive of it. I am unable to comment on the nature of scientific or clinical advice that informed this initiative as I have no knowledge of this and was not consulted. Any representations to the UK Government in relation to this would have been made at Scottish Ministerial level.

Conclusions and lessons learned

535. As stated previously, throughout the pandemic there was a continuous review of processes and procedures across all aspect of the response to see if changes and

improvements needed to be made. Such changes were carefully considered and implemented if appropriate. I cannot recall any specific assessment of the effectiveness of the restrictions implemented over this period in controlling the spread of Covid-19 or of the economic, social or non-Covid-19 health related consequences of the restrictions implemented in Scotland. Policy officials within Scottish Government may be able to provide specific details if such detailed assessments were undertaken.

536. There were no specific systems put in place for this, it was very much part of everyday embedded processes in the overall response to what was happening.

Decisions relating to the period between 7 September 2020 and April 2022

537. A definition of the Scottish Government's overall aim throughout the emergency phase of the pandemic (lasting until April 2022 in Scotland) was to minimise the harms that it would cause.

538. The Scottish Government's strategic approach to managing the pandemic and the implementation of NPIs evolved over time, particularly as various aspects of the Covid-19 crisis changed. Following the March 2020 'lockdown', it covered three broad phases:

- The 'Route Map' [GS2/068 – INQ000078400] approach to easing NPIs in place during mid 2020;
- The 'Levels' approach implemented from November 2020 to August 2021; and
- The 'Baseline Measures' in place from August 2021 until the end of the emergency phase of the pandemic in April 2022, including the temporary, targeted response to the Omicron variant.

539. There is recognition that the harm of the pandemic was multi-faceted. It was firstly a health crisis, causing health harm and hence the urgent need to protect life, but it was quickly apparent that it was much more than that. Arguably it was the biggest crisis that Scotland, the broader UK and many other countries have faced since

World War II. It was an economic crisis and a crisis for society more generally, seriously affecting for example education, inequalities, social isolation and many other aspects of life. The Scottish Government had to take these broader aspects of harm into account in determining its responses to the pandemic. Moreover, the nature of the crisis presented by Covid-19 required innovation in the development of the overall response and specific approaches.

540. Because Health is devolved, responsibility for much of the management of the pandemic in Scotland fell to Scottish Ministers. As noted elsewhere in this statement, the UK Government did however, retain control over certain 'reserved' areas of policy that influenced the Scottish Government's ability to deploy its devolved powers and there was collaboration across the four nations on elements of pandemic management. Scottish Ministers were open to coordinating measures across the four nations where that was appropriate but would ultimately take decisions that best addressed Scotland's needs.

541. Since the Scottish Government's aim was to minimise the overall harm of the pandemic, an approach to making decisions was required to enable this. To aid transparency, the Scottish Government published the way it would take future decisions on its pandemic response. This approach was set out in April 2020 in the Framework for Decision Making [GS2/010 - INQ000131025]. This document enunciated the Scottish Government's principles and approach to managing the pandemic, particularly in relation to the use of NPIs, as set out in Figure 1 below.

542. As stated previously in this statement, a key part of the approach described in the Framework for Decision Making was to marshal the many and various harms of the pandemic into four categories:

- Harm 1: direct Covid-19 harm;
- Harm 2: other health harm caused by the pandemic;
- Harm 3: societal harm; and
- Harm 4: economic harm.

543. The categorisation of harms into this 'four harms' approach was not perfect but it provided a manageable means, at a strategic level, to take account of the many and various harms of the pandemic in decision-making. It was adopted from April 2020 through to the lifting of the final Covid-19 legal requirements in April 2022 (and beyond). It was more manageable, for example, than seeking to weigh up a far greater number of specific harms in reaching decisions: it was a deliberate simplification to address some of the inherent complexities of the crisis.

544. A published update, Framework for Decision Making – Further Information (5 May 2020) [GS2/091 – INQ000131026], explained how the government's approach to NPIs was developing in light of epidemiological conditions. A supporting evidence paper (7 May 2020) GS2/092 – INQ000256712] explained the various types of evidence being considered as part of 'four harms' assessments of NPI options. Additional information on the evidence used in four harms assessments was set out in a further publication in December 2020 [GS2/070 –INQ000131028].

545. Additional complexities also needed to be recognised and addressed. For example, the harms that Scottish Ministers were seeking to reduce were often 'non-linear': that means that they did not increase or decrease over time at a steady pace. A business might survive a fortnight of enforced closure but not two months. Consequently the economy might see an accelerating increase in harm the longer that measures on businesses were in place. Other examples of complexity stemmed from the uncertainty surrounding many of the parameters needed to assess harm and from the reality that the relative harms were adjusting over time; for example as increasing vaccination coverage and improved treatments reduced the direct Covid-19 health harm (harm 1) for a given level of prevalence of the virus in Scotland.

546. Given the complexities and uncertainties in assessing the pandemic's various harms, it was necessary for rational decision making to adopt ways to simplify and otherwise make sense of information, such as marshalling the various negative impacts into four harm categories. While simplifying some of the complexity, this approach could not, however, remove all uncertainty; for example, the current and future state of the pandemic, the timing of future vaccines and treatments, the

impact of responses etc. This presence of significant uncertainty justified a role for the application of judgement in decision-making, taking all factors into consideration, including those that were difficult to quantify with much accuracy or confidence. This uncertainty also provided justification for adopting a cautious approach, particularly at stages during the pandemic when the risk to public health was potentially extreme.

547. Decisions needed to be taken about when to ease or tighten measures, about how much measures should be eased or tightened, which measures should be eased, newly introduced, changed or removed. These decisions required assessments to be made of the current and near-term state of the pandemic (and hence how much of a change in measures was warranted given the need to suppress the virus) and of the effects changing different measures would have, alongside the consideration of the potential interaction of measures. Further information on the intended approach to phasing the easing of measures was set out in an internal Scottish Government document: General Principles for Phasing, in May 2020 [GS2/093 – INQ000131040]

548. Because the four harms of the crisis potentially moved in different directions as a result of changes in measures (e.g. re-opening schools might increase prevalence of the virus and hence 'harm 1' but mitigate educational impacts and hence reduce societal 'harm 3'), decisions could involve a trade-off between the different harms. This trade-off was often more subtle than was presented in public discourse (e.g. it was never as simple as a stark choice between prioritising health or the economy).

549. Explicit consideration of the broader harms beyond that from direct Covid-19 meant that decisions on NPIs were not taken on the basis of transmission risk (harm 1) alone, which was a frequent misperception. Instead a broader perspective was taken. Because of the misperception that the only thing that mattered in decision-making on measures was transmission risk, perceived inconsistency issues ('anomalies') arose; e.g. 'X activity is less risky than Y activity, therefore there is an error in that Y is permitted but X is not'. This would not be an error if

other factors beyond transmission risk (notably, impacts on the other harms) had influenced the decision to prioritise Y over X.

550. In principle, an analytical framework could have weighed up the different options concerning NPIs at different times. For example, metrics such as QUALYs (quality-adjusted life years) or the less established WELLBYs (well-being adjusted life years) could have provided a common metric to quantify the impacts of different NPI options across the different harms and so provide a rational basis for selecting options that would minimise overall harm. A combination of NPIs could have been chosen that was projected to lead to the minimum overall reduction in QUALYs or WELLBYs for Scotland when all the harms from both the pandemic and the responses to it were taken into consideration. An influential academic paper from April 2020 set out such an approach, based on WELLBYs, to aid consideration of timings for easing measures (in the UK) [GS2/094 - INQ000326395].

551. However, such a problem would have needed to have been solved and re-solved repeatedly during the pandemic, as the parameters for calculating the optimal configuration of NPIs changed. Moreover, an overall change in WELLBYs at population level may look very different for sub groups within the population, raising equalities considerations. In practice, such an approach would have been unwieldy, with likely too little time to conduct the relevant analysis given the need for rapid responses, and would have been dogged by uncertainties and complexities, including those set out above. For example, in addition to not knowing at the outset when vaccines would become available, the approach would also have had to grapple with issues such as how to quantify the impact over decades to come of educational disruption alongside quantifying the impact of Long-Covid on people's future health, and all the other impacts associated with the pandemic, all in a common metric.

552. Importantly, the principle that it was possible to identify a configuration of NPIs that minimised the overall harm of the pandemic was a useful one that guided the Scottish Government's strategic approach. This approach involved developing options for NPIs based on assessments of their impacts on the different harms (called 'Four Harms Assessments'), enabling Ministers to make judgments and

decisions about the optimal configuration of measures so as to minimise overall harm and remain consistent with the broader principles set out in the Framework for Decision Making (lawful, clear, realistic etc.) [GS2/010 - INQ000131025]

553. Over time the nature of the broader crisis caused by the pandemic evolved. Both the virus and the impacts and responses for it changed. The virus itself became much more transmissible over time as successive variants with increased transmissibility came to dominate. Clinical and pharmaceutical responses to the virus, both in the form of treatments and vaccination, were developed and improved, leading to a reduction in the direct health harms that would result from transmission. Increasing acquired immunity and/or protection from severe illness, as more people became infected (either with or without vaccination), also tended to reduce adverse health effects from infection.

554. Understanding of the virus also evolved alongside an increased understanding of the impacts of NPIs. The way people behaved in relation to the virus also changed, as adherence to measures adjusted, particularly as a significant percentage of the population gained increased immunity or protection through vaccination and/or prior infection.

555. The relative balance of harms also developed over time, in response to the factors above and to wider developments. In particular, in considering how to minimise overall harm across all four harms, it matters how long measures have already been in place, causing escalating societal or economic harms. For example, in considering whether to retain measures for business, general economic conditions and the additional challenges placed on businesses through NPIs are both relevant in assessing harm. A restriction on business activity that was judged proportionate when no-one in the population was vaccinated against Covid-19 and financial support for such businesses was available may well have been judged disproportionate when 90% of the adult population had been vaccinated and financial support had been withdrawn. As another example, in considering measures on education, including schools, which were implemented by Ministerial direction under powers in the Education Acts, how much educational time had already been disrupted was a relevant factor.

556. While retaining a high degree of consistency with the approach and principles set out in the Framework for Decision Making in April 2020 [GS2/010 – INQ000131025], over the course of the pandemic the Scottish Government's approach adapted to reflect the evolving, multi-faceted nature of the crisis. Over time, and with increasing vaccination coverage, the Scottish Government's overall strategic approach to minimising harm was adjusted.

557. When there was zero or relatively low vaccine coverage in Scotland and the health risk to an individual from catching Covid-19 (particularly for older individuals or those with other vulnerabilities) was relatively high, the trade-off between the different harms was such that minimisation of overall harm depended crucially on bearing down very heavily on prevalence of the virus. Thus the strategic priority in 2020 and the first half of 2021 was on suppressing prevalence, even at the expense of considerable broader harms. Consequently, in the Scottish Government's October 2020 Strategic Framework publication [GS2/095 – INQ000249320] the strategic intent was to "suppress the virus to the lowest possible level and keep it there, while we strive to return to a more normal life for as many people as possible."

558. Once vaccine coverage in the older age-groups in the population had reached relatively high levels in Scotland later in 2021 and the health risk to the average individual (and particularly older, vaccinated individuals) had fallen considerably, the trade-off between the different harms changed, and the Scottish Government's strategic intent was adjusted in the June 2021 Strategic Framework Update [GS2/096 - INQ000326396] to: "'suppress the virus to a level consistent with alleviating its harms while we recover and rebuild for a better future."

559. In the Strategic Framework Update published on 22 February 2022 [GS2/097 **INQ000147453**] the Scottish Government's strategic intent was revised for the last time to: "manage Covid-19 effectively, primarily through adaptations and health measures that strengthen our resilience and recovery, as we rebuild for a better future."

560. Practically, this meant that the Scottish Government would now be less driven by suppressing transmission than in the past, and more concerned with reducing and mitigating harm more generally. This recognised that after two years of the pandemic and in light of developments in vaccines and treatments, the impact on the other harms from a strategy overly focused on suppression would be disproportionate.

561. As both the nature of the Covid-19 crisis changed and the Scottish Government's overall strategy evolved in response, so its approach to imposing and easing NPIs also evolved, from the initial measures introduced in March 2020 (including the 'lockdown') through to the lifting of the remaining legal measures on 18 April 2022.

Background to the second lockdown

562. On 25 December 2020, restrictions were relaxed for Christmas Day to allow people to mix indoors and travel more freely. The restriction of what was originally a 5 day period of more relaxed countermeasures to only 1 day was due to the rapid emergence of a more transmissible variant, later termed Alpha. It was evident that the proportion of infection derived from this variant was increasing and early studies suggested that it was 70% more transmissible. Restriction of these relaxations to only one day was based on combined advice that recognised the entirety of harms affecting society through the Four Harms process. This was communicated through an emergency media briefing on 19th December and subsequently through media interviews and further media briefings in the days that followed.

563. On 26 December 2020, mainland Scotland was put into level four restrictions (close to full lockdown). Level 4 restrictions were applied, in conjunction with the shortened planned Christmas relaxation of restrictions in order to counter the emergence of the new variant, later termed Alpha. Early studies showed that this variant was more transmissible and epidemiology demonstrated its rapid growth in communities across the UK. These measures, part of the recognised strategic approach in Scotland, were necessary to try to curtail and slow its impact, particularly as mass vaccination of the vulnerable was not long started.

The second lockdown

564. On 4 January 2021, mainland Scotland was placed under lockdown until the end of January 2021, beginning from midnight. Schools were closed and people were ordered to stay at home except for essential purposes. This decision was made using data of growing number of cases and hospitalisations across the country, modelling that showed NHS was likely to be overwhelmed, a recommendation from UK CMOs to move to alert level 5 and advice from SAGE on the response.

565. Advice was given that robust measures were necessary to suppress community transmission using recognised frameworks and restriction of activities in order to prevent significant mortality and morbidity, including the overwhelming of healthcare services. It was judged that this included leaving home except for essential purposes in modelled responses in order to reduce R below 1.

566. I was a clinical adviser as part of a team giving the same advice; I was one of the 4 UK CMOs who advised raising the UK alert level to the highest level, level 5.

567. My preference was to move to more stringent measures sooner than 4 January 2021 on purist health protection grounds, but I recognise that in a balanced harms approach this would have resulted in greater societal harms, including those of a public health nature. This approach represented a compromise across those harms and demonstrates that there were no harm or risk free decisions available to decision makers then, and throughout the pandemic.

568. Strategies other than lockdown in December 2020/January 2021 were considered but were rejected for the similar reasons that they were inappropriate at other times of the pandemic response as detailed elsewhere in this statement.

569. Extensive modelling was undertaken to show a range of scenarios and responses to a combination of measures; given the transmissibility of the new variant, it was evident from these models that severe restriction would be necessary to restrict growth of the epidemic and return R to below 1.

570. Like many other clinicians and scientists, I did not find the content of the Great Barrington Declaration (October 2020) to be grounded in good science. As has already been explained elsewhere in this statement, it would have been unfeasible to safely protect all those at higher risk of serious illness through shielding and the long term effects of infection (Long Covid) and duration of immunity were still being understood. However, it is correct that lockdowns are not harm free, and this was recognised in Scotland. The use of the Four Harms process, detailed elsewhere in this statement was an attempt to try to mitigate some of these other harms in a more balanced approach [GS2/070 – INQ000131028].

571. Learning and new evidence was applied throughout the pandemic response as a matter of routine. In this period, it was important to act robustly and with urgency to a threat that, whilst evidence was still emerging, was potentially of great significance.

572. The rationale for the re-introduction of attendance restrictions at schools at the same time as the second lockdown was based on advice provided by the Educational and Childrens Sub-Group (of the C19AG) and was communicated through guidance, engagement with the education system and via media briefings and interviews.

573. On 19 January 2021, the First Minister extended Scotland's lockdown until mid-February 2021 because whilst there was evidence that cases and R were declining, they had not yet reached a level where restrictions could be eased. For this same reason, schools remain closed on advice provided by the Education and Children's Issues Sub-Group (of the C19AG).

The easing of the second lockdown

574. On 22 February 2021, Scotland's schools began a phased reopening, with the youngest pupils returning to the classroom (primaries 1 - 3). Senior 5 and 6 pupils were next to return on 15 March 2021. All other school pupils returned in April 2021 after the Easter holidays. This was based on advice from the Education and

Children's Issues Sub-Group (of the C19AG) – see attached exhibit [GS2/098 - INQ000326397].

575. On 23 February 2021, the Scottish Government published an updated decision-making framework, [GS2/099 – INQ000078358] setting out the broad order of priorities for relaxing lockdown restrictions and the conditions to be met at each stage. As set out in the foreword of the document the aim was to suppress the virus to the lowest possible level and keep it there and that the aim of maximum suppression was not some ideological goal. When the virus is allowed to circulate at relatively high levels within the community the risk of it accelerating out of control is at its highest. Community transmission also increases the risks of the virus mutating and new variants emerging. A strategy of maximum suppression was the best hope at that time of avoiding a third wave and a further lockdown. Reopening of society and the economy would be cautious and gradual and informed by the latest evidence and data, not by dates. If we opened up too quickly to meet arbitrary dates, we risked setting progress back. There were far too many uncertainties such as the impacts of both new variants and of vaccinations. The aim of the updated framework was to be as open and transparent about the challenges that lay ahead.

576. Of course, for as long as there are restrictions on our way of life, the Scottish Government must and will use the resources available within our devolved powers to provide support, and where necessary we will press the UK Government to use its reserved powers to do the same. It was communicated in guidance, media briefings and interviews, following the same format as previous decisions and updates.

577. On 2 April 2021, the "stay at home" order was lifted in Scotland, and replaced with a three-week "stay local" order that required people to stay within their local council area [GS2/100 – INQ000326398]. This was based on advice from the Four Harms Group, including an assessment of prevailing epidemiology, vaccine uptake and coverage and modelling. This showed sufficient decline in cases and vaccine coverage and protection to enable these restrictions to be eased gradually with further assessments as this was done. It was communicated in updated guidance, media briefings and interviews.

578. On 6 April 2021, [GS2/101 – INQ000326399] the FM confirmed that all secondary school pupils would return full time to the classroom after the Easter holidays and that they would no longer need to follow social distancing rules, but required wear face coverings throughout the school. It was important to try to ease disruption to schooling as soon as possible due to the educational harm children were experiencing and facilitating confidence. Reducing risk of transmission within schools by wearing of face coverings was one of a number of measures introduced to try to reduce the likelihood of spread within educational settings. Advice was provided by the Educational Sub-Group of the C19AG and was communicated through guidance, engagement with the education system and via media briefings and interviews.

Conclusions and lessons learned

579. The purpose of the second lockdown was to try to reduce direct Covid-19 harm as a consequence of a new more transmissible variant and to prevent the NHS in Scotland from being completely overwhelmed. It achieved both purposes.

580. Continual assessment was undertaken throughout the period of the lockdown to assess the performance of measures against modelling. I cannot recall any further analysis of how different or earlier decisions relating to the management of the pandemic in Scotland had been taken in the period around the time of the second lockdown,

581. I cannot recall any formal assessment of consequences of the second lockdown not related to the spread of the Covid-19 virus be they economic, social or non-Covid-19 health related.

582. In the autumn of 2021, Public Health Scotland (PHS) ran a second survey of individuals at the highest risk of Covid-19 [GS2/102– INQ000326400]. This survey was organised to help understand:

- The longer-term impacts of the initial (March–July 2020) shielding period;

- How individuals in the highest risk group manage risk;
- The support available to individuals in the highest risk group has met their needs; and
- The future support needs of the highest risk group.

583. Learning was developed throughout the pandemic and it is often difficult to attribute a particular time when that learning crystalised. The UK CMOs' Technical Report [GS2/036 - INQ000130955] contains extensive learning from this time from the perspective of the clinical response that CMOs would wish to pass on to future clinical leaders. Questions that relate to learning from the Scottish Government perspective are best addressed in Scottish Government corporate statements.

584. Continual learning was evident throughout the pandemic and was shared through professional advisory structures in groups such as UK CMOs, UK Senior Clinicians, the C19AG its Sub-Groups. It was also played into discussion through governance and infrastructure groups such as the Four Harms Group and to operational groups when this was necessary.

585. Decisions to ease the second lockdown in mid-April 2021 were made on assessments of epidemiology, healthcare system pressures, R rate and modelling through a four harms process before advice for Scottish Ministers was formed from this discussion.

586. Assessments were made by HSCA of the likely impact of NPIs (or various combinations of) on case numbers, R-rate and modelling. These were then subject to discussion at Four Harms Group before advice offered to decision makers.

587. On 16 April 2021, the stay local rule was lifted for Scotland and up to six people from six different households were allowed to meet up outside again, but people were still not permitted to stay overnight outside their council area, and the advice remained for people to shop within their council area whenever possible. At this stage there were differences in epidemiology evident in different parts of the country; advice offered and decisions made around restrictions in travel attempted to reduce the likelihood of spread from one higher risk area to an area of lower

risk. This was communicated in guidance and in media briefings and media interviews.

588. On 20 April 2021, the FM confirmed the reopening of outdoor hospitality, gyms and non-essential retail from Monday 26 April 2021. Non-essential travel between Scotland and the UK's other Home Nations was also permitted again from that date. This was a risk based approach which attempted to open settings according to the scientific evidence of risk of transmission within them, balanced by consideration of other harms that opening would alleviate.

589. On 14 May 2021, the FM confirmed that Glasgow and Moray would remain in level 3 restrictions for a further week after the rest of Scotland moved to level 2 on Monday 17 May 2021 due to high rates of Covid in those areas. At this time, both these areas continued to show higher levels of prevalence than in other areas of Scotland; a benchmark of 50 cases per 100000 population was set in the tiers approach adopted in Scotland and these remained significantly above that. In addition, there was evidence that some of the raised level of cases in Glasgow were driven by the Delta variant, recently imported to the UK.

590. On 1 June 2021, the FM announced the next round of relaxing restrictions, with Glasgow moving from level 3 to level 2 restrictions from Saturday 5 June 2021. Some areas of Scotland moved to level 1 restrictions, but 13 council areas in the Central Belt remained in level 2. Island communities moved to level zero, meaning they had no restrictions. Restrictions applied in each council area were influenced by prevailing epidemiology in the tiered approach to restrictions used in the strategic framework. The difference in these different areas reflected the differing numbers of cases, healthcare pressures and risk between each LA area.

591. I am not aware of any audit conducted to assess any alleged confusion created by the use of local restrictions.

The move to level zero

592. On 19 July 2021, Scotland moved to level zero restrictions, allowing larger numbers of people to meet up indoors, as well as attending weddings and funerals. This move to level zero reflected the epidemiology and risk at that time, with advice being developed to decision makers through the four harms process. The move to level zero was communicated in guidance and through media briefings and media interviews.

593. On 9 August 2021, the bulk of pandemic related restrictions were removed in Scotland. Rules that remained included compulsory mask wearing in some locations and restrictions surrounding the administration of schools in the early part of the new academic year. Children under the age of 12 were no longer legally required to wear face coverings in public places. Nightclubs were among the venues allowed to reopen following the lifting of restrictions. The removal of the bulk of the pandemic related restrictions reflected the epidemiology and risk at that time, with advice being developed to decision makers through the four harms process. At this stage, environments with greatest degree of risk for transmission were allowed to reopen. The further lifting of restrictions was communicated in guidance and through media briefings and media interviews.

594. Scottish Government introduced Coronavirus (Covid-19) domestic Covid Status Certification. Please see the attached exhibit [**GS2/085** – INQ000131046] for the detailed Business and Regulatory Assessment (BRIA) undertaken

595. On 18 September 2021, following changes to the traffic lights system in England, the Scottish Government announced that the green and amber lists would merge, but unlike England that there will be no changes to the rules regarding Covid tests for returning travellers. The Scottish Government aimed to maintain a four nations approach to international travel restrictions wherever possible, but sometimes needed to carefully consider the risks associated with aligning with the UK Government. On this occasion it was concerned that the UK Government proposals to remove the requirement for pre-departure testing for some travellers would weaken our ability to protect the public health of Scotland's communities. This was communicated in guidance and via the Scottish Government website.

Please see the attached exhibits [GS2/104 – INQ000326402], [GS2/105 – INQ000326420, [GS2/106 – INQ000326421].

596. In a written submission to Scottish Ministers dated 20 September 2021 [GS2/107 – INQ000326422] containing clinical advice regarding the COP 26 summit, I expressed the view and that of the NCD, that hosting the event in Glasgow as planned in October/November 2021 is associated with a far greater degree of risk than deferring until Spring 2022. As the background prevalence increases, the likelihood and risk of outbreak increases too. There remained a risk to the local population and delegates through the use of public transport. Although the risk to the local population would be mitigated by measures in place for delegates, these mitigations may be less evident when there is high prevalence and crowding. Our concerns were fed back to the UK Government Cabinet Office. The CMO for England also reviewed the package of mitigation measures and, although he was content the measures were sufficient, he was keen to stress that whilst they would lower the risk, they did not make the conference risk-free. The submission provides further details of the Covid Adaptation Plan for the event.

The emergence of the "Omicron" variant (first detected in South Africa in November 2021)

597. I first received information of the emergence of the Omicron variant in November 2021. Information sharing through GISAID and through professional networks, especially through UK CMOs was excellent throughout the pandemic response. Detailed conversations about what was known took place immediately and further information was relayed after conversations between the CMO England and South African clinicians. At each stage, colleagues in Scottish Government and Scottish Ministers were updated with the latest information, around which there was significant interest and concern.

598. The existing restrictions and systems were deemed to be the most appropriate way to manage the Omicron threat, as these were well tested and familiar to the general public.

599. I do not think that it was necessary to implement a full lockdown in response to the Omicron variant, such was the coverage of protection in the population from natural exposure and vaccine derived immunity alongside other medical countermeasures. Boosting this immunity by maximising vaccine uptake was very desirable at this stage. Early evidence suggested that whilst two doses of vaccine was not likely to reduce the chance of infection with Omicron substantially, three doses had a greater protective effect, but there appeared to be ongoing protection from death and severe illness requiring hospitalisation.

600. On 10 December 2021, the FM said that Scotland faced a "tsunami" of Omicron cases with it likely to become the dominant variant of Covid-19 within days [GS2/108 - INQ000326423]. She announced changes to self-isolation rules from the following day, requiring anyone living with someone who tested positive for Covid-19 to self-isolate for ten days, while other contacts could stop self-isolating once they had received a negative PCR test or if they have had two vaccine doses. The guidance and rules on isolation developed throughout the pandemic and were kept under review as new evidence was produced. These changes were based on assessments of infectiousness by clinicians in UKHSA and reflected the changing nature of viral characteristics as new variants emerged and influence of vaccines on susceptibility to infection.

601. On 16 December 2021, the Scottish Government issued new guidelines for hospitality and retail businesses [GS2/109 – INQ000326403} advising the return of social distancing and one-way systems for shops and supermarkets. The guidelines were effective from 12.01 am the following day. This guidance was introduced to reduce transmission within these environments which were noted to be higher risk, particular during the busy period pre-Christmas. There was now a strong evidence base for social distancing and given the increased transmissibility of Omicron, and high attack rate estimated from early observational studies, it was desirable to limit opportunities for transmission as much as possible.

602. On 21 December 2021, new measures were announced for Scotland effective from 26 December 2021 [GS2/110 – INQ000326424] that limited the number of spectators at outdoor sporting events to 500, and indoor events such as concerts

to 200 if seated and 100 if standing. Pubs and restaurants were required to offer table service only. Edinburgh's Hogmanay Street Party was also cancelled. These measures were introduced to limit opportunities for transmission using a well-established evidence base where proximity and movement around indoor environments increased the likelihood and extent of transmission events. It was communicated in guidance and through media briefings and media interviews in these terms.

603. On 26 December 2021, fresh restrictions were brought in as an attempt to halt the spread of the Omicron variant [GS2/110 – INQ000326424], including the cancellation of all large events. These measures were introduced to limit opportunities for transmission using a well-established evidence base where proximity in large crowded environments increased the likelihood and extent of transmission events. It was communicated in guidance and through media briefings and media interviews in these terms.

604. On 27 December 2021, one metre physical distancing measures were reintroduced for the hospitality and leisure sectors,[GS2/110 – INQ000326424] while hospitality had to provide table service only. Nightclubs were required to close for a period of at least three weeks. These measures were introduced to limit opportunities for transmission using a well-established evidence base where proximity and movement around indoor environments increased the likelihood and extent of transmission events. It was communicated in guidance and through media briefings and media interviews in these terms.

The lifting of restrictions in April 2022

605. On 18 April 2022, the rules regarding the wearing of face coverings in shops and restaurants, and on public transport were lifted [GS2/111 – INQ000326404]. Advice on the lifting of these restrictions was developed through the Four Harms process and this advice then passed to decision makers for discussion at Scottish Cabinet. This was a well-established process. At this point in the pandemic, there was sufficient confidence in the degree of population protection established through natural and vaccine mediated immunity, alongside the prevailing

epidemiology of that time, which showed established trend in reduced number of cases, to remove these restrictions.

606. The significance of this decision along with the warning on continuing risks was communicated to the Scottish public by statements given from Scottish Ministers, accompanied by media interviews with clinicians to explain these changes, as had become the normal process.

Conclusions and lessons learned

607. I am not aware of any assessment being undertaken on the effectiveness of the restrictions implemented over this period in controlling the spread of Covid-19 in Scotland.

608. I am not aware of any assessment being undertaken of how different or earlier decisions relating to the management of the pandemic in Scotland in this period or any assessment of the economic, social or non-Covid-19 health related consequences of the restrictions implemented.

609. Questions about lessons learned by the Scottish Government are best directed to officials responding corporately. Lessons that I learned and would wish to convey are captured within the UK CMOs' technical report [GS2/036 - INQ000130955].

610. There were occasions when I provided advice to Scottish Government in relation to border controls where either the speed or extent of action was not possible due to differing responses from the UK Government. Policy officials would be able to provide details of whether those matters were raised with UK Government as I was not involved in those discussions.

611. Learning from the pandemic response was continually fed back into the system of response; the four UK CMOs have produced an extensive technical report [GS2/036 - INQ000130955] to facilitate learning and key points from our experience for clinicians and advisers in a similar position in the future. In Scotland, the SCOPP has been established and will provide the Scottish

Government with recommendations for future pandemics preparedness based on learning and experience from this one.

Conclusions and lessons learned from the use of NPIs in response to the pandemic

612. Other than as already covered in response to questions answered above and relation to your/the Scottish Government's general experience of decision-making about NPIs in Scotland and the rest of the UK, please identify any key areas which you consider worked well, and any key areas in which you consider there were issues, obstacles or missed opportunities

613. There are no further areas that I would wish to highlight that have not already been covered in my response to questions answered above.

Figure 1: Principles and Approach set out in the Framework for Decision Making (April 2020)

Our Approach

- **Suppress** the virus through compliance with physical distancing and hygiene measures, ensuring that the reproduction number remains below 1 and that our NHS remains within capacity
- **Care** for those who need it, whether infected by the virus or not
- **Support** people, business and organisations affected by the crisis
- **Recover** to a new normal, carefully easing restrictions when safe to do so while maintaining necessary measures and ensuring that transmission remains controlled, supported by developments in medicine and technology
- **Protect** against this and future pandemics, including through effective testing, contact tracing and isolation
- **Renew** our country, building a fairer and more sustainable economy and society

Our Principles

These are the principles by which we will make our decisions:

Safe	We will ensure that transmission of the virus remains suppressed and that our NHS and care services are not overwhelmed.
Lawful	We will respect the rule of law which will include ensuring that any restrictions are justified, necessary and proportionate.
Evidence-based	We will use the best available evidence and analysis.
Fair & Ethical	We will uphold the principles of human dignity, autonomy, respect and equality.
Clear	We will provide clarity to the public to enable compliance, engagement and accountability.
Realistic	We will consider the viability and effectiveness of options.
Collective	We will work with our partners and stakeholders, including the UK Government and other Devolved Nations, ensuring that we meet the specific needs of Scotland.

The 5-tier Covid-19 management system

614. With the intention of providing a more flexible and clear approach to using NPIs to manage the pandemic in Scotland, an approach based on five 'protection levels' of measures (numbered 0 to 4) was published in October 2020 in the first Covid-19 Strategic Framework document. This approach superseded bespoke arrangements for measures that had been applied in Aberdeen in August 2020 (in response to an outbreak focused around hospitality settings) and then, from September 2020, across the Central Belt and later across the rest of the country, including in what became known as a 'circuit break' or 'reset' in October 2020 as the virus regained hold in different degrees across much of Scotland.

615. The levels approach enabled measures to be tailored according to the state of the pandemic in different parts of Scotland (with Local Authority areas being seen as the principal, though imperfect, building block for setting measures). This added complexity to the alternative of a nationwide approach to measures, but it helped to ensure proportionality (and hence the lawfulness of measures) in each area. Otherwise, measures might have been imposed in areas (such as certain island communities) that were disproportionate given low prevalence of the virus there. Initial allocations of the 'protection levels' were made and applied in early November 2020. Shortly afterwards, the WHO published interim guidance recommending a five-level (0 to 4) approach to setting NPIs in managing the pandemic.

Conclusions and lessons learned

616. As stated previously, throughout the pandemic there was a continuous review of processes and procedures across all aspect of the response to see if changes and improvements needed to be made. Such changes were carefully considered and implemented if appropriate. I cannot recall any specific assessment of the effectiveness of the restrictions implemented over this period in controlling the spread of Covid-19 or of the economic, social or non-Covid-19 health related consequences of the restrictions implemented in Scotland. Policy officials within

Scottish Government may be able to provide specific details if such detailed assessments were undertaken.

617. There were no specific systems put in place for this, it was very much part of everyday embedded processes in the overall response to what was happening.

Care homes and social care

618. I was not directly involved in the strategy relating to care homes and social care in the management of the pandemic. Social care policy was overseen within another directorate in HSC where Elinor Mitchell was the Director and where there was a strong understanding of the sector. Clinical advice in this area was primarily provided through a combination of senior advisers, such as Professor Graham Ellis, SMO in Older Age Medicine, Fiona McQueen, CNO, Anne Armstrong, CNOD alongside health protection advisers in PHS and IPC advisers in ARHAI and through the group CPAG.

619. I do not recall the specific periods when each of them were involved in providing their input to this area. After I assumed the role of interim CMO in April 2020 I was asked periodically to comment on care homes guidance as it evolved from earlier iterations. Decision making on policy was taken by Scottish Ministers on the advice of policy officials advice and operational decisions were taken within the care home management structure or local health and care systems.

620. I was not involved in the decision making relating to testing or the procedures for discharge from hospital to care homes until I assumed the role of interim CMO in April 2020. At this point I identified a medical chair for the Clinical and Professional Advisory Group that was set up in April and periodically commented on extant guidance as it evolved from earlier iterations and as more widespread testing became available. Questions in relation to decision making and formulation of policy are best directed to those most closely involved in its inception and oversight.

621. Though Scottish Government did not have statutory responsibility for the provision of social care, there was excellent understanding of the sector through the work of the community health and social care directorate led by Elinor Mitchell. Infection control risks in care homes and in domestic care were generally understood and advice provided from relevant experts within Scottish Government; at the outset of the pandemic this advice was covered in national infection control manuals and subsequently augmented with further advice firstly from HPS on 12th March then clinical considerations document published by Scottish Government on 13th March, revised 26th March and 15th May 2020. Questions in relation to this advice are best addressed to those involved in the provision of that advice so that accurate information may be conveyed.

622. Advice in relation to the spread of Covid-19 within the care home setting was provided to decision makers through a specific advisory structure CPAG and comment is best obtained from these sources. However, in the UK CMO Technical report [GS2/036 - INQ000130955], CMOs expressed general views on obtaining evidence in these settings: The UK scientific response to the emerging high impact of Covid-19 on at- risk care settings required fast-paced, collaborative and multidisciplinary research programmes at scale. The Vivaldi study, [GS2/049 –INQ000000] for example, established a network of over 300 care homes to gather evidence on a range of issues in care homes from early in the pandemic. This included a cross-sectional survey showing an increased risk of resident infection associated with use of non-permanent staff, not paying sick pay for staff, new admissions to the care home, and difficulty in isolating residents. These risks were often in tension with the economic and workforce features of the sector, including staff turnover and vacancy rates, along with frequent use of non-permanent agency staff. This meant that prevention of staff movement could risk reducing care to some residents. They also had to be balanced with other issues such as the importance of having visitors to resident wellbeing; there were difficult trade-offs in managing transmission risk within homes. The Easter 6 (later named the 'London Care Homes Network'), meanwhile, used detailed genomic testing and contact tracing analysis to understand transmission networks in care homes. These bespoke studies have provided rapid and high-quality evidence on a range of topics including vaccine efficacy, the emergence of variants, and their

comparative outcomes, and the high prevalence of antibodies to SARS-CoV-2 in both residents and, to a lesser extent, staff early in the pandemic. Beyond the Vivaldi and 'Easter 6' networks, much of the evidence on the impacts of interventions on care home residents, positive and negative, has been indirect. Evidence drawn from modelling studies and existing studies of community or hospital populations of older adults highlighted the vulnerability of older people to physical deconditioning and the impact of ageing on vulnerability to other infections. To interpret study outputs and provide science advice informing social care policy decisions, the SCWG complemented work conducted by the Scientific Pandemic Influenza Group on Modelling Operations (SPI-M-O) to understand the impact of SARS-CoV-2 on vulnerable populations and settings such as care homes. Modelling approaches were used to understand the key determinants of ingress and transmission of SARS-CoV-2 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 SARS-CoV-2 and to reduce hospital admissions and avoidable mortality due to Covid-19. There remain, however, important gaps in the evidence. Always a challenging setting for research, infection control policies have made care homes even less accessible during this pandemic. Evidence on best practice to address social isolation and loneliness in care homes is still emerging and not yet synthesised or well understood, while there remains a striking lack of directly gathered evidence from residents on their perceptions and preferences. Importantly, understanding of the wider impacts of NPIs needs further development. Their impact in care homes for older people is likely to be different from the general population due to the high prevalence of cognitive impairment, some degree of deafness, and physical frailty. There are not yet high-quality studies which allow comprehensive quantification of the balance of benefits and harms of different NPIs in a care home setting.

623. It became evident that there were three different pandemics within communities, within hospitals and within care homes, though there was a relationship between these. Ingress to closed settings such as hospitals or care homes was most likely to occur when community transmission was high and there developed a strong evidence base that inadvertent transmission from people who entered care homes

as staff or transiently were the most important vector for ingress. It therefore became strategically more important to control community transmission to as low a level as possible – a critical consideration – and to try to optimise protective measures, such as staff and visitor testing, visiting restrictions and enhanced infection control in order to prevent this. This was, however, complex in its enactment as by doing so in what was people's homely setting was an onerous undertaking for them.

624. Others who were involved in these discussions would be best placed to comment on this question; however, I note that in the guidance published 13th March 2020 it states that prior to people being admitted to a care home (whether from hospital or the community), clinical screening should be undertaken of patients alongside a risk assessment to ensure sufficient resources including appropriate isolation facilities were available within the care home to support social distancing and isolation. The guidance recommended all admissions to be isolated for seven days and if known to have contact with Covid-19 patients for 14 days. Both clinical decisions around discharge and risk assessments were undertaken locally by health and social care professionals, and paid particular attention to the needs and rights of the patients.

625. On 21 April 2020, as part of her statement to parliament, the Health Secretary announced that all admissions to care homes from hospital should have a negative test for Covid-19 prior to admission to the home, regardless of symptoms unless it is in the clinical interests of the patient to be moved, and then only after a full risk assessment. Where a patient tested positive for Covid-19, two negative tests were required. This policy was reflected in both Scottish Government and HPS guidance for care homes.

626. As the national response to the pandemic changed in response to emerging findings and scientific advice, it became clear that the safeguarding measures introduced to protect care homes residents, including recently transferred patients, were not as effective as anticipated, and rates of infection and fatalities continued to rise. In the early stages of the pandemic, test and protect measures were not established across the UK, and science at that stage also advised that only

symptomatic patients could transmit the virus, all of which contributed to the increased infections.

627. On 28 October Public Health Scotland published its report: Discharges from NHS Scotland Hospitals to Care Homes between 1 March and 31 May 2020 (revised publication 21 April 2021) [GS2/112 - INQ000343839]. The report looked specifically at whether there was a link between hospital discharges and Covid-19 outbreaks and concluded: "In conclusion…we do not find any statistically significant association between hospital discharge and the occurrence of a care home outbreak, but cannot rule out a small effect. Care home size is much more strongly associated with the risk of an outbreak than all other care home characteristics, including hospital discharge.

628. I was not involved in discussion that related to freeing up hospital beds by discharge of patients to care homes in the period before 21st April 2020 announcement. However, I would acknowledge to the inquiry that the international advice at the time indicated that in-hospital capacity was going to be incredibly important in any country's response, with the expectation that high numbers of Covid-19 patients would be admitted. Therefore moving fit for discharge patients out of areas destined to inevitably receive Covid-19 patients was crucial for both patient safety and to maximise available hospital capacity to avoid delays in treatment and risk of nosocomial infection. Significant work was undertaken at the beginning of the pandemic response to increase capacity in ICU and HDU, including the procurement of additional ventilators and equipment, through a short life working group. This work effectively doubled ICU capacity in real terms with further equipment held in reserve as further contingency. With a pre-Covid-19 baseline of 336 ICU ventilators, a total available stock of 809 ICU ventilators was achieved. An audit of the centrally held stockpile was undertaken in July 2021 following a review of the number of ICU ventilators being held in NHS Boards. At that point NHS Boards held ICU ventilators and medical equipment for at least treble ICU capacity. I do not believe that ICU capacity hampered the ability of NHS in Scotland to fight the pandemic, but recognise that this was down to extraordinary efforts and commitment of staff who worked in these units and who experienced a

volume and intensity of workload that sits beyond the imagination of most people. Their contribution was remarkable."

Borders

629. Following the move in Scotland and the rest of the UK to provide a route map to gradually relaxing some of the original lockdown restrictions, and the fall in the infection rate in Scotland and the UK overall, an assessment was made of the risks from Covid-19 posed by travellers arriving into (or back into) any part of the UK. Port health was, and is, devolved to Scotland. Immigration and customs control was, and is, reserved and enforced by Border Force.

630. As infection levels continued to fall in the UK, it was considered essential by the Prime Minister and Home Secretary, on the basis of scientific advice, to introduce controls to reduce the risk of importation from people travelling internationally and arriving into the UK.

631. As at 20 April 2020, 93% of countries around the world had in place border restrictions in response to Covid-19. These restrictions included the suspension of flights, border restrictions (total or partial) and destination-specific travel restrictions. In particular, Australia, Canada, Singapore, South Korea, Italy and France all had in place 14 day self-isolation requirements for travellers arriving into those countries.

632. The Chief Medical Officers' (CMOs) joint statement provided as part of the UK Government's rationale for these measures was aimed at population level outcomes around the control of the pandemic. The Scottish Government's view was that the fundamental purpose associated with border control and quarantine was the prevention of harm to individuals. The rationale was that the first duty of the state was, and is, to protect its domestic population, in this case from a virus that caused harm and death.

633. I contributed to the CMO's joint statement and the submission to the First Minister [GS2/113 – INQ000326405] and the Scottish Cabinet regarding UK Government proposals for possible checks at the border [GS2/114 – INQ000326406].

634. A key tenet of the approach was that effectively importing more virus must lead to more transmission and harm, including deaths of individuals in Scotland. Rates could theoretically fall if you were importing at lower levels of infectivity than we had nationally, but the absolute cost in harms and deaths would still rise. Similarly, the rate at which individuals might then (initially) be seeking to access healthcare might not change much as a result of importation but the absolute numbers would. This was material, because key parts of that resource were finite, scarce and under huge pressure.

635. If we were to have allowed the unrestricted movement of individuals into Scotland from abroad, including from countries where the incidence of the virus was higher than in the UK, then the risk of new transmission chains of the virus entering the country would have increased, thereby putting the relatively fragile position with "R" in Scotland at risk of increasing.

636. At the point of introduction of the international measures, there was careful consideration of the most appropriate and timely steps that could be taken in Scotland to adjust the current lockdown restrictions to allow some sectors or activities to restart, whilst ensuring that the individual and cumulative effect of any such changes did not have too significant an impact on the overall "R" value. Introducing additional risks to the "R" value from anyone newly entering Scotland from abroad had the potential to introduce new transmission chains of the virus and potentially could have prevented the taking forward of some of the relaxation of domestic measures.

637. At all stages, the domestic and international measures were balanced against each other. The CSA's evidence (on 5 May 2020) to the UK Health and Social Care Committee highlighted that the UK had a large influx of cases in March 2020, that could clearly be seen to have come from Europe based on genomic analysis, shortly before airline traffic then decreased by 99%.

638. This received significant media attention as it took place at a time when international travel was "normal." In March 2020, the UK experienced major influxes of the European version of coronavirus , specifically from Italy and Spain.

639. The evidence of spikes/higher transmission rates into the UK when travel was at higher levels supports the rationale that people could travel from abroad and bring further cases to the UK beyond the levels that we were currently experiencing., Obviously that would create an increased health risk to our population, health service capacity and ability to respond effectively, with consequential impacts on economic activity and wellbeing.

640. The Scottish Government concluded it was necessary to proceed on a precautionary basis. This approach would seek to reduce harm at an individual level, by taking steps to reduce a cause of risk that would otherwise result in more individuals in Scotland contracting Covid-19. The success of this approach at individual level was then expected to result in a lower overall incidence of the virus in Scotland than would otherwise have been the case without these measures, and would therefore have a beneficial impact at overall population level.

641. It was agreed to implement the measures across the Four Nations. A combination of lower infection rates in Scotland at that time and the potential for higher numbers of international travellers in the coming weeks, meant that the Scottish Government considered border measures to be needed in June 2020. Also it is worth noting that, practically, the measures could only be implemented on a Four Nations basis. Whilst the legislative underpinning was devolved public health powers, they required a shared approach with Border Force given the fact that immigration is a reserved matter and Border Force, which controls entry into the UK, is part of the UK Government Thus, differing approaches were taken as to which countries were on the relevant restriction lists with Border Force enforcing the applicable rules at entry points into the UK.

642. From the point of introduction of the measures, a number of issues arose around the Common Travel Area (CTA). The UK Government had proposed that travel

within the CTA should be exempt from the requirement to provide contact/locator details and to self-isolate. This exemption reflected the challenges in relation to the land border on the island of Ireland. During initial discussions Scottish Government flagged a concern that this exemption would therefore apply to individuals transiting through Dublin and then on to a location in Scotland, Northern Ireland, Wales or England. The CTA was an issue throughout the duration of the international travel measures given how easy it was to travel around within it without checks, for example, travellers could travel from Dublin, Belfast or Cardiff without border checks.

643. While the UK Government initially indicated that they were content with such a position, the Home Secretary wrote to the First Minister on 1 June 2020, proposing a new approach whereby any traveller arriving in England from Ireland, the Channel Islands or the Isle of Man would be required to self-isolate in England if they had entered these jurisdictions, on a journey starting outside the CTA, within the previous 14 days. The period of self-isolation in England would be whatever was required to take them to 14 days from the time of their arrival in the CTA, including any time spent in other parts of the UK. The UK Government also proposed that individuals entering from the CTA would be required to provide locator details if they were subject to self-isolation.

644. The UK Government sought a common approach across all four nations to travel from other parts of the CTA and asked the Scottish Government to make similar provisions in Scottish regulations.

645. Whilst it was difficult to see how such a proposal could be enforced, given the lack of border controls within parts of the CTA and having discussed the issue with UK Government officials, they accepted that the focus would be on self-enforcement. Colleagues in Northern Ireland were concerned about any enforcement regime. Despite concerns regarding enforcement the Scottish Government supported this approach and aligned.

646. On 8 July 2020 Cabinet discussed Border Health Checks. At that point, blanket restrictions were in place (with only a few exceptions) requiring 14-day quarantine

on return from all countries outside the Common Travel Area (the UK, the Republic of Ireland, the Isle of Man, and the Channel Islands). The UK Government had however, announced that with effect from 10 July 2020, it would exempt travellers from specified countries from the requirement to self-isolate, and it had published a list of those countries (which it had rated 'green' and 'amber'). In light of this, the First Minister had requested further analysis, based on the latest data provided by UK Government from the Joint Biosecurity Centre (JBC) and PHE, in order to identify those countries with a point prevalence significantly above Scotland on which to base a judgement about exemptions for travel to Scotland.

647. The First Minister's preferred option, subject to Cabinet's views, was to exempt all the countries on the UK Government's list with effect from 10 July (both 'green' and 'amber'), with the exception of Spain and Serbia. This appeared to be the most proportionate option, albeit one which would raise a number of diplomatic issues and which had the potential to generate some opposition within the travel industry. Cabinet subsequently agreed to this and to three weekly review points.

648. In terms of the scientific advice at the time, within the same cabinet papers I provided advice that "a representative of the World Health Organization (WHO) had made an equivocal statement regarding the possibility of airborne transmission of the SARS-CoV-2 virus, although further, urgent research was required before a definitive position could be reached. The WHO's position remained that the virus was spread by droplet transmission, but an WHO official had now acknowledged some evidence to suggest that airborne transmission could not be ruled out in crowded, enclosed or poorly ventilated spaces." [GS2/115– INQ000214409]

649. Travel restrictions then continued to be considered during the summer of 2020. For example, on 29 July the then Cabinet Secretary for Health advised Cabinet that "the latest data from the UK Government JBC had flagged an increased risk of Covid-19 being imported by people travelling to Scotland from Luxembourg, and it would therefore be consistent with the clinical advice to remove Luxembourg from the list of destinations exempted from quarantine requirements. It was noted in discussion that efforts should be made to implement this change simultaneously

across all four UK nations but that, if this could not be achieved, it would be appropriate for the Scottish Government to proceed on its own account that day."

650. Four nations decision-making about the response to Covid-19 always considered the impact of Covid-19 restrictions for people living and working across internal UK borders. I recognised that the necessity of some movement across the land border with England might make communicating the message to the Scottish public more challenging where a different approach to NPIs was being taken in Scotland, than it was in other UK nations.

651. Broadly, the 4 Nations aligned on travel measures. This was for the following reasons:

- Divergence of approach may have had the consequence of Scotland being perceived internationally as a less attractive destination than England. On certain issues, in particular any difference in which countries were exempt and on access to private sector testing later in the period, this was perceived by the tourism and aviation industries in particular as placing Scotland at a competitive disadvantage, making long term recovery from the economic impacts of Covid-19 more challenging. Whilst decisions were required to be made on public health grounds, economic harms were taken into consideration as part of a balanced policy decision in line with the Four Harms process previously described.
- Foreign, Commonwealth and Development Office (FCDO) advice to travellers was a key driver of behaviour as this could impact on the validity of travel insurance. It is important to note that FCDO travel advice focused on the risk to an individual of travelling to a specified country, whereas the border health measures focused on the risk to the community of an individual who had been overseas returning to Scotland. This therefore meant that sometimes those two processes resulted in different risk assessments as regards a specific country.
- UK Border Force staff played a crucial role in the enforcement of the measures at ports of entry into Scotland. While they had to apply the measures adopted by the Scottish Government, operational decisions

about levels of checking, which could impact on the effectiveness of the measures, were a matter for Border Force as they were required to enforce the measures.

652. It is my view that closing the borders in January to March 2020 is unlikely to have prevented incursion of the virus unless it was a complete closure, or combined with a comprehensive policy of quarantine for every entry to the UK. Given the UK's reliance on importation of essential goods, materials and business travel, such a move may have ultimately had a significant public health impact with only marginal gain in delaying what was largely an inevitable occurrence. .

Decision-making between the Scottish Government and (a) the UK Government and (b) the other devolved administrations in Wales and Northern Ireland

653. Many aspects of health policy and delivery are devolved matters and so the responsibility of the Scottish Government rather than the UK Government. There was, however, a well-established ecosystem of formal and informal arrangements for liaison and, if the governments agreed, joint action.

654. The four nations CMOs (and DCMOs from around April 2020) met to consider their advice to the health and social care sectors across the UK and government agencies in all parts of the UK involved in responding to this outbreak. This group met regularly throughout the pandemic. Covid-19 specific four nation CMO meetings began at the end of January 2020 and continued thereafter. Frequency varied. In some weeks UK CMOs met multiple times and each meeting also varied in topic; often UK CMOs met to give a brief update of the situation in each nation. A chronology of the four nations' CMO meetings has been provided to the Inquiry by DHSC:

655. Overall I would say there was effective collaboration, coordination and communication between the UK Government and the devolved administrations in all aspects of the response to the pandemic. It is important when considering differing approaches between the nations to recognise that this divergence was from each other, and not from a single nation whose approach was considered

"orthodox" or a benchmark. For significant periods of the pandemic, all four nations took different decisions and applied different levels of restrictions within their territories to reflect the state of the pandemic in different areas, characteristics of their population and prevailing national risk appetite.

656. For more details on decision-making between the Scottish Government, the UK Government and other devolved administrations please refer to the Module 2-2A - Corporate Statement - DG Strategy and External Affairs (M2A Scottish Government 01) - Final Statement submitted to UKI (revised) dated 22 June 2023 [GS2/116 – INQ000215495].

657. In my view, inter-governmental clinical professional structures worked very well and these, allied to the approach of individuals holding senior clinical roles, encouraged and facilitated collaborative approaches to information sharing, scientific analysis, problem solving and provision of consensus advice. Others will be better placed to comment specifically on areas of inter-governmental relations where they were more closely involved.

658. In any future pandemic, whilst emergency committees such as COBRA and SAGE are very useful in the immediate response; in any prolonged response there is, in my view, a need to move to an agreed alternative forum for decision making and advice fairly quickly. This was largely the case during this pandemic response, but in doing so in the future, meticulous attention to true and proper co-operation will always be necessary given the devolved nature of some responsibilities such as health.

659. The scope and remit of my advice relates to Scotland. However, advice was based on what was considered best for Scotland having regard to the health status of the Scottish population and its characteristics. It is an older population with a higher rate of multimorbidity and underlying illness, and therefore a greater risk than other parts of the UK. The greater development of multimorbidity in the Scottish population generally occurs at a younger age and this is especially evident in areas that are economically disadvantaged. Where there was a divergence of approach to NPIs in Scotland compared with other UK nations, this was driven by the

differences in the Scottish population and other factors. Advice was given solely on what was genuinely considered to be appropriate for Scotland.

660. Where it was possible to achieve consistency with the other UK nations, that was desirable, but was not always possible. Sometimes other UK countries would make announcements at short notice which could impact on public health messaging in Scotland. Overall, there was excellent communication between the UK countries through clinical professional channels where sufficient notice of these decisions was proffered before they became public knowledge. The Module 2/2A corporate statement provided by DG Strategy and External Affairs on 23 June 2023 [GS2/116—INQ000215495] covers the topic of divergence in more detail.

661. Decision making about borders largely worked well, but there were occasions when risk appetites between the nations were set at different thresholds. Broadly speaking, Scotland appeared to have the lowest appetite for risk at a cross-government level when higher risk countries were identified through excellent data and analysis packs produced by JBC. This occasionally led to some disagreement about the timing and extent to which additional border controls were implemented for some countries. At this point, I would wish to commend JBC for the thorough and helpful international analysis that they produced when assessing these risks and for the manner in which they worked across the nations through the established technical and professional structures.

662. Representatives of the devolved administrations were not present at initial meetings of SAGE. My understanding was that the initial meetings had a very small list of attendees, however questions about the operation of SAGE, including decisions about attendees and how meetings are organised, are for the UK Government to answer (SAGE Secretariat sits in the Government Office for Science, known as GO-Science).

663. However, in my view this did not have an impact on the Scottish Government's understanding of and initial response to the emergence of the pandemic as information emanating from SAGE was shared between the CMOs and devolved administrations. Furthermore, a Scottish Official was present from SAGE meeting

1 on 22 January 2020 (and subsequent meetings); this was Dr Jim McMenamin (from HPS now PHS), Strategic Incident Director for Covid-19 and chair of the Covid-19 National Incident Management Team reporting to the CMO.

664. I had no personal interaction with any of the three UK Tsars appointed by the UG in April 2020 to tackle what it perceived to be major issues relevant to ensuring public health: vaccines (Kate Bingham), PPE (Paul Deighton) and track and trace systems (Dido Harding).

665. It is my view that sufficient consideration was given to inequalities during the 4 nations decision-making, and that this was regularly raised as a consideration and an area where further data and evidence was targeted for development.

666. There was four nations discussions and decision-making in respect of Covid-19 restrictions over the festive period in December 2020, but this was no different to any other period during the pandemic as explained previously.

667. During the course of the pandemic, the Scottish Government sought to learn lessons from decision making in other countries (utilising whatever trusted and verified information was available) and to improve its analysis of Covid-19 on an ongoing basis through both the epidemiology and the impacts of measures including NPIs.

668. Whilst it was evident that some decisions made by the UK Government were first informed at a later stage of planning or, on rare occasions, discovered through media stories, for the majority of the time there was communication of intentions in an appropriate way. Those who were decision-makers in Scottish Government will be able to comment on whether they felt appropriately involved in core decision-making. Information sharing and clinical decision making between professional structures in the four nations was, in my view, of a very high standard and collaborative in its approach.

Interrelation between the Scottish Government and local government

669. In my view there was very good communication between key Scottish Government decision-makers and LAs, in particular with relation to the reasons for, and the imposition of both national and local NPIs. When Scotland had its levels system in place there were regular discussions between individual LA leaders and Scottish Ministers. These generally had a Scottish Government senior clinician (usually a DCMO) attending in order to provide context and explain the clinical rationale for the decisions being made around levels and NPIs. The meetings allowed for sharing and discussion of the available data and trends with the LA leaders.

670. As part of the 5-tier Covid management system approach reports and indicators were produced to monitor the virus at LA level and to support decision making about the placement of each LA within the most appropriate level.

671. The implementation of the levels required the production of an indicator set to establish initial and subsequent levels for each local authority. On 29 October 2020 initial documentation was published as follows:

- An analytical paper setting out the levels approach;
- A slide pack explaining the five indicators used;

672. From then on, a weekly levels analysis report was produced and published to inform decisions about the level allocation of each LA [GS2/117 - INQ000326407].

673. From my perspective the arrangements between Scottish Government and LAs worked well and were constructive. There were, on occasions, challenging conversations as Scottish Government and individual LAs contemplated the consequences of rising cases and potential need for countermeasures but the structures and data were available to be able to have these with robust evidence to agree the best way forward. My role in these discussions was to ensure that the evidence was available, interpreted correctly and to provide advice on the range of outcomes likely to occur and what options for intervention could be taken. The granular detail produced by HSCA teams was especially helpful, as were the close

relationships with local Health Board Directors of Public Health and Health Protection Teams that added further information when these assessments and decisions were necessary.

Covid-19 public health communications

674. Whilst Government advice was consistent across the devolved nations at the outset of the pandemic (23 March 2020), advice over the subsequent months often varied by nation for various reasons including different epidemiological conditions and different approaches to non-pharmaceutical interventions. When policy interventions were available to all four nations, e.g. furlough scheme, shared messaging was possible. However, other policy interventions (e.g. restrictions, vaccination programme) were delivered differently in Scotland from other devolved nations. In these instances, Scotland-specific public health messaging was necessary to ensure that the general public had the most up-to-date information.

675. In the very helpful advice from C19AG on risk communication there was little additional information that was not derived from other communication experts and advisers. In this respect, it was confirmatory of an approach in how to convey risk and understand adherence, and so was helpful for providing that information. The inclusion of two behavioural science experts on the group was very important and frequently their advice was assimilated into information conveyed by me at briefings. Conveying altruism and collective action for societal benefit was considered much more effective an approach as the pandemic proceeded, rather than using sanction and fear.

676. Though the reproduction number (R) was an important marker of the pandemic, it was one of many measurements used by the Scottish Government in tracking the pandemic. In public engagement, it was helpful as there were simple explanations associated with growth or regression of the pandemic infectious wave that could be easily conveyed by setting a target of below 1.0 in order to achieve regression. Similarly, rising risk could be conveyed as R increased above 1.0, particularly at times when it was significantly above 1.0. The science is well established transmission dynamics with R being used to monitor outbreaks of infectious

disease. One drawback to this was that calculations of R were made using data and a supercomputer that, whilst created high confidence in its accuracy, resulted in R data which lagged the period from which it was derived by over 1 week.

677. It is my view that Scottish Government explained the territorial extent of their decisions adequately. My only concern in relation to territorial issues, was for the Scottish public when other UK nations made announcements that were conveyed in national media and had the potential for confusion and loss of adherence.

678. I was not aware of any restrictions placed on the publication of medical data and studies carried out by the individuals/bodies providing advice to key decision-makers within the Scottish Government. In my view the publication of modelling data was sufficiently timely and transparent to explain the Scottish Government's strategic decisions in response to the pandemic.

679. I do not recall any key public health communications that went against expert medical or scientific advice.

680. I do not understand the context of the view offered by PHS in relation to 'the use of different language to express policy intent led to challenges for PHS in the development of guidance' and don't recognise it as having proved to be a problem that was raised with me at any time but it may have been with Scottish Government policy teams.

681. Public health messaging from Scottish Government and the NHS in Scotland was consistent and clear in my view. Broadly, it also remained consistent with government advisers and NHS staff elsewhere in the UK. There were occasions when independent commentators offered an alternative view that could have led to confusion but I think, by and large, there was remarkable consistency from commentators to messaging from government.

682. Generally, communication duties were divided up cognizant of other duties and commitments; though they were shared principally between the NCD and myself, in broad terms I did more briefings with politicians being the principal independent

clinical adviser to government, and the NCD did more media interviews. It was important for clinicians to take part in these media briefings so that trusted public health advice could be conveyed to the general public and the media, so they could legitimately scrutinise the data and advice in as transparent a way as possible. However, I was not a government spokesperson and did not wish to be viewed as such. It was important for me to maintain my independent advisory role.

683. It is my view that the combination of daily briefings given by politicians and senior clinicians, alongside generous access to media interviews, proved very effective in maintaining public trust and effective communication. Indeed, polling conducted over the course of this response supported this view.

684. Disinformation was a continual issue over the course of the pandemic and was particularly difficult to deal with on social media platforms. Repetition of factual statements that countered this information, without being drawn into direct confrontation with the perpetrators, was the most effective way of dealing with this. This was experienced most often in relation to vaccination, and given the exceptional uptake rates this was successful in ensuring that protective programmes were not compromised. Where there was evidence of malicious campaigns or targeting that went beyond lone actors, these details were passed on to relevant authorities.

685. Where breaches of social restriction or lockdown occurred, there was, in my view, inevitably a legitimate public interest where this was intentional. It is important to separate these intentional acts from more human lapses in concentration, such as forgetting to replace a mask or straying too close to someone inadvertently. In reality, I do not believe that they had a profound impact on behaviours during the height of the pandemic as fear was a greater motivation to adhere to measures at that time. However, as this fear dissipated and public frustration became more evident in some groups, I do think that this had some (immeasurable) effect on both behaviour and public confidence.

686. I was not subject to any rules or guidance from Scottish Government on the way I behaved or views that I expressed beyond those of normal society and codes of

conduct. I was conscious at all times that there could, and should be, public scrutiny of my behaviours, but there was never any attempt to influence these by anyone in Scottish Government beyond what was normally expected of a senior civil servant.

687. On 10 February 2022, I apologised after retweeting a Twitter post from Health Secretary Humza Yousaf that accused Prime Minister Boris Johnson of lifting self-isolation rules in England to distract attention from the "Partygate scandal". Retweeting this Twitter post was a careless mistake that was contrary to guidance issued to Senior Civil Servants on impartiality, it was wrong to do so and I apologised for my mistaken action. I do not think it affected public confidence.

688. The most effective way of maintaining confidence and compliance with the Scottish regulations was to ensure that publicly visible people, such as myself or Scottish Ministers, were complying with them scrupulously and showing respect for them. Incidents elsewhere were beyond our direct influence but demonstrating this compliance from senior officials to the Scottish public was critical.

689. I was not directly involved in the assessment of any impact on public confidence of the resignation of Catherine Calderwood, though immediately after I took up the role of interim CMO it was clear that a period of regrouping and stabilisation of advice was necessary. This was achieved by more fully involving other senior clinicians such as the NCD and CNO, and recruiting two interim DCMOs.

690. I took part in discussions around incidents in relation to Margaret Ferrier with the First Minister at the time and it was assessed that these would be addressed in briefings with the media.

691. The vaccine programme in Scotland was a particular success and a high degree of planning and coordination was used to ensure this. Key to this success was maintaining public confidence and effective communication around the vaccines available, maintaining the momentum for speed of vaccination and protection that this conferred. This relied on multiple mediums of communication, via press briefings, technical briefings, interviews and social media usage. My first two

vaccinations were both with Astra Zeneca product and these were publicised widely. All the time, safety data was being monitored through close liaison with other UK nations and Medicines and Healthcare products Regulatory Agency (MHRA) to ensure that the balance of risk, and therefore model of consent, remained appropriate.

692. It is notable that in the WHO study published in Eurosurveillance, [GS2/118 – INQ000326408] "Estimated number of deaths directly averted in people 60 years and older as a result of Covid-19 vaccination in the WHO European Region, December 2020 to November 2021", it showed that almost 28,000 deaths were averted in Scotland in the over 60s age group in this period alone. This was assessed as the second most successful vaccination programme in the WHO Europe region in this paper with only Iceland achieving a greater percentage of expected deaths averted on a much smaller population.

693. The Strategy and Insight team in DG Corporate developed an evolving communications strategy that informed people about the required protective behaviours needed at each stage of the pandemic (particularly as restrictions changed over time). The communications strategy was shaped around a recognition that the general public in Scotland is highly motivated to act in the name of the collective best interests and provided ongoing support with wellbeing to build resilience and support positive mental health.

694. Further details regarding the public health communications strategy of the Scottish Government during the pandemic can be found in Module 2-2A - Corporate Statement - DG Corporate (M2A Scottish Government 01) - Final Statement submitted to UKI on 23 June 2023 by Lesley Fraser [GS2/119 – INQ000215474].

Public health and coronavirus legislation and regulations

695. Strategic decisions relating to the response to Covid-19 were made by Scottish Ministers. As CMO I was amongst the advisers who attended meetings where advice was discussed, agreed and submitted to Scottish Ministers. Officials from across the Health & Social Care Directorate (HSCD) provided a breadth of

Ministerial submissions and advice across a wide range of key areas. Similarly, I provided input to advice for Scottish Ministers that originated from other departments of Scottish Government. I had a very limited involvement in the strategy relating to legislation and regulations as this was predominantly the work of policy officials and Scottish Government Legal Directorate. In contributing to this advice, I provided evidence and professional clinical advice to officials alongside my personal opinion, but I was not the policy or strategy lead.

696. The Module 2A DG Strategy and External Affairs corporate statement submitted on 23 June 2023 (Statement No. 2)G[GS2/116 – INQ000215495] includes a summary description of legislative procedures in the Scottish Parliament, including for primary legislation (Bills that become Acts of the Scottish Parliament following Royal Assent), for secondary legislation (Scottish Statutory Instruments (SSIs) made by the Scottish Ministers), and for the Parliament to give legislative consent under the Sewel Convention to primary legislation by the UK Parliament relating to devolved matters or altering the competence of the Scottish Parliament or the Scottish Ministers. Most Covid-19 legislation in Scotland during the pandemic took the form of secondary legislation – regulations – subject to procedure in the Scottish Parliament. The Scottish Parliament also passed several Bills and gave legislative consent to the Coronavirus Act 2020 passed by the UK Parliament.

697. Due to the nature of the public health emergency and the need to make changes quickly, the regulations were made under the 'made affirmative' procedure. Typically, regulations were preceded by a ministerial and official Covid(O) meeting with the UK Government, as explained in Module 2A DG Strategy and External Affairs corporate statement submitted on 23 June 2023 [GS2/116 – INQ00215474]. The regulations were subject to a 28-day statutory review requiring Ministers to review the need for the requirements imposed by the regulations, which involved an assessment as to whether the requirements remained necessary and proportionate.

698. Prior to any such Scottish Ministerial decision, input to the advice to Ministers was sought from clinical, policy and legal interests in the Scottish Government. In

practice the regulations were amended regularly as required by the prevailing public health circumstances.

699. I do not recall giving specific advice in relation to whether guidance or regulations were used to secure compliance, but I was supportive of the use of regulations in this space as part of a package of measures, including provision of guidance, education and extensive communication, to secure as high adherence across society as possible. I do not recall giving specific advice regarding sanctions.

700. Outdoor spaces, grouping and activity were generally of a lower transmission risk than indoor equivalents, but were not wholly risk free. It was evident that transmission could still occur in outdoor settings, especially where large groups of people were in close proximity. Restrictions, and sanctions, generally reflected this and I recall no point when advice was not taken. 550, 551, 552 and 555.

701. With respect to the rationale behind the "FACTS" message promulgated by the Scottish Government; as stated in the FOI response you referenced, Clinical Advisers and Policy Officials provided the Scottish Government Marketing Unit with the five key behaviours that are important to follow to reduce the spread of coronavirus. This was based on advice from the WHO that a Government's ability to effectively communicate with the public during the pandemic was just as important as the public health measures.

702. This information was briefed to the agency that had the creative contract for the health portfolio and they were tasked with developing a mechanism to bring these behaviours together. A series of options were developed and tested for efficacy with the Scottish public by an independent research agency. The options considered at the time were as follows:

Acronyms:

- SAFER (Stay 2 metres apart, Avoid crowded placed, Face coverings, Extra cleaning of hands and surfaces, Remain at home if you have symptoms)
- FACTS (Face covering, Avoid Crowds, Clean hands, Two meter distance, Self-isolate)

Slogans:

- Remember Our Core Four (which excluded the self-isolation behaviour)
- Remember Our Five
- The Vital Five
- Follow the Five

The independent research agency recommended FACTS and this was submitted to and approved by Scottish Ministers for implementation [GS2/120-INQ000326363 and GS2/121- INQ000326409]

703. The C19AG's remit was to advise in particular on the scientific and technical aspects of the pandemic and more broadly, on the health impacts. Where those health impacts extended to the potential impacts on the population as a whole, or specific groups within the population, then the C19AG was able to draw on the relevant expertise within the group, from the Scottish Government and from other sources such as SAGE. The C19AG did not advise on economic issues. The C19AG needed to have a clear remit to make best use of the scientific and technical expertise available; involving the group in regulations would not have been a sensible or suitable use of their time and expertise.

704. I provided no specific medical or scientific advice in relation to proper parliamentary scrutiny in the maintenance of public confidence in the Scottish Government's pandemic management strategy.

705. I provided no specific medical or scientific advice in relation to how to explain clearly and effectively to the public the difference between non-legal guidance on restrictions on behaviour that did not carry criminal or civil sanctions and primary and secondary legislation with sanctions for an established breach.

706. I provided no specific medical or scientific advice about the enforcement of NPIs and the proposed penalties (including fixed penalty notices, level of fines and the availability of custodial sentences), with specific regard to the likelihood of these sanctions maximising compliance and maintaining public confidence.

707. I was not approached for medical or scientific advice about means of enforcement other than criminal penalties (e.g. guidance, civil penalties, etc.).

708. No specific medical or scientific advice underpinned these decisions. However, it was evident that people's behaviours already favoured "doing the right thing" and isolating if identified as a domestic case or a contact, using this approach; with a communication strategy based on this altruism, it was an approach I supported. The ability to move to impose a legal duty was held in reserve, but in relation to international travel, the majority of which was discretionary during this period and which held additional risk of introducing new variants, it was judged that a legal duty to isolate was more appropriate.

709. I provided no specific medical or scientific advice about the likely impact on at risk, vulnerable or people with protected characteristics. This advice is most likely to have emanated from clinical advisers who were providing advice to policy officials dealing with shielding and at risk groups.

710. The Module 2A DG Strategy and External Affairs corporate statement submitted on 23 June 2023 [GS2/116 – INQ000215495] provides details of any data analysis or behavioural modelling used to determine the proportionality and likely success of proposed sanctions, and the data or information relied upon to determine the actual penalties imposed. Other than being a recipient of data analysis and behavioural modelling, I had no involvement in this area.

711. It is my view that legislation and regulations were generally approached in a proportionate and appropriate manner in Scotland. Communication of these was at times difficult due to differences between the four nations. The effective enforcement of these regulations was at times challenging e.g. wearing of face coverings indoors in some locations within the hospitality and retails sectors. This was largely a result of people claiming exemptions to the regulation or non-adherence without challenge.

Key challenges and lessons learned

712. Details of my Scottish and UK parliamentary committee appearances can be found in the official records of attendance.

713. Key issues and junctures in the decision-making process relating to the management of the pandemic in Scotland are covered in this statement.

714. The key challenge was undoubtedly in the identification of high quality evidence on which to base advice and in which it was both available timely and with high confidence. This necessitated advice that was carefully framed to reflect the evidence base as it stood at that time, where expert consensus lay, and in what time period the degree of confidence was likely to improve. Often, particularly in the early stages of the pandemic, it necessitated decision makers having to make those decision on information about which there was uncertainty in order to take protective actions in a timescale where they might be useful. Here, the public health precautionary principle had to often be utilised.

715. The challenges of this period are summed up within the UK CMOs' Technical report [GS2/036 - INQ000130955] thus: Of course, there were particular windows for policy decisions and the evidence base did not always give a definitive answer to support one option or another at the time a decision had to be taken. In such cases, there was a need to use basic epidemiological principles and be open and clear about what the evidence base did and did not say, and with what level of certainty any conclusions could be reached. The evidence base evolved throughout the course of the pandemic, and so it was important to keep an open mind and consider all feasible possibilities. It was also important to bring together a range of disciplines and types of evidence to get a fuller, more certain and more nuanced picture.

716. The key lessons learned from my experience in this pandemic response, and which I would want to convey to future advisers who might find themselves in this position and to the inquiry, are set out in the UK CMOs' Technical report [GS2/036 - INQ000130955] on the pandemic and are contained at the end of each chapter.

I have curated the majority of them here in my response as I feel that they are important and should be available explicitly to the inquiry for consideration. They are many and broad across a range of responses and reflect particularly the complexity of considerations that decision makers are faced with when facing even a public health response to a pandemic alone. It is, in my view, inevitable that they will be required again and that vital infrastructure should be in place and maintained in order that a future response is optimal.

717. More on preparedness for a future pandemic can be found in interim recommendations from the Scottish Standing Committee on Pandemic Preparedness, chaired by Professor Andrew Morris and are not listed here.

718. The C19AG's remit was to advise in particular on the scientific and technical aspects of the pandemic and more broadly, on the health impacts at that time. The C19AG is now inactive and the last meeting was on 3 February 2022. The last event that group took part in was a deep-dive briefing with Ministers which took place on 9 March 2022. The record from this has been provided [GS2/122 - INQ000326410, GS2/122a – INQ000326411 and GS2/122b – INQ000326412]. Lessons learned work will be for CMOD, SCOPP and policy officials in Scottish Government to analyse and take forward. The C19AG needed to have a clear remit to make best use of the scientific and technical expertise available; involving the group in lessons learned would not have been a sensible or suitable use of their limited time and expertise.

719. Scientific and medical advice will often need to be formulated on the basis of limited data. Understanding the pathogen and the disease was a global effort, particularly at the outset, and sharing data and expertise from the beginning was key. Gaining a clear understanding of the pathogen and the disease required an array of cross-disciplinary studies to be initiated quickly. Building on and adapting existing research systems and networks was usually much faster than setting up new systems, but strong leadership, direction and coordination are required. Viral variants, population behaviours and population immunity changed significantly over time requiring continuation of studies.

720. This pandemic, in common with many others, reflected and in many cases exacerbated existing inequalities. Research on where the disparities were, what their causes were and how best to reduce them needed to begin from the outset of the pandemic. A wide range of qualitative and quantitative research methods were needed to understand disparities. Continual dialogue with local communities was important in understanding risks and vulnerabilities, and to co-design effective responses at a hyper-local level that may not be picked up in larger, national data sets or research.

721. Research will always be one of the most important parts of any response. The main reason that a research response was possible at scale was pre-existing strengths. Pre-planning before the pandemic where possible, and adapting existing structures rather than building new ones, allowed a much faster response than would have been possible otherwise. Rapid prioritisation and review was essential, along with a commitment to test clinical interventions rather than just deploy them. Several methods and processes came to the fore in this pandemic including: platform trials, preprints and open access very rapid review. Multidisciplinary research increased in importance and strong cross- disciplinary teams emerged. The testing of social interventions and policies was difficult. It is important to plan not only for stepping up pandemic-related research, but also reinstating other (non-pandemic) research as soon as possible.

722. Good data are essential for an effective pandemic response – otherwise decision-makers, service providers and researchers are flying blind. Data sharing and linkage is essential from the outset. Data curation and analysis required considerable resource. Surveillance studies, in particular the ONS CIS and REACT, were important to provide consistent, representative data on positivity in the community and in particular settings, and to include those who were asymptomatic. Analyses had to be continually adapted to understand the evolving epidemic. Data lags limited analyses. Transparency of data helped engage the public with public health interventions. Rapid collation of data, analysis and assessment of the situation required multidisciplinary working. Modelling is just one tool of many that can be used to understand the situation and be taken into account in decision-making.

723. A range of types of modelling and analysis may be needed in the future. Modelling is not forecasting. Epidemiological modelling is most useful for looking at 'what if…' questions in the form of scenarios. The SPI-M-O secretariat played a vital role in bridging the gap between expert modellers and policymakers. It is important, but not always easy, to be clear with decision-makers and the public about what contact tracing and self-isolation can and cannot achieve in different circumstances.

724. Pre-symptomatic and asymptomatic transmission, in the absence of routine mass asymptomatic testing, are a huge challenge for even a highly effective contact tracing system and place a premium on short turnaround times. The scientific and public health principles of contact tracing and self- isolation are well established, and most of the challenges in this pandemic were operational, and not directly within the remit of CMOs or UK GCSA. Large-scale contact tracing should wherever possible build on existing systems and expertise. Preparedness plans should include the need for large-scale digital platforms. The rapid design and execution of pilots and research studies was needed to support dynamic evaluation of contact tracing and to address evidence gaps. The health equity dimension to contact tracing is important but was not always fully addressed.

725. In the absence of pharmaceutical interventions, NPIs are the only option for pandemic control. NPIs have complex impacts and involved balancing multiple known, potential and unknown harms and benefits The effectiveness of NPIs depends largely on how far individuals are able and willing to adhere. Trust was important in public communications around NPIs so that people knew what to do and, as importantly, why. The risks of entrenching or exacerbating inequalities in the deployment of NPIs needs to be considered. NPIs in educational settings have the potential to have lasting effects on children's education, developmental and life chances. Educational settings should not be seen in isolation. NPIs in education can exacerbate problems of inequality and deprivation. The education and childcare sector and the educational estate should not be seen as a single block. The difficulties of real-world evaluation of NPIs in educational settings should be anticipated. Residents of care homes for older adults are very likely to be at high

risk of serious disease in any respiratory disease epidemic. NPIs that reduce personal contacts, particularly isolation from family and loved ones will have a considerable impact on residents' (and families') quality of life. The control of transmission in care homes also depended on alignment with wider public health, social care and healthcare systems.

726. 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. Advice from behavioural and social science was essential in informing good practice in the support and management of care staff and in protecting residents. Research and innovation to improve care homes' resilience to respiratory and other infections is needed and could inform, among other things, building regulation and best practice.

727. Speed of decision-making (in relation to vaccines and medicines research and procurement)) was crucial, particularly at the outset of the pandemic. An adequately powered trial with a faster result will prevent more deaths than an apparently perfect trial with later results. On the other hand, too many trials would have led to few or none reporting.

728. The pressure to 'just do something' was intense on individual clinicians especially early in the pandemic. Existing research infrastructure (such as NIHR and MRC) and relationships (such as NHS and the academic community) were built on rather than setting up new organisations wherever possible. CMOs and UK GCSA are not responsible for procurement, but the rapid procurement of potentially useful drugs and vaccines at risk was essential and cannot wait for the final published trial results in an emergency.

729. The model of the Vaccine Task Force, which integrated research and development, procurement and manufacturing, was important for rapid development and delivery of vaccines. Balancing early dissemination of initial results against proper peer review of final results was never satisfactorily resolved in this fast-moving emergency. Independent scientific and clinical advice was

especially important for decision-making in areas where risk and benefit were less clear cut, or where there was more scientific uncertainty. Vaccine uptake has proven to be the most important factor in reducing the impact of epidemic.

730. Improvements in care reflect the extraordinary efforts of medical, nursing and allied staff. The rapid flow of international experience was absolutely essential, whether through formal routes or through informal networks. Observational studies like Covid-19 Clinical Information Network (CO-CIN) and SIREN provided essential insights into severe and mild-moderate disease. Management of PPE and best infection control advice in healthcare settings was very difficult. Training of staff for redeployment was essential, and considering issues of indemnity and registration was central to having staff able to practise safely and legally.

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: 15 November 2023