Witness Name: Professor Ian Young

Statement No.: **M2C-IYO-001**

Exhibits: 46

Dated: 31 January 2024

UK COVID-19 INQUIRY

WITNESS STATEMENT OF PROFESSOR IAN YOUNG

I, Professor Ian Young, will say as follows: -

1. I, Professor Ian Young, Chief Scientific Advisor (CSA) to the Department of Health Northern Ireland ('the Department'), make this statement in response to the request from the UK Covid-19 Public Inquiry ("the Inquiry"), dated 10 August 2023 under Rule 9 of the Inquiry Rules 2006 (SI 2006/1838), requiring me to provide the Inquiry with a witness statement in respect of specified matters relating to Module 2c.

2. I have structured my statement to include the role, function and responsibilities of the Chief Scientific Advisor (CSA); my CSA Covid-19 specific role and remit; early understanding of Covid-19; an overview of my subsequent involvement in the Covid-19 response; my involvement in SAGE; the Chief Scientific Advisors' network and absence of an overall NI CSA; interactions with other UK bodies; the Strategic Intelligence Group; data and modelling; advice and decision-making in relation to Non-Pharmaceutical Intervention (NPIs); testing and care homes; health disparities; Executive Committee structure and decision-making; informal discussions and decision-making; healthcare workers; Covid-19 public health communications; the Republic of Ireland; particular Executive Committee decisions; learning during the pandemic.

The role, function and responsibilities of the Chief Scientific Advisor:

3. I was appointed to the post of Chief Scientific Advisor (CSA) to the Department in November 2015. The CSA role is part time, with the total commitment equating to three days per week, and I report within the Department to the Chief Medical Officer (CMO). The remainder of my time is split between Queen's University Belfast (as Professor of Medicine) and Belfast Health and Social Care Trust (as a Consultant Chemical Pathologist, and until September 2022 as Associate Medical Director and then Deputy Medical Director with responsibility for Research and Development). During the Covid -19 pandemic the CSA role became a full-time commitment from 23 March 2020 (following my return to work after a period of ill health) until early 2022. I was absent for a second period on health grounds from 15 February 2021 to 29 March 2021.

4. In my CSA role, I have specific and exclusive responsibility for research and development (R&D) in the Health and Social Care system in NI. In executing this responsibility, I work closely with staff in the Public Health Agency's Health and Social Care (HSC) Research and Development Division and HSC Trusts' Directors of Research. The current R&D strategy [Exhibit IY/1 - INQ000183439] sets out the Department's commitment to support research, researchers and the use of evidence from research to improve the quality of both health and social care and for better policy-making. It identifies high-level priorities and delivery mechanisms, which were developed in consultation with a wide range of stakeholders. The R&D Division funds research infrastructure and a range of research programmes, and works closely with other stakeholders and delivery bodies in NI, UK and Ireland to co-ordinate activities. This allows a flexible response in response to policy needs and questions as they arise. In addition, research objectives feature in a variety of other Departmental strategies (for example, the Cancer Strategy and the Mental Health Strategy amongst others), and there are separate strategies for some professional groups (for example, social workers and allied health professionals).In addition, I provide input and advice as required on a number of areas to policy colleagues in the Department, particularly in relation to genomics and rare diseases, and liaise with other Chief Professions Officers. I provide advice to the Chief Medical Officer (CMO), Permanent Secretary and Minister as required, and prepare responses to correspondence, including freedom of information requests, NI assembly questions, and other correspondence. I liaise with senior officials in

other NI Government Departments (particularly Agriculture and Economy) on relevant matters. I am also Head of Profession for the Healthcare Science Workforce (Chief Scientific Officer (CSO) role). There are no statutory duties in relation to the CSA role.

5. Of note, the responsibilities of Health CSA differ across the four countries of the UK, and I am the only one of the CSAs to have responsibility for Research (Director of Research and Development), Scientific Advice (CSA role) and the Healthcare Science workforce (CSO role).

6. On new matters of particular importance, I provide a briefing and seek Ministerial approval before proceeding, but the need to do this has been infrequent. I provide advice in relation to policy in development, working with policy colleagues in relation to areas for which they have lead responsibility. There has not been an occasion where I have felt it necessary on scientific grounds to challenge policy adopted or decisions taken by the Minister of Health. My CSA role is restricted to the Department of Health and liaising with other Departments as required – it is not a cross-government role. I do not believe it would be appropriate to offer unsolicited advice to Ministers in other Departments or to the NI Executive in relation to their policies or decisions and have not done so, apart from participation in discussions at NI Executive meetings as discussed below. A request for advice from Ministers in other Departments to inform their policies or decisions would normally be directed to the Minister. A response would be prepared within the Department and as CSA I would provide professional advice to inform Minister's response, as required.

7. My role, functions and responsibilities in a public health emergency are essentially as described above, but with a focus on the response needs of the emergency concerned. Essentially, this requires me to work closely with the CMO and other Departmental officials to provide scientific/medical/technical advice to the Health Minister, which also can form part of the Minister's advice to the NI Executive, to inform its decisions. How this evolved during the COVID pandemic is addressed in detail below. I would expect the CSA functions and responsibilities to vary depending on the type of public health emergency concerned.

8. In my CSA role I represent NI in a number of UK external advisory bodies related mainly but not exclusively to research, including the Office for Strategic

Coordination of Health Research (OSCHR), the UK Clinical Research Collaboration (UKCRC), Health Data Research UK (HDR UK), the Life Sciences Vision Delivery Board, the National Genomics Board, the UK Accreditation Service (UKAS) Advisory Committee and the UK Rare Diseases Framework Board. I meet regularly with the Health CSAs from England, Scotland and Wales, though these meeting were only formalised relatively recently. Prior to that I met regularly with the Health CSAs from Wales and Scotland. I have separate regular meetings with CSOs for Scotland and Wales in relation to the Healthcare Science Profession. In relation to this part of my job, I also represent NI at the Clinical Science Committee of the Royal College of Pathologists. As my CSA role is part time and I have other responsibilities, I am also a member of other advisory bodies in a personal capacity.

9. In addition to the UK bodies indicated above, I also represent NI on bodies with an all-Ireland role. The focus again is predominantly research, and these include the US-Ireland Steering Committee, the All-Island Palliative Care Network Board and the All-Island Cancer Consortium. I also meet regularly with senior leaders from the Health Research Board of Ireland (ROI).

10. Prior to the Covid-19 pandemic, I spent most of my time as CSA on Research and Development and the main resources available to me were staff in the Research and Development Division of the Public Health Agency (PHA), to which I am formally an advisor. Diary management for my entire CSA role was handled by a Personal Assistant in the PHA who also supported other staff. Within the Department of Health prior to the pandemic there was no dedicated CSA support (which remains the case at present), and support relied on me liaising with relevant policy colleagues personally. During Covid my diary management was switched to the Department, where I was effectively working full time, and this arrangement continues at present when I have resumed a part time role as CSA. A Deputy CSA was appointed from February 2021 until the end of the pandemic period, but is no longer in post.

My CSA Covid-19 specific role and remit:

11. My role as CSA during Covid-19 commenced following my return to work from a period of ill-health which lasted from 12/2/20 to 23/3/20. I have no record or recollection of being involved in specific discussions or meetings about Covid-19

before 12/2/20, although I was aware of and was following developments through the scientific literature and media. My remit in relation to the pandemic was not recorded or specified in writing at the outset but evolved during the pandemic as described in detail below. Throughout the pandemic I worked particularly closely with the CMO, providing scientific advice to him and agreeing joint advice to the Minister of Health and the NI Executive or other Ministers as required. However, in addition we each focussed on specific areas and meetings independently. I did not generally attend primarily medical meetings and the CMO generally did not attend primarily science-focussed meetings, although inevitably there was overlap between the two and many occasions where we both attended meetings (for example, the Strategic Intelligence Group, discussed below, and at various points during the pandemic the Modelling Group).

12. In providing scientific advice to the Minister of Health and the NI executive, I drew on a wide range of information and evidence. These included data on the progression of the pandemic in NI, discussions and papers from the UK Scientific Advisory Committee for Emergencies (SAGE) and its subgroups, and other elements of UK Covid-19 response infrastructure, discussions at the Department's NI Strategic Intelligence Group and Modelling Group, discussions with colleagues (including clinical colleagues) throughout the NI HSC system and the other nations of the UK / ROI, outputs from World Health Organization (WHO), the European Centre for Disease Prevention and Control (ECDC) and the US Federal Drugs Administration (FDA), reports from various Royal Colleges and other bodies (including "Independent SAGE") and the wider scientific literature.

13. The volume of information available about Covid-19 was immense, and inevitably only a small portion could be actively reviewed, so particular priority was given to local data flows and information from SAGE and its subgroups. Any meetings which I attended with clinical Royal Colleges' representatives occurred in the context of SAGE – meetings with senior clinician were generally attended by the CMO or deputy CMOs, or relevant Chief Professions Officers in the case of non-medical clinician groups.

14. Inevitably, as the pandemic progressed, evidence increased in volume and became more robust as the extent of uncertainty decreased. For example, evidence on the value of face coverings evolved and increased rapidly during the first year of the pandemic, and advice evolved in parallel to reflect the emerging

evidence. A similar pattern was observed in many other cases, some of which are referenced below.

15. Given the enormous volume of available evidence, my role, working with the CMO, was to provide key evidence and related advice to core decision makers, including the Minister of Health and NI Executive. This was done sometimes in the form of written advice and sometimes in the form of verbal updates or presentations. In general, advice was provided based on what I considered to be best evidence (taking into account the sources of data and information described above); at times a range of different options were provided based on the data and evidence available. However, throughout the epidemic the overall strategic intent (including the principal and overriding objectives driving advice) was to achieve a high degree of population immunity as quickly as possible with restrictions as limited as possible (to minimise harms), while avoiding the hospital system becoming overwhelmed, with vaccination playing an important role in this. At the same time, we recognized the significant impact that a new virus could have in a population with no previous immunity and the need to keep data about severity and long term impacts under review.

16. I sought to present scientific evidence in a way that was as understandable as possible, adjusting my communication style, approach and terminology for the audience to whom I was communicating. This involved providing less or more scientific detail for different audiences and using analogies when helpful. In general, senior policy colleagues and Ministers exhibited a sufficient scientific mind-set to understand the scientific and medical concepts which I sought to convey and asked appropriate questions. I did not generally seek to communicate mathematical concepts underpinning modelling or epidemiology as I did not think this was necessary or would be helpful, although I did seek to convey and explain the concept of uncertainty. The Minister of Health was an exception, in that he had a particular interest in and high level of understanding of mathematical concepts and data.

Early understanding of Covid-19:

17. From around December 2019 I was aware of emerging evidence of a new infectious agent in China, and from mid-January 2020 I was aware of the risk of human to human transmission of the virus, primarily from scientific and media

coverage. Emerging evidence of person-to-person spread of SARS-CoV-2 was highlighted in an update to the Minister from Department officials on 22nd January 2020 (the same day as WHO made an announcement about this) and this was indicated in a written statement to the NI Assembly by the Minister on 24th January 2020. It was around this time that I was aware of the potential gravity of the outbreak of Covid-19 in China, although the degree of uncertainty around this remained very high. I discussed the emerging information informally with colleagues in the Department but I have no recollection or record of any formal discussion or meetings prior to my absence on sick leave from 12th February 2020. At that stage the number of Covid-19 cases reported in Europe was in low double figures, and colleagues in the Department (e.g. CMO / deputy CMOs) would have been leading on the issue from an NI perspective and attending appropriate meetings (the first Covid-19 related death in Europe was reported, in France, on 15th February 2020, and the first case of Covid-19 was recorded in NI on 27th February 2020).

18. In terms of monitoring events in China and other nations first affected by Covid-19, there were no NI specific mechanisms. We were dependent on UK mechanisms and communication via the CMO group (which included the four UK CMOs and deputy CMOs) and other routes, and in addition through announcements and data from WHO and ECDC.

19. My involvement with the Covid-19 response began following my return from sick leave on 23rd March 2020, and I am not in a position to comment on decisions made before that time (such as changes in self-isolation time, Covid-19 testing policy, timing of schools closure or the decision to lockdown) or the evidence on which they were based. At this stage there had been less than 100 cases identified in NI and one death. However, it was clear from emerging data that there was potential for a severe disease outbreak with a very large number of deaths, based on pandemic modelling conducted for SAGE at a UK level. Early assumptions about the potential mortality rate were based on emerging data and experience with other Coronaviruses, and to an extent pandemic planning which had focussed on the potential for an influenza pandemic. While there was significant scientific uncertainty about the likely mortality rate, the urgency and risks of the situation seemed to be fully apparent to Ministers, based on media coverage and discussions with CMO and other senior officials.

20. A few days before my return to work I discussed with the CMO the key priorities which he wished me to initially pursue as CSA. I have no handwritten or informal notes in relation to these conversations. We agreed that establishing a NI Covid-19 modelling group and reviewing relevant scientific advice in relation to the situation in NI were key initial issues. While my return to work was meant to be phased, in practice it became full time from 23rd March 2020 and remained so throughout the pandemic. Seven day working was the norm, and often this extended from early morning to late evening in view of the extent of the demands and information to be reviewed and considered. My diary records are only available from 15th June 2020. I have been unable to establish an explanation for this, but the first meeting I attended to discuss the Covid situation is likely to have been on 23rd March 2020, though I spoke to the CMO during the week before by phone. I was not immediately involved in providing advice to Health Minister and NI Executive on my return to work due to my focus on establishing modelling capacity and ensuring my appropriate involvement with UK Covid-19 scientific advice structures.

21. At the point when I returned to work, UK wide modelling which had been conducted on behalf of SAGE and scaled down for the NI population suggested that there was potential for a very large number of deaths, and the Department had said on 19th March 2020 that in the case of an 80% infection rate the NI death toll could be in the region of 14 000 (Exhibit IY/2 - INQ00000). There had been close to 100 cases in NI and in addition over 500 cases reported in ROI. Given what was known about the virus even at that early stage, it seemed to me that the pandemic was well established on the island of Ireland and in Great Britain and that further spread was inevitable given freedom of travel. I believed that the pandemic was already beyond the point where it was likely that testing and isolation of cases would be sufficient to prevent serious consequences without other restrictions, given the likely modes of transmission, the absence of immunity and limited testing capacity.

22. The early stages of the pandemic were a period for which I was largely absent from work for the reasons outlined above. I am therefore not in a position to comment on what consideration was given by Ministers or senior officials to the strategic response to the pandemic before 23rd March 2020, and in particular the extent to which allowing widespread natural infection to proceed unabated to achieve "herd immunity" was considered. The move from "contain" to "delay" had been announced by UK Government on 12 March 2020, and I am not sufficiently

informed about the evidence base at this date to comment on the strategic appropriateness or timing of this shift.

23. However, from an early stage following my return to work it was clear that the pathway out of the pandemic would require a high degree of population immunity to be achieved, either as a consequence successful vaccination or natural infection followed by recovery, or else would require the development of successful treatments for virus infection which would minimise morbidity and mortality from infection. The available evidence at that stage also suggested that allowing the pandemic to proceed unabated would lead to substantial numbers of patients with severe illness which would overwhelm secondary care capacity within a short period and lead to a large number of deaths. In the absence of effective treatments or vaccination only non-pharmaceutical interventions (NPIs, discussed below) would avoid such a scenario and allow effective treatments to be identified or vaccines to be developed.

24. The strategy of "flattening the curve" to allow time to better understand of the severity of the pandemic, build capacity in health and social care, develop new treatments and vaccines seemed the most realistic option to me at that time. It was likely that infection was sufficiently established for containment to be no longer realistic; accordingly, there was potential for large numbers of deaths and an overwhelmed healthcare system in the short term if the pandemic was allowed to proceed unabated. In practice, this could only have been prevented at that stage by "lockdown", which was in my view effective in achieving its aims, though at significant long term costs. The need for lockdown might have been avoided by taking the "New Zealand" approach either for the island of Ireland or for the UK and Ireland together (discussed elsewhere), although this would have been a difficult policy decision politically and practically, would have been associated with considerable costs to the economy and family life and would have required the agreement of respective Governments. Without significant travel restrictions, I did not think at the time and do not think now that a test / trace / isolate strategy could have been effective without significantly greater testing capacity than existed.

25. At this early point there was widespread public concern about the risks associated with the pandemic, and relatively little concern about the consequences of NPIs. I was therefore of the view that in the initial phase the people of NI would accept and adhere to restrictions on their freedoms for what seemed likely to be a few weeks,

while recognising that for a small minority of the population restrictions were likely to be unacceptable. Behavioural fatigue is a well-recognised phenomenon, and became a significant factor as the pandemic progressed (discussed further below). However, at the outset of the response to the pandemic (at least after 22nd March 2020) there was no major concern about this for the reasons described above and the focus was very much on avoiding severe health outcomes during the initial wave of the pandemic.

26. Prior to my return to work in March 2020, there was no single individual deputizing for me or covering the full range of my responsibilities. Rather, a number of different individuals from the CMO Group provided cover. As discussed elsewhere, there was no NI cross-government CSA at the outset of or during the pandemic. From my perspective, the extent to which cross-government CSAs participated in the Covid-19 response differed across the four countries of the UK and the roles which they played seemed to differ. I do not believe that the absence of a cross-government CSA made any significant difference to the scientific response from the Department's perspective, either at the start of the pandemic or during its course. However, I believe that a cross-government CSA might have better co-ordinated the provision of scientific advice to other NI government Departments who lacked a Departmental CSA and might have co-ordinated a process to agree cross-Departmental scientific advice, better balancing a range of considerations and impacts.

An overview of my subsequent involvement in the Covid-19 response:

27. During the initial week after my return to work, I was largely focussed on establishing a Departmental Modelling Group (discussed below) and generating initial outputs from that work in addition to reviewing the current state of scientific knowledge about the virus. I attended my first SAGE meeting (discussed below) on March 29th 2020, and participated in a press conference on 1st April 2020 with the First Minister and Deputy First Minister during which I presented data on the need for NPIs (restrictions, as they became popularly known). My role in the Covid-19 response was essentially a full time one from then until the end of the pandemic, although I continued to do some hospital and university work (including clinical work) throughout. Inevitably, I attended a large number of formal and informal decision-making or advice generative committees and groups dealing with

the UK or NI government response to Covid-19; details of these are provided in the chronologies accompanying this statement. The main groups with which I was involved are described briefly below, along with my role in these groups. The vast majority of these groups focused on developing or informing advice or disseminating information, with decisions being made at Ministerial level.

28. I did not at any stage during the pandemic attend Cabinet Office Briefing Rooms (COBR) meetings, nor was I ever invited to attend. I understood that the CMO attended most if not all of the meetings he was invited to and conveyed all relevant information to me. There may have been some advantages to me attending, in terms of being aware of nuance of discussions, but I cannot be definitive about this without more insight into the nature of COBR meetings. I am confident that CMO would have informed me of any relevant matters discussed at the COBR meetings. However, I did frequently attended meetings of the NI Executive to support the Minister, almost always along with the CMO. At Executive meetings I generally gave a verbal update on the progression of the pandemic and any key scientific developments or modelling updates in support of the "R paper", a weekly paper prepared for the Executive on the epidemiology of the pandemic in NI, and where appropriate other papers submitted to the Executive by the Department. I responded to questions from Ministers and contributed to other Covid-19 related agenda items when invited to do so. Most of these meetings were held via Zoom, with some face-to-face meetings at stages of the pandemic when this was allowed.

29. In many cases, prior to Executive meetings, I attended a pre-brief with the First Minister, the Deputy First Minister and Junior Ministers, accompanying the Department's Minister, CMO and other senior officials from the Department and the Executive Office. Occasional meetings were held with other Ministers (in particular the Ministers for Justice and Communities) ahead of Executive meetings, and in addition there was a number of separate meetings with other Ministers when requested. In all of these my role was to provide an update on the general course of the pandemic and related scientific issues and to answer questions.

30. There were a number of meetings within the Department which I regularly attended. Many of these were informal ad-hoc meetings involving various senior officials to address specific issues. However, there were also more regular or structured meetings. These included the Covid-19 Modelling Group and Strategic Intelligence Group (SIG), both of which I chaired. In addition I participated as a

member of a number of other groups as noted in the chronologies accompanying this statement. I also participated in the Testing Group chaired by the Public Health Agency.

31. I participated in meetings with the CMO and Deputy CMOs from ROI during which information was shared about the progression of the pandemic in NI and ROI. In these meetings I generally gave a presentation on NI epidemiology and modelling when appropriate and took part in discussion. I had occasional meetings with other senior ROI officials in relation to modelling or research.

32. I was not involved in providing advice to the Minister of Health or the Northern Ireland Executive during the early months of the pandemic in relation to the discharge of hospital patients to care homes. I have no recollection or record of my advice being sought in relation to this issue, although I cannot discount the possibility that I may have been present at meetings where aspects of it were discussed (see para 73 below). In retrospect, I think it may have been appropriate to ask for my input in relation to scientific evidence pertaining to the discharge of hospital patients to care homes. However, without a detailed understanding of the totality of the evidence and practical considerations at the time I do not know if I would have provided any contrary advice.

My involvement in SAGE:

33. SAGE held its first Covid-19 meeting on 22nd January 2020 and I attended my first meeting on March 29th 2020. Early minutes of SAGE meetings do not necessarily record all of those who attended as observers. It is likely that an NI observer from the Department of Health was present at most meetings, but it is not possible to be certain about this. Outputs of SAGE meetings were sent to the CMO.

34. Following my return to work, I requested that I join SAGE as a full member. This was done by email to the SAGE secretariat during the week 23rd – 27th March 2020. It was agreed, and I attended my first meeting on 29th March 2020. Full participation in SAGE allowed a complete understanding of the range of views and weight of opinion expressed within scientific discussions, and also allowed the opportunity to ask questions of general relevance or specifically from a Northern Ireland perspective, and to express opinions. I think that full participation in SAGE meetings is of more value than just having observer status or access to minutes or

other outputs and that in future full representation of the devolved administrations, as soon as SAGE is stood up, should be essential if health issues are involved, since responsibility for health is a devolved matter. Given my absence, I can't comment on whether the limited initial SAGE participation impacted on the NI Government response, although if this was the case I suspect it would have been only to a very limited extent.

35. I continued to attend almost all SAGE meetings throughout the pandemic (apart from during one period of ill health, when the deputy CSA attended). The main benefit was receiving information and listening to the range of opinion expressed, although I also asked questions and participated both from a general scientific perspective, based on my areas of expertise, and from an NI specific perspective.

36. Information and advice from SAGE was considered along with other information and evidence, and informed advice provided by the CMO and by me to Ministers and the Executive. SAGE papers and minutes were shared directly with senior officials in the Department and other departments where relevant and were discussed at the Strategic Intelligence Group and Modelling Group. SAGE minutes were similarly shared, including with The Executive Office. In addition, I provided oral updates on SAGE advice in meetings with senior officials, the PHA and when attending Executive Meetings. SAGE advice and outputs were used to inform NI pandemic modelling (discussed in more detail below), and in particular SAGE consensus of the likely impact of individual NPIs or packages of NPIs on Rt (the reproduction number of the virus as a given time, t) were used to model how NPIs might affect the development of the pandemic in NI.

37. In general, I considered SAGE to be an effective forum for the provision of scientific advice during the pandemic. Discussions were wide ranging and often included a range of opinion; I did not have a sense that any opinions could not be expressed. The range of expertise present or which could be called on seemed appropriate to me, including behavioural and social science where appropriate, along with basic science, public health and relevant clinical specialties. I believe that SAGE members were aware of the full range of scientific opinion that was being expressed in the wider scientific community, ranging from those who considered the impact of the virus to be insignificant to those who believed that immediate and prolonged lockdown was required.

38. In the main SAGE restricted its discussions to the health impacts of the pandemic. Although there was some discussion of broader impacts of interventions (including educational and economic impacts), I think in retrospect that more focus on these might have been helpful in helping to understand the longer term impacts of both the pandemic and the response.

39. Discussions at SAGE were dominated by the position in England, though took account of the position in the devolved administrations. For example, there were generally attendees from and an update on the NHS England position, though not the position in the other countries of the UK. I think this was understandable to an extent given that the majority of the UK population is in England. Modelling for SAGE through SPI-M was done at the level of English regions, and on a whole country basis for Scotland, Wales, and NI, largely as a consequence of population size rather than any reluctance to do more detailed country specific modelling. In addition, the majority of SAGE participants were based in England and were most familiar with structures and the position in England.

40. Since the science of the pandemic was universally applicable, I do not think that this had any significant adverse impact. However, in my participation in SAGE, I was keen to emphasise that NI by virtue of geographical separation from GB was a separate epidemiological unit (as part of the island of Ireland). I believe this was understood by SAGE members, but the implications were generally left to NI officials and structures to determine and to interpret SAGE advice in this context.

41. Given my absence for the initial period of the pandemic, I can only comment in retrospect on the initial advice provided by SAGE and its application in NI. However, given the considerable uncertainties involved I think that in general the advice and its application were appropriate. The question of whether or not to pursue an all-Ireland response was largely a political matter, but I think that the scientific rationale for such an approach could have been stressed more at an early stage by SAGE.

The Chief Scientific Advisors' network and absence of an overall NI CSA:

42. There is a UK Government CSA network chaired by the UKG Chief Scientific Advisor. This includes Departmental CSAs from Whitehall Departments who work to support each other and to resolve cross departmental problems (Exhibit IY/3 -

INQ000353673). The network members provide advice to the Government Chief Scientific Adviser on all aspects of policy on science and technology. In particular, they provide advice to UK Government ministers, discuss and facilitate implementation of policy on science, technology, engineering and mathematics (STEM), identify and share good practice in STEM-related areas, including the use of scientific advice in policy making, and facilitate communication on particular high profile STEM-related issues and those posing new challenges for government. The cross-government CSAs for Scotland and Wales are members.

43. The NI Executive does not have a general CSA, meaning a CSA unattached to any specific government department or policy brief with overall responsibility for Government Science, although future recruitment to such a post is planned by the Executive Office. There are two Departmental CSAs in NI – one in the Department of Health (me) and one in the Department of Agriculture, Environment and Rural Affairs (DAERA). Each CSA has a specific policy brief and provides advice to their respective Ministers. The DAERA CSA and I are in regular communication on a range of issues.

44. The DAERA CSA and I agreed around 2016 that he would act as point of contact with the UK CSA Network, passing relevant papers to me. Requests that the DAERA CSA and I made, prior to the pandemic, that we should both be part of the UK Network were declined by the UK Government CSA on the basis that only one representative for each Devolved Administration was allowed. This was a matter for the UK Government CSA; I was disappointed that only one NI representative was allowed given the specific circumstances of NI (viz., that there was not a Government CSA, unlike in the countries of the UK), and it was not helpful in terms of connections to UKG Science. Our decision that the DAERA CSA should be the point of contact with the UK CSA network was on the basis that his role was a full time one whereas mine was part time, and in addition he was in post before me. Once the pandemic began, I was fully occupied in providing scientific advice in NI and considered SAGE to be the important UK scientific group in relation to health advice. The DAERA CSA continued to act as NI link to the UK CSA Network. I discussed this with him and did not believe there was likely to be any value in replacing him as link to this network, given my involvement with SAGE and other groups during the pandemic.

45. Northern Ireland is not large enough to have a CSA Network of its own. From my perspective, I believe I would have benefitted from participation in the UK government CSA Network, in particular since health is a devolved matter and there was no cross-cutting NI CSA. However, I am not aware of what (if anything) was provided by the CSA network which was distinct from advice and discussion at SAGE during the pandemic. The impact of not having a cross-government CSA did not change from my perspective as the pandemic progressed.

Interactions with other UK bodies:

46. In my capacity as CSA I have no direct contact with PHE or bilateral meetings during the pandemic and only met PHE representatives at SAGE and other meetings listed above. I received outputs from the JBC and attended four nation CMO/CSA meetings to discuss issues related to the JBC. However, I am not aware to what extent NI was consulted or involved in the decision to establish the JBC. JBC advice, particularly in relation to international travel, was important in informing decisions about restrictions on international travel and the broader international situation. NI representatives attended relevant JBC meetings. Similarly, I have subsequently engaged with the UK Health Security Agency (UKHSA) in a number of respects, including in relation to their science strategy, and receive relevant outputs from them. However, most UKHSA engagement occurs through relevant Department Policy leads and the PHA.

The Strategic Intelligence Group:

47. There was not initially any independent group of scientific experts in NI to consider SAGE papers and outputs, the outputs of SAGE subgroups and other scientific papers and reports from an NI perspective and to inform scientific and medical advice to the Minister of Health and the NI Executive. On or about 27 April 2020, I established the Strategic Intelligence Group (SIG) for this purpose and it met regularly and provided advice throughout the main phases of the pandemic. SIG included representation from the PHA, Queen's University Belfast, Ulster University and Cambridge University as well as the Department of Health, from a range of medical, scientific and other disciplines. Members were selected and approached by me after discussion with the CMO to cover relevant areas of scientific expertise. The terms of reference, membership and areas of scientific expertise are provided

in Exhibit IY/4 - INQ000183441. Dates of SIG meetings are provided in the accompanying chronologies. SIG met at varying intervals, depending on the state of the pandemic, the emergence of new evidence and the need for scientific advice.

48. The main role of SIG was to provide scientific advice to CMO and myself, to inform the advice which we provided to Ministers, the Executive and the broader system. SIG advice was not disseminated separately from this, and was not provided directly to the public. However, it did inform the public advice which was provided by CMO and me. SIG considered a wide range of evidence. This included many SAGE papers, but also reports and evidence from a variety of other sources. SIG members were invited to table papers or reports for discussion when they considered these to be relevant or informative. Potential advice to Ministers was in many cases discussed with SIG members to seek their views. In general SIG advice aligned closely with advice emanating from SAGE, but took account of the somewhat different progression of the pandemic at times in NI in contrast to the progression in GB, and also the unique cultural and geographical features of NI, and progression of the pandemic and policy decisions on the island of Ireland.

49. All meetings of SIG and relevant advice were minuted – sample minutes are provided at exhibit Exhibit IY/5 - INQ000353612. The membership of SIG was selected to provide a wide range of scientific expertise and representation from key sectors in NI. At an early stage SIG members were invited to suggest additional members who could bring complementary expertise to discussions. Members were expected to have general awareness and experience of the NI environment and culture along with relevant scientific expertise and knowledge. I believe that SIG provided the degree of expertise which was required to inform health advice, with no particular shortfalls.

50. I think that SIG functioned effectively during the pandemic and provided useful advice to myself and the CMO which in turn informed the advice which we gave to Ministers and the broader system. One of the main roles of SIG was to ensure that evidence was interpreted in the specific context of NI; in this respect it compensated for the fact that most SAGE advice was generated in the context of the situation in England / GB (as discussed above). It would be desirable to stand up SIG or a similar body at an earlier stage during any future pandemic or health emergency to serve a similar function. SIG was focussed on the health impacts of the pandemic; as I have indicated elsewhere, I think it would also be desirable to have a cross-

government scientific / technical advisory group which would seek to integrate health advice with other considerations (educational, economic etc).

51. Apart from SIG, the other main group which provided expert scientific advice specific to Northern Ireland was the modelling group (discussed in detail below). Medical advice to core decision makers was provided through the CMO who received information from a range of sources including the UK Senior Clinicians Group.

Data and modelling:

52. Northern Ireland did not have established capacity in pandemic modelling which could be immediately stood up at the outset of the pandemic. (I did not have any role in relation to pandemic preparedness, so cannot comment on why this was the case). In the initial stages of the pandemic, Northern Ireland relied on UK modelling which was presented to SAGE. I established an NI modelling group at the end of March 2020 at the request of the CMO when I returned to work, and this group played an important role in informing NI policy as the pandemic progressed. UK modelling (which included modelling of the pandemic in NI by UK modelling groups) was helpful, but generally lagged behind NI local modelling which used the most up-to- date data (as described in paragraph 61 below) to inform advice to the Minister of Health and NI Executive. In addition, it was important to be able to respond to requests from key decision makers for updated modelling in a flexible and rapid way at key stages of the pandemic, and this flexibility required local modelling capacity.

53. The need for local NI modelling was mainly driven by the need for flexibility and responsiveness rather than any fundamental differences in the NI population compared with the rest of the UK, although such differences do exist (for example, a much lower percentage of ethnic minorities than elsewhere in the UK). It would not be true to say that infection rates in Northern Ireland generally lagged behind those in England, though that was the case at times. It would be more correct to say that the pandemic proceeded somewhat differently in NI, sometimes ahead and sometimes behind progression elsewhere in GB, and that timely and flexibly NI specific modelling was therefore important in guiding advice to core decision makers.

54. Terms of reference for the modelling group are provided at exhibit Exhibit IY/6 - INQ000353613 . These initially included consideration of modelling on an all-Island basis. However, after discussion this was not considered to be feasible due to differences in testing strategies and data collection / flows, and as an alternative we discussed modelling and modelling outputs at the regular joint meetings led by the CMOs for NI and ROI. Almost all systems, guidelines and processes around testing and data collection differed at various times between NI and ROI, along with policy decisions as discussed elsewhere. For example, deaths reporting was significantly delayed in ROI when compared with NI and arrangements for testing varied across both jurisdictions. Without alignment of both policy and data collection I do not believe that modelling on an all-Island basis would have been helpful or meaningful. Indeed, this was also the case in the UK where policy and data collection differences meant that modelling was done separately for England, Scotland, Wales and NI.

55. Membership of the modelling group was drawn from the Department, PHA, Queen's University Belfast (QUB), Ulster University (UU), the Strategic Investment Board (SIB) and the HSC Trusts. Members are listed at Exhibit IY/6 - INQ000353613 and varied somewhat through the pandemic. Minutes of modelling group meetings were taken (example at Exhibit IY/7 - INQ000353614), along with a note of key advice / decisions taken. Modelling group outputs informed advice given by the CMO and me to Ministers, the Executive and the broader system.

56. The modelling group considered modelling from a range of sources, including various UK modelling groups (through SPI-M) and NI specific modelling done locally as well as results on the ongoing Office for National Statistics (ONS)-19 Covid survey. As the pandemic progressed, the core model which we utilised was initially an SIR model (Susceptible Infectious Recovered) developed by the SIB member of the modelling group, and quality assured by a QUB member (Exhibit IY/6 - INQ000353613). As the pandemic evolved, this became an SEIR model (Susceptible Exposed Infectious Recovered). There was no formal contractual arrangement between SIB and the Department in relation to modelling, but later in the pandemic SIB entered into a more formal arrangement with PHA and the Health and Social Care Board (HSCB) to provide modelling support to them. The modelling group mainly restricted its approach to NI wide modelling of short-medium term (up to six weeks) Covid-19 outcomes, particularly case numbers

(when testing was steady), hospital admissions, hospital occupancy, ICU occupancy and deaths. The available data was in general sufficiently robust for these purposes, and the expertise on the modelling group was appropriate given this remit. For clarity, I did not, and do not, consider that for the remit of this modelling there was other specific modelling expertise which would have been useful for the task, but was not available. However, there were limitations in data (discussed below) which meant that there were aspects of the pandemic which could not be modelled in real time (for example, impacts on subgroups of the population based on ethnicity or disability, or utilization of specific health and social care services). The modelling group did not look at long term consequences of policy decisions or NPIs, either on health outcomes or the economy. Inevitably such modelling would have been associated with substantial uncertainties; appropriate data was not available to allow this and modelling of economic consequences lay outside the remit of the group and the Department.

57. This was a similar approach to that used by the majority of academic UK modelling groups and modellers in ROI, and the outputs did not differ substantially from the outputs produced by SPI-M modellers. The latter were used to sense check the NI modelling, but tended to lag somewhat in fast moving periods of the pandemic and were less flexible in terms of considering different scenarios. We also looked at different time points at a number of other models including an SEIR model developed by Ulster University (UU) and an agent-based model developed by Queen's University Belfast (QUB).

58. As the pandemic progressed, the modelling group agreed estimates of Rt on a weekly basis (separately for cases and hospital admissions) which informed and were included in advice to core decision makers. These estimates were given in the form of a range which took account of estimates from the various models available and members' understanding of the likely uncertainties involved and were published weekly by the Department (see sample attached as exhibit Exhibit IY/8 - INQ000353615). There were occasions when SAGE modelling groups did not produce an estimate of Rt for NI as they considered that case numbers were too low, but as a result of more current data flows the NI modelling group was generally able to do so.

59. In addition, the modelling group discussed and agreed assumptions to be used for modelling purposes and discussed the outputs prepared for modelled scenarios

which were subsequently considered by core decision makers and included in advice to the Minister and the Executive. Forward modelling was not conducted on a weekly basis, but in particular at times when it seemed likely that policy decisions in relation to restrictions (either an increase or decrease) would be considered. For example, during August – September 2020 the epidemiology of the pandemic was monitored, but forward modelling was not carried on until early October 2020 when it seemed that policy decisions would be required. Modelling was not restricted by technical limitations other that at times of extremely low virus transmission (such as early July 2020).

60. Assumptions used for modelling purposes, including estimated impact of NPIs, were largely the same as those used by SPI-M modelling groups and discussed at SAGE in relation to virus characteristics and the extent of and persistence of population immunity. Information about the demographics of the NI population was taken from the Northern Ireland Statistics and Research Agency (NISRA) estimates and data for the NI population. Estimates of Rt for various modelled scenarios were agreed by consensus of modelling group members taking into account real time estimates of Rt (based on case numbers or hospital admissions, depending on what was being modelled) and SAGE estimates of the impacts of various non-pharmaceutical interventions (NPIs).

61. Modellers received data updates on a daily basis throughout most of the pandemic, with occasional periods (holidays etc.) when data updates were less frequent. Data updates came from two sources – directly from the PHA and via the Information Analysis Division (IAD) in the Department, with data flows being refined as the pandemic progressed:-

    a. Hospital admissions and occupancy data came directly from the PHA and included an estimate of hospital occupancy as a result of community acquired infection and of nosocomial infection.
    b. Total testing numbers and positive test results, along with Intensive Care Unit (ICU) data and deaths, came via IAD on a daily basis.

Positive test results in primary care, community settings and hospital settings were not reported separately in data flows coming to the modelling group. This information was available at the level of individual units within the Health and Social Care system (for example, wards, hospitals, Trusts or care homes), but did not come to the

modelling group in a format wherein it was possible to identify the care location. Rather the modelling group focussed on NI wide modelling as described above. NISRA reported deaths on a weekly basis; I am not aware of any impediments to them producing data more frequently and I am sure that NISRA would be able to clarify this issue, if considered helpful.

62. Information about the transmission of Covid-19 in care homes, including deaths, was reported to and collated by the PHA and The Regulation and Quality Improvement Authority (RQIA). The PHA also investigated and advised on response measures in relation to individual outbreaks. Information about numbers of outbreaks in care homes and the extent of outbreaks formed part of PHA reporting to the Department and was discussed at meetings at which I was present. However, I did not ask for or receive any separate data in relation to care home transmission or outbreaks. My view at the time was that each care home constituted its own microenvironment, and that once infection was introduced into a care home, the extent to which it spread would be primarily related to a range of local factors such as the effectiveness of infection prevention control (IPC) measures in that care home and the number of residents and staff in the home. Given that each care home was its own small microenvironment, I did not think that separate modelling of the care home sector would be meaningful and I am not aware that any such modelling took place in NI or elsewhere. The risk of infection being introduced into a care home would relate to IPC measures and the extent of movement of staff, visitors and patients into an individual home, and the main determinant of the risk of infection in epidemiological terms would be the rate of transmission in the broader community. This was what we were modelling, and I did not think that modelling of the care home sector specifically would add anything useful. The modelling group did not raise any specific concerns about the level of knowledge available from the care home sector and I did not seek further data beyond that described above. The keys to protecting the care home sector were to reduce community transmission, effective IPC measures within the sector, and minimizing uncontrolled movements in and out of individual care homes. Testing played an increasingly important role as it became more available later in the pandemic, as did vaccination, with the care home sector being prioritised for both within available capacity. With the benefit of hindsight I think that more could have been done to protect the care home sector and this is covered in the UK CMOs Technical report.

63. Routine data flows did not facilitate the identification of trends in the transmission of Covid-19 within some specific groups within the community (such as those from different ethnic backgrounds or with disabilities) but did allow identification of trends within specific geographical areas (such as council areas or post codes). We were able to conduct more detailed analyses to look at impact and trends based on age, sex and socioeconomic deprivation. Analysis in relation to ethnicity and disabilities occurred at a UK level and learning from that was relevant to NI; no similar analysis was conducted in NI to my knowledge, although I would not expect the results of such an analysis to differ significantly from the UK more broadly. However, due to poor coding of ethnicity in health care records it was not possible to look at trends in those from different ethnic backgrounds and real time data on disability overall was lacking.

64. In general data flows were accurate and timely. I liaised well with PHA colleagues who were providing data and was not aware of any particular challenges, other than those noted below. I had no involvement in or particular awareness of the "Rapid, Focused External review of Public Health Agency" [Exhibit IY/9 - INQ000001196] (PHA Rapid Review) and cannot comment on issues which may have existed around deaths reporting. However, I was aware that case numbers were heavily dependent on testing strategies and behaviours and, particularly in the earlier stages of the pandemic (through wave 1), the number of cases was a very significant underestimate of reality due to limited test availability and the absence of widespread community testing. In addition, recording of hospital admission numbers with Covid-19 was dependent on coding, which occurred at a Trust level and was done manually. Consequently, there could be a delay of several days before all admissions on a given date were captured.

65. Outputs of modelling earlier in the pandemic included estimates of case numbers, hospital admissions, ICU numbers and deaths under a range of potential scenarios. As the pandemic progressed, the main focus became hospital admissions and numbers for future modelling scenarios. While there were demands from various sources for modellers to predict what would happen in the pandemic, we were always very clear in both written and verbal communication that modelling was not a prediction, but was mainly useful to indicate the range of possible outcomes in different scenarios. To assist in this, modelling was generally presented to include reasonable best case, reasonable worst case and a central case as the pandemic progressed. In practice, outcomes generally fell within the

wide range covered by future modelling over a four – six week period, and in this sense modelling scenarios proved useful over this time period.

66. Modelling had to take account of numerous uncertainties, ranging from uncertainties about virus characteristics (transmissibility, immune escape etc), immunity following vaccination or natural infection, individual and population behaviours (including adherence to NPIs) etc. Indeed almost every aspect of science and modelling during the pandemic was associated with a degree of uncertainty or was contested. As a scientist I am used to dealing with uncertainty and sought to convey the level of uncertainty at all times when providing advice or speaking to the public / media, but there was a strong desire for certainty from decision makers which at times created tension and frustration as a result of uncertainty in discussions and advice.

67. Modelling conducted by the Department Modelling Group was restricted to an NI level looking at immediate health outcomes (case numbers, hospital pressures and potential for deaths). Responsibility for individual Trust level modelling and surge modelling was taken by the HSCB and PHA, working with individual Trusts and with support from Strategic Investment Board staff. Individual Trust level modelling drew on Departmental modelling outputs but required detailed involvement of Trust staff, so I think that this division of responsibilities was appropriate. To do all of this modelling through the Departmental group it would have been necessary to involve too many people which would have been too cumbersome. Modelling did not address the economic impacts of the pandemic, or the steps taken to respond to those economic impacts; advice on these issues was provided through the Minister of Economy to the Executive and other Ministers. Advice in general terms on the range of non-Covid-19 related health outcomes, having regard to the steps taken to respond to the pandemic (for example in relation to mental health or cancer diagnoses), was provided in Department papers to the Executive, but the uncertainties and long term nature of those outcomes was too great to allow more than qualitative advice to be provided. Similarly, the impact of Covid-19 in relation to equality issues, such as the impact of the pandemic or the steps taken to respond to it, in relation to poverty or social mobility was highlighted in qualitative terms in advice to the Executive through Department papers but uncertainties were too great to allow quantitative modelling to be conducted.

Advice and decision-making in relation to NPIs:

68. NPIs (whether statutory in regulation or in guidance only) were a vital policy instrument through most of the pandemic, and were the key policy lever which could be implemented to reduce the immediate and short term impacts of the pandemic and to prevent the hospital system from being overwhelmed. This was a primary objective when NPIs were recommended in advice, with the broader objective of allowing time for the development of effective treatments and the development and roll-out of vaccination to achieve a high degree of population immunity. Advice on the relative effectiveness of different NPIs evolved during the pandemic, based on experience of their effectiveness when implemented earlier in the pandemic, and emerging evidence. At each time point advice on NPIs was based on the accumulated available evidence at that time, and I believe that advice at each time point was appropriate on that basis. Inevitably, different advice would have been given at various time points during the pandemic if the knowledge available now had been available from the beginning (for example, in relation to the use of face coverings and the importance of ventilation).

69. All NPIs were most effective when public adherence was highest, and concern about behavioural fatigue and economic impacts were important considerations. The former was addressed (along with enforcement) through the cross-government Adherence Group established by TEO and the latter was the focus of advice provided to Ministers by the Department for the Economy. These issues were considered by Ministers alongside health advice in reaching policy decisions.

70. There were several sources of evidence about the levels of public adherence to NPIs, including survey results and analysis of open source mobility data (via Google). NISRA launched a new Coronavirus (Covid-19) Opinion Survey on 20 April 2020 designed to measure how the Coronavirus (COVID-19) pandemic was affecting people's lives and behaviour in Northern Ireland. Approximately 22,000 people in Northern Ireland participated in the survey, providing data on a wide range of topics relating to the pandemic. The reports focused on behaviours including Hygiene Behaviour, Social Distancing, Face Coverings and Slowing the Spread of Coronavirus (COVID-19). The Department commissioned Queen's University Belfast to conduct a contact matrix survey and Ipsos Mori on behalf of the TEO also conducted surveys. Generally, adherence was reasonably good on the part of most of the public. However, it is doubtful if use of face coverings in indoor settings where social distancing could not be maintained was sufficiently

high to maximise impact on transmissions. In addition there was evidence of a failure to adhere to household restrictions and adherence was lower in some demographic groups (for example, younger men) (exhibit Exhibit IY/10 - INQ000353674).

71. During the pandemic, I noted that there was significant mixed messaging through media and social media about the effectiveness and appropriateness of NPIs, including widespread circulation of misinformation. In addition, there were well publicised episodes at a UK level where high profile individuals failed to adhere to public health advice, and at times during the pandemic mixed messaging from public figures and political representatives in NI. More consistent messaging and behaviours across all of these channels might have helped to increase adherence. There were also significant challenges with enforcement, responsibility for which lay outside the Department. Advice which we provided to the Executive discussed the importance of enforcement as well as adherence (exhibit Exhibit IY/11 - INQ000353616 & Exhibit IY/12 - INQ000353617), and the CMO and I wrote to the Chair of the TEO Adherence Group to express concern that enforcement was not as effective as it could have been (Exhibit IY/13 - INQ000353619).

72. Assessment of the effectiveness of NPIs was made at a whole population level, but we were aware of the likelihood that NPIs would have differential effects on specific groups of people within society in Northern Ireland, and that impacts would vary. For example, individuals in houses of multiple occupancy or large family groups in accommodation with a small number of rooms were likely to find adherence to NPIs more difficult, and it was likely that they would be less effective. Similarly, adherence to work from home messaging was much less likely to be possible for individuals in manual occupations than those in office based roles. CMO and myself recognised that economic impacts of lockdown would be much greater for already economically disadvantaged individuals and sought to ensure that financial support for such individuals and families would be maximised (exhibit Exhibit IY/14 - INQ000353620 & Exhibit IY/15 - INQ000353621). When considering NPIs, more generally, CMO and I took account of impact on specific groups of people to the best of our ability and to highlight this to Ministers.

Testing and Care Homes:

73. I did not have any role in providing advice to the Minister or the Northern Ireland Executive during the early months of the pandemic in relation to the discharge of hospital patients to care homes, as policy and advice on this issue came from elsewhere in the Department. I have no recollection of being involved in discussions about the testing of those entering care homes at this time. At some point I became aware that residents had been admitted into care homes without a recent negative test, subject to a period of quarantine; however, I have no record indicating exactly when this was although I am recorded as present at a meeting of the Expert Advisory Group on Testing (see below) on 14 April 2020 when a note of the meeting records "Now recommended that patients who previously tested positive are tested again before discharge from hospital / admission to care homes" (exhibit Exhibit IY/16 - INQ000353676). Hospital flows, including admission and discharge flows, were a matter of concern throughout the pandemic (as at other times of high pressure) but I am unaware of whether there was any unusual pressure to admit patients from hospitals into care homes.

74. An Expert Advisory Group on Testing was established by the Department at the request of the CMO and led from the PHA; it met for the first time on 28 March 2020. I attended some meetings of this group, usually for only part of the meeting due to other commitments. On 18 May 2020 [Exhibit IY/17 - INQ000103704], the Minister announced that Covid-19 testing would be made available to all Care Home residents and staff across Northern Ireland; this included Care Homes which did not and had not previously experienced a COVID-19 outbreak, and the decision was informed by advice from SAGE and SIG. The Minister said it was intended to complete the roll-out of testing to all residents in June 2020. On 28 July 2020 the Minister announced the next phase of testing in Care Homes [Exhibit IY/18 - INQ000103705]. This involved a rolling programme of regular testing, starting on 3 August 2020, for all residents and staff in homes which did not have a confirmed outbreak of the virus, with the aim of helping to keep those homes free of Covid-19. The roll out of routine testing meant that Care Home staff would be tested on a fortnightly basis and residents would be tested monthly. The Minister also referred to the start of the rolling programme in his statement to the NI Assembly on 28 July 2020 [Exhibit IY/19 - INQ000103706]. It is undoubtedly the case that limited testing capacity was a critical factor in the first few months of the pandemic, and led to the need for challenging and difficult decisions about how limited testing should be most effectively deployed. Every effort was made to maximise the availability of testing through development of a local testing network, but for me

one of the key lessons from this pandemic is the need to focus more on a rapid expansion of reliable testing capacity at the earliest point possible, in order to be able to identify all cases and fully support a contact tracing service.

75. I was not involved in providing advice on PPE supply; I was aware in a general sense that there were PPE shortages but was not aware of specifics around particular care settings.

Health disparities:

76. It was clear from very early in the pandemic (before I returned to work on 23 March 2020) that certain groups of people were particularly vulnerable to becoming severely ill or dying from Covid-19 as compared to the general population. These included older individuals compared with younger individuals and those defined as clinically extremely vulnerable. Evidence identifying these groups emerged at a national and international level, rather than specifically in NI, and this was discussed at SAGE and the UK CMOs group, and within NI at relevant meetings. As the pandemic progressed, evidence accumulated and additional groups and risk factors were identified (for example, there being increased risks for those with Down Syndrome, severe obesity and certain ethnic minorities). Throughout the pandemic public health advice and messaging focussed on high risk groups, in particular the elderly and clinically vulnerable and those caring for or coming in contact with them, who were prioritised for pharmaceutical treatments and vaccinations as they become available. Given the extent of population mixing, it would have been difficult to do more to protect these vulnerable groups other than providing additional support for them to self-isolate if they wished to do so. They were also dependent on the wider population adhering to public health guidance in public areas.

77. In terms of data and analysis during the pandemic, we looked in particular at age, gender, and social deprivation (based on postcode), and the position in care homes was reported and analysed by PHA and RQIA. I saw some of this information at times but did not receive regular detailed reports. Ethnic minorities form a much smaller proportion of the population than in many other regions of the UK, and ethnicity is not well coded in NI health care records. On this basis, analysis regarding ethnic minorities was not available, and data collection relating to co-existing morbidities and underlying health conditions was not also routinely

reported and so could not be analysed in real time. The implementation of the new NI electronic health care record and Departmental data strategy should help to address the richness of data collection in the future.

Healthcare workers:

78. Specific advice and guidelines were also provided for healthcare workers, who were in addition prioritised for vaccination when it was available, although this is not something I was involved in. Protection of healthcare workers was important, both in terms of their own health and their role in introducing infection to healthcare settings or transmission of infection within those settings. As the pandemic progressed, advice on testing healthcare workers was provided and I was involved in discussion on the optimal frequency of testing. Testing for healthcare workers was one of the priority areas set out by the Department in its first Interim Protocol for Testing, issued on 19 March 2020, before I returned to work. I was not involved in the provision of advice on supply of PPE or infection prevention and control, which came from elsewhere. Advice on protection of other essential workers came partly in the form of general public health guidance, but more specifically lay with other NI government departments and I did not have sight of the specifics of this.

Covid-19 Public Health Communications:

79. As the pandemic progressed, I was involved in numerous press conferences and briefings, on my own or with Ministers, the CMO or senior officials, for television, radio and print media. The main purpose of these interviews and briefings was to explain the progress of the pandemic in NI, to explain the evidence and science underpinning policy responses, to encourage adherence to public health advice, and to answer questions. It is difficult for me to judge the effectiveness of this messaging, but I believed at the time it was generally well received and that I communicated clearly and effectively.

80. In addition, I, mostly along with the CMO, reviewed and commented on other Departmental communications and press releases and also advertising campaigns being developed through TEO, and I wrote occasional articles for print media (exhibit Exhibit IY/20 - INQ000353622). The Department used multiple channels of communication, including social media, to transmit messaging.

81. Evidence available suggested that the public generally understood what public health measures were in place and the reasons for them, though that did not necessarily lead to individual adherence to those measures. I do not have sufficient expertise or evidence to comment on whether communication could have been more effective.

Executive structure and decision-making:

82. Throughout the majority of the pandemic I attended meetings of the NI Executive, almost always with the CMO. The majority of meetings were held virtually with a small number in person at certain phases of the pandemic when risk of virus transmission was lower. In general my role was to provide advice at the request of the Minister of Health and to speak to papers and updates submitted by the Department of Health. At most meetings I provided a verbal update on progression of the pandemic, including any significant scientific developments, and I frequently used PowerPoint slides to support this. I responded to questions from Ministers on my presentation and to points made in subsequent Covid-19 related discussions when asked to do so by Ministers. Occasionally I asked to speak in response to points made where I thought that clarification was required in terms of scientific evidence or understanding. I generally left Executive meetings following completion of Covid-19 related items unless specifically asked to stay.

83. I have had the opportunity to see some examples of minutes of Executive meetings as a result of disclosures to this Inquiry. With one or two exceptions I did not see Executive minutes during the pandemic, nor was I invited to approve or agree minutes to ensure that my verbal advice was accurately recorded. I have been struck by the fact that minutes are very brief and they do not in any way capture the detail, nuances or range of views expressed in discussion. I have also seen informal notes of some Executive meetings (via disclosures from the Inquiry), which are somewhat more extensive but also limited to what the note taker perceived as being key points. Therefore the verbal advice which I provided to Executive, the questions I was asked and the responses which I gave do not appear to have been recorded, unless there are records or notes which I have not so far seen. I have no personal notes or records of Executive meetings other than

most of the PowerPoint slides which I used when speaking (for an example, see exhibit Exhibit IY/21 - INQ000353623).

84. As discussed above, my role as CSA Health was to provide scientific advice to the Department and the Minister of Health. I had no previous experience of attending Executive meetings prior to the pandemic. In practice, I felt I was giving advice directly to the Executive but this was with the agreement of the Minister of Health. The advice I gave was scientific in nature and did not take account of what I perceived as political considerations in securing policy agreement by Ministers. My advice was focussed on health considerations, with occasional references to other areas (economy, education, communities etc). However, since those areas lay outside my domain and expertise, I understood that appropriate advice and papers would come via Ministers for the relevant Departments. The purpose of my advice was to inform discussions and decision making by Ministers. Whilst decision making was informed by my advice, it could not be led by it. Ministerial decision making needed to take account of a wide range of factors apart from health advice, including – economic advice, financial considerations, impact on education, family life, and societal and cultural considerations. Nonetheless, I recognise that scientific advice from a health perspective was a particularly important element in informing decision making.

85. Inevitably (and appropriately, in my opinion, in light of the considerations indicated above) decision making did not always align with scientific advice from a health perspective, especially in terms of the timing of decision making. Some specific examples of this are considered in more detail below. I cannot recall any specific examples of key decisions where my advice from a health perspective had not been sought, with the exception of the "eat out to help out" scheme in August 2020, which was largely a decision made at a UK level. Around that time the CMO and I expressed concern about the progression of the pandemic and advised that Ministers should reconsider their decision to reopen non-food serving pubs and bars in Northern Ireland on Monday, 10 August 2020 (see exhibit Exhibit IY/22 - INQ000353624). I cannot recall being asked for advice specifically on the "eat out to help out" scheme.

86. Department specific decisions (largely operational) were made at a departmental level by the relevant Minister. My understanding was that individual departments led on pandemic related issues falling under their respective domains, taking

relevant papers to the Executive where decisions were potentially significant, controversial or cross-cutting. Sometimes the Department was asked to provide advice to individual departments from a health perspective, and occasionally I contributed to this (for example, in relation to schools, which was a matter for the Department of Education). In general this worked reasonably well, though on occasions (for example in relation to the application of NPIs in schools, or advice for students returning to or from University) I felt that there was a lack of clarity in terms of who should be leading. Apart from such intra-departmental decisions, I am not aware of core-decision maker meetings which I would have expected to attend but was not party to.

87. The structure and makeup of Northern Ireland government has been outlined and considered elsewhere by the Inquiry. My role was to provide scientific advice to the Minister of Health, and as required and with his agreement to other Ministers. This was most frequently done to Ministers collectively at the Executive but on occasions I met with individual Ministers or small groups of Ministers. When meeting with small groups of Ministers, this was most commonly with more than one Minister from the same party or with the Minsters of Justice and Communities jointly (since they were sole Ministers from a particular party). The scientific advice I presented was the same, regardless of whom I was speaking to, and questions were answered in the same way.

88. At the Executive, it was clear that there were differences in approach and in the weight placed on scientific evidence and other priorities by different Ministers and, generally when there were multiple Ministers from a single party they adopted or supported the same position. I did not find this particularly difficult, and would imagine that a similar diversity of opinion might exist in a single party government faced with the same challenges. In some respects I saw it as positive, as it ensured that diverse views were expressed and considered. There were some occasions when pressure on me increased as a result of strong views expressed by a single Minister or block of Ministers, but I did not find this unduly oppressive and continued to present my best objective assessment of the available scientific evidence and epidemiology for Ministers' consideration. In general, I thought that Ministers exhibited good collective responsibility although there were occasions when this broke down and individual Ministers either in terms of behaviours or comments appeared to diverge from the collective Executive position or public health advice. Examples of this included DUP Ministers comments on the Covid-19

certification scheme around 18/11/21 and Sinn Fein Ministers attendance at a prominent funeral earlier in 2021. I do not think these examples were helpful in terms of encouraging population adherence to public health advice, but also note that some UK Government Ministers, senior officials and public figures also engaged in unhelpful comments or behaviours at times, which when visible in NI was also similarly unhelpful.

89. It seemed clear to me that individual Ministers had very different views at times on SARS-CoV-2 and the scientific understanding of it, the likely benefits of various types of NPI, the merits and justification of restrictions to individual freedom of choice and risks to family life. These were legitimate positions which were also articulated in the media and society as a whole. Given the diversity of individual views and political positions, I was impressed by the extent to which Ministers were able to rise above political differences and act independently of their political interests to make decisions in the public interest of all. There were clearly occasions when this was difficult or broke down and individual Ministers broke rank to express contrary views. In addition, there were occasions when reaching a consensus position took longer than I would have liked purely from the perspective of Covid-19, but overall I thought that collective decision making worked well in immensely difficult circumstances.

90. The cross-community vote procedure at the Executive was used only on a very small number of occasions during the pandemic, when consensus was most difficult to achieve. This procedure is an essential part of Northern Ireland political governance and so far as I could see was used as intended. From my perspective, it was unfortunate that the procedure was needed in this context but it was used appropriately and provided space and impetus to allow Ministers to find a consensus position.

91. Overall, I thought that the Executive Office structure was reasonably effective in enabling key decisions to be taken speedily, taking account of the most up-to-date medical and scientific advice. However, as a result of the nature of the Executive there were occasions when larger party groupings took opposed positions and this led to a delay in making key decisions as a result of the need to find a shared position among core decision makers. Some of these occasions are discussed in more detail below. I think this was less to do with understanding of scientific and medical evidence, and more to do with differing emphasis placed on the broader

range of issues which Ministers had to consider in coming to policy decisions. However, there were occasions when the scientific evidence was challenged by some Ministers and on these occasions I expanded on the reasons for the advice which was being given.

92. On occasions officials were uncertain about the details of decisions which had been agreed, and this led to a need for post-Executive discussions among officials and if necessary dialogue with TEO to confirm the agreed policy intent and to agree details in relation to implementation, including development and proportionality of regulations and legislation. This is not entirely surprising given the complexity of the issues and the extent of debate at times. I participated in these discussions at times, but did not advise on development and proportionality of regulations and legislation.

93. I worked closely with the Minister of Health throughout the pandemic, and believe I had a good professional relationship with him. At all times I felt that he listened carefully to scientific and other advice and asked probing questions which showed a high level of understanding of the relevant science. I met with him regularly and at no stage felt that my advice was being neglected or ignored. The Minister of Health would be best placed to comment on the extent to which he was adequately supported by the Executive; overall, my impression was that he was in general supported reasonably well, especially early in the pandemic, but that there were occasions later when other Ministers made critical comments or comments inconsistent with collective Executive decision making and public health advice.

94. I also met regularly with the First Minister and the Deputy First Minister (usually accompanied by the Minister of Health, the CMO and others, including the Junior Ministers). I occasionally met with them separately in other contexts (press conferences, etc). Again, I felt that both First Minister and Deputy First Minister listened carefully to scientific advice and respected it, even when the advice was challenging, and factored it appropriately into decision making.

95. I met less regularly with other Ministers on an individual basis, or in the case of the Ministers for Justice and Communities sometimes jointly. There were occasional meetings where several Ministers from one of the two largest parties were present together. These meetings were always conducted positively and in a courteous manner; advice was listened to and questions asked and responded to by me.

Meetings of the Executive which I attended were conducted in a more formal manner. On occasions questions and challenges to me were put in a very forthright way. Almost always, I felt that this was within the bounds of normal robust discussion given the enormous pressure under which Ministers were operating and the critical nature of the decisions which they were being asked to consider.

96. Overall, I felt that Executive decision making in Northern Ireland during the pandemic functioned reasonably well in a tense and difficult environment, when Ministers were dealing with a high degree of uncertainty and decisions potentially had critical consequences, not least for human life. The presence of Ministers from different parties with significantly differing views on a range of issues meant that a wide range of perspectives were expressed at Executive meetings, which I thought was a particular strength. The obverse of this was that on occasions groups of Ministers on a party basis appeared to take a collective position which resulted in delays to making decisions which were in my opinion critical. Almost invariably, such decisions were eventually made anyway after a delay. One example of this would be the delay in determining what level of restrictions to impose during the period of autumn 2020, when on occasions a number of Executive meetings were held over a few days before a decision was finally agreed, but Executive decisions were also considered over more than one meeting on other occasions. Sometimes public communications by Ministers were not completely consistent, with the risk of undermining public confidence in decision making and adherence to public health advice and NPIs.

Informal discussions and decision-making:

97. Given the rapidly evolving nature of the pandemic, the necessary pace of decision making and the huge volume of information which was available, there were inevitably numerous informal interactions and meetings (which were unminuted) between senior officials and officials and Ministers and in which I participated. These included informal discussions between the CMO, the Minister and myself about the progress of the pandemic, emerging medical and scientific evidence, and advice that the CMO and I were providing. However, decisions relevant to NI's response to the pandemic were not made in these meetings.

98. In addition, I participated in similar meetings with senior officials from other departments and other Ministers where I am not aware whether or not minutes were taken. The dates of such meetings are included in the accompanying chronologies, insofar as they are available from my diary. Of note, there were pre-meetings with the First Minister, the Deputy First Minister and Junior Ministers (along with other meetings senior officials) before most Executive Meetings. These were not decision making meetings and I have not seen any minutes or notes from them. I have commented above that any minutes I have seen of Executive meetings are brief, were not approved by the CMO or myself, and do not capture in any detail verbal advice which I provided in those meetings.

99. I did not have any informal WhatsApp, text or other online messages with the First Minister, the Deputy First Minister, or other Ministers, apart from the Minister of Health. I have retained all relevant WhatsApp and other messages / conversations with the Minister of Health and relevant others and have provided them to the Inquiry as requested.

The Republic of Ireland:

100. Throughout the pandemic I recognised and advised that it was likely that the island of Ireland would function as single epidemiological unit in terms of the Covid-19 pandemic, given free movement of people across the NI-ROI border. To this extent an analogy could be drawn with the effective treatment of the island of Ireland as a single epidemiological unit for the purposes of animal health and welfare. However, this analogy or model fell apart in that there was also free movement of people within the common travel area (i.e. between NI, ROI and GB) which provided an additional level of complexity which did not apply to the same extent to animal movement. Therefore, in the absence of a political decision to prevent movement of people between GB and Ireland (which was never to my knowledge proposed), the epidemiology of the pandemic on Ireland, while separate, was closely linked to epidemiology in GB. The existence of the common travel area and close connections between ROI and Europe meant that Ireland as an island could not be easily compared to an island nation like New Zealand which was much more isolated both geographically and in terms movement of people across borders. It would have been theoretically possible to make a decision to close the borders of Ireland north and south (as was done for New Zealand) but this would have required a political

decision to take place very early in the pandemic and would have been very difficult in practical terms.

101. In terms of epidemiology, I am not aware of what consideration was given by TEO to the advantages Northern Ireland might have had by reason of its geography or physical location, or whether Northern Ireland might have had an 'island advantage' had it aligned its policies or approaches more closely with the Republic of Ireland. However, briefings to the Executive included frequent reference to geographical factors with a particular focus on progress of the pandemic in counties of NI bordering ROI, and differences in the prevalence of the virus between GB and NI. It was made clear that movement of individuals from areas of higher prevalence into NI would increase the chances of transmitting the virus in NI, and public health advice was given in relation to self-testing of individuals coming from elsewhere in the common travel area before entering NI. CMO and myself advised on CTA travel risks during the pandemic (for example, in May 2021 when advice around intra-CTA travel was removed), indicating that Ministers needed to weigh up societal and economic considerations around this when making policy decisions on any guidance or restrictions.

102. I had no involvement in the development of the Memorandum of Understanding signed by the Departments of Health of NI and ROI on 7 April 2020. The Memorandum, 'Covid-19 Response – Public Health Cooperation on an All-Ireland Basis' [Exhibit IY/23 - INQ000130355], focussed primarily on the following key areas: modelling, public health and NPI measures; common public messages; behavioural change; research; and ethics. Following signing of the memorandum, the two Departments had weekly meetings through most of the pandemic. These meetings were jointly chaired by the Chief Medical Officers of NI and the Republic of Ireland and I attended the meetings, along with DCMOs from both jurisdictions and respective subject-specific policy lead officials. Data was shared in relation to the pandemic trajectory and information concerning the policies covering international travel in relation to border health measures. At times during the pandemic high community transmission was observed in some border counties. This was discussed at the weekly CMO meeting and joint actions was agreed. For example, in response to high case numbers in the council areas of Donegal in the Republic of Ireland and Derry and Strabane in Northern Ireland, there was joint messaging by the CMOs on the high levels of transmission in border counties.

This was underpinned by joint work between the Health Service Executive (HSE) in ROI and PHA in NI.

103. My view throughout the pandemic was that it proceeded largely in a similar way across the island of Ireland, with transmission higher at some points in NI and at other points in the Republic of Ireland. Given freedom of movement across the Northern Ireland/Republic of Ireland border it is unsurprising that this was the case. At times the Department was concerned at the possibility of transmission from the Republic of Ireland to NI given policy differences, and at times Republic of Ireland officials indicated that they were concerned about the reverse case.

104. The Inquiry has asked about a comment made by Deirdre Heenan, who contends that "*comparative analyses of health outcomes are 'actively discouraged' between administrations, north and south. The absence of comparable data or structures to facilitate cross-border comparison and shared learning tend to belie high-level commitments to 'co-operation and action within the island of Ireland.*" I have never encountered or been aware any such discouragement to comparative analyses of health outcomes between NI/ROI. In addition, I have always encountered a desire and willingness to share learning. However, I do largely agree that there is a relative absence of comparable data collected in the same way to facilitate such comparisons.

105. Relating to the comment from Deirdre Heenan above, highlighting the absence of comparable data to facilitate cross-border comparison, direct comparison of rates of infection between NI and ROI is difficult, in my opinion, due to differences in testing volumes, access to testing and behaviours during the pandemic. The ONS survey gave an objective indication of prevalence in the UK (including NI) but there is no comparable data for ROI, although we did discuss the survey and highlight its value to ROI colleagues at a number of CMO meetings. There were also significant differences in how deaths were reported in NI and ROI during the pandemic, with a significant delay in reporting deaths in ROI compared with NI. This also makes direct comparison of deaths (including excess deaths) difficult, and I think at least partly explains higher deaths reported in NI than ROI through the early stages of the pandemic. In this context, it is of interest to note that excess deaths in ROI have been significantly higher than those in NI in the post-pandemic period. As well as issues with data comparability, any NI / ROI comparison also needs to take account of additional factors such as

demographics, rurality and population density, in addition to timing of policy decisions.

106. Data comparisons between NI and the rest of the UK are likely to be somewhat more reliable as data collection and flows were similar, and show that deaths with Covid-19 on the death certificate were significantly lower in NI than in England, Scotland or Wales (coronavirus.data.gov.uk, accessed 20/09/23). However, multiple factors including those mentioned above also need to be taken into account in relation to this comparison.

107. Early in the pandemic I discussed with ROI modellers the possibility of joint modelling of the pandemic across the island of Ireland. However, different approaches to testing and differences in data flows meant that this did not seem feasible and as an alternative we shared approaches to modelling and modelling outputs in the weekly CMO meetings. The agenda of the joint CMO meetings was broad and we also shared information about and discussed NPIs, outbreaks, public health measures and the outcomes of key research studies and advice being provided to core decision makers from a medical and scientific perspective.

108. Collaboration and sharing of information between officials in the two Departments of Health was in my experience very good. However, different policy decisions in NI and ROI were often taken and implemented at very short notice based not just on health advice but also on the broader range of factors discussed above. On occasions, for example, I was certainly taken unawares by policy changes around NPIs in ROI, and I suspect that ROI colleagues were similarly taken unawares by policy decisions in NI. Decisions to co-ordinate policy between the two jurisdictions would have been a matter for Ministers and I do not know whether this was discussed.

109. One area where I was aware of difficulty was in relation to the sharing of information around international travel. Despite ongoing representations, ROI were unable to share information with NI about international travellers arriving in Dublin and travelling to NI, and this was undoubtedly associated with a degree of risk for NI at some stages of the pandemic.

110. I do not think that there is any direct evidence to answer the question of whether greater harmonisation or co-operation with the Republic of Ireland might have produced better outcomes in Northern Ireland, and there has been no modelling that I am aware of on this issue. Such modelling would require, in my view, extensive assumptions and would be easily susceptible to a range of biases. Short term outcomes purely in terms of Covid-19 might have been improved, but I do not believe that significant improvements could have been obtained without significant restrictions on movement within the common travel area (which would have led to significant challenges to the economy and society, along with the possibility of social unrest) or a broader harmonisation or co-operation between the UK as a whole and ROI. I have not been asked to comment specifically on the issue of UK-ROI co-operation and alignment; it would also be a matter for Ministers but I think it is worthy of consideration and attention from a scientific perspective in the same way that I have been asked about NI/ROI co-operation.

Particular Executive Committee decisions:

111. The Inquiry has made specific reference to a number of Executive Committee decisions and asked me to comment on those.

112. During the first wave, the impact of lockdown measures was clearly apparent by mid-April 2020 and case numbers were beginning to fall, with the expectation that hospital pressures would begin to decline shortly afterwards. I did not wish NPIs to be retained for longer than necessary, given their adverse impacts, while also wanting to maintain Rt at less than 1 if possible. In this context, I gave advice on pathways out of the pandemic which included advice on the impact of removing restrictions (exhibit Exhibit IY/24 - INQ000353627). I felt that the measures to ease the first lockdown in stages from 24 April 2020 onwards were proportionate and reasonable, and data subsequently showed that Rt remained below 1 essentially until the end of the first wave. The primary objective of the lockdown (preventing the hospital system from being overwhelmed) was achieved.

113. In relation to the 'rule of six' which came into effect on 22 June 2020, my advice on the relative risks of two ways of mitigating risks in relation to indoor meetings was transmitted to Ministers to inform decisions about relaxing restrictions on indoor meetings (exhibit Exhibit IY/25 - INQ000353628). My advice

was that the risk of allowing "bubbling" of two households was somewhat less than the risk associated with the "rule of six", an easement which would enable up to six people to meet indoors. The "rule of six" was not a bubble approach, and would require social distancing and other mitigations (ventilation, attention to hand and respiratory hygiene etc) to be in place where possible. In addition, I advised that it was necessary for people to be responsible about the amount of time they were to spend together and overnight stays should not be permitted. At that stage of the pandemic, I felt that the decision to implement the rule of six was proportionate taking into account other considerations and given the low community prevalence of infection.

114. Notes of the Executive Committee meeting of 15 June 2020 record that the Minister for DAERA said that the Executive was following science which was "currently unproven...a best guess". I am recorded as respectfully disagreeing but pointing to the "uncertainty" and the need for decisions to be informed by science but also to take other considerations into account (INQ000065730, p12). During the pandemic, there is no doubt that core decision makers (including Ministers, at times) looked for certainty in terms of scientific advice. Policy decisions are much easier in the presence of evidential certainty than when evidence in uncertain, and Ministers in particular were asked to balance scientific and medical evidence with a range of other considerations as discussed below. At all times I did my best to indicate the degree of uncertainty in the scientific evidence, and to remind Ministers of the importance of other factors, in terms of decision making. I was keen that decisions should be properly informed by the scientific evidence (and its uncertainty understood) and that it should be given appropriate weight, but that decisions should not be led solely by that evidence.

115. It is also important to highlight that science relating to Covid-19 (and its interpretation) was a contested space throughout the pandemic (and remains so), and that much of this played out in the media and in social media. I am sure that Ministers and other core decision makers were aware, to a variable extent, of alternative scientific views to those which I considered reliable, and at times I was asked about and commented on some of these views. In general, I felt that most Ministers accepted the scientific evidence which I presented and the uncertainties I indicated, though there may have been a small number who remained sceptical about certain aspects of the evidence. When this was raised in discussion I sought to respond appropriately, as indicated in the notes of the 15 June 2020 meeting.

116. In relation to the reduction of social distancing from 2 metres to 1 metre agreed by the Executive on 25 June 2020, the CMO and I provided advice on the likely impact of this in terms of increasing transmission, in particular in indoor settings (Exhibit IY/26 - INQ000353629). I believe that this advice was laid out clearly in terms of the risk which would be involved. I did not feel under any particular pressure from Ministers to amend or change my advice, and understood (as outlined elsewhere) that in reaching a policy decision they would balance the impact or reducing social distancing with economic and other factors. At the time, I did not think the decision to reduce the requirement was unreasonable given the range of considerations, but did indicate the need to keep it under review.

117. The requirement to wear a face covering on public transport and in shops became mandatory in July 2020. The science around the benefits of face coverings in terms of protecting the wearer and reducing transmission to others evolved during spring and early summer 2020, and the CMO and I provided advice to Ministers during this period (exhibits Exhibit IY/27 - INQ000353630). Initially there was significant scientific uncertainty around the magnitude of any benefit and some concern that use of face coverings might result in harmful behaviour change in terms of reduced adherence to other NPIs (such as social distancing). Evidence accumulated around the likely benefits of wearing face coverings in indoor settings where social distancing could not be maintained, and awareness that benefits of wearing face coverings were greatest when used by a high proportion of individuals in appropriate settings. Ministers considered this advice along with other considerations in the run up to the July 2020 decision, during a period when case numbers were declining. The requirement was introduced near to the nadir of transmission and the timing was a matter for Ministers, though the decision was made before wave 2 and would have been expected to have benefit if adherence had been high.

118. During summer 2020 I provided advice on a range of relaxations at the request of the Executive, including, for example, indoor marriages, baptisms and related celebratory events; reopening of indoor fitness studios and gyms; reopening of outdoor leisure playgrounds, courts, and gyms; reopening of cinemas; outdoor horse racing and equestrian competitions from 11 July 2020; competitive games and [sporting] events; reopening of libraries; reopening of indoor sport and leisure facilities, including skating rinks and leisure centres (exhibit Exhibit IY/28 -

INQ000353631, Exhibit IY/29 - INQ000353632 & Exhibit IY/30 - INQ000353634). Advice was not sought on the broader question of whether or not to encourage people to return to their workplace in summer 2020.

119. The "Eat out to help out" scheme was implemented in August 2020, and, as I have indicated earlier in this statement, I have no record or recollection of being asked for advice in relation to this. In terms of the broader context, Rt was significantly above 1 (which was reported to Ministers weekly), and although absolute case numbers and hospital pressures were relatively low it was clear that the trajectory was strongly upwards. The CMO and I were very concerned about the impact of opening non-food serving hospitality venues at this time and wrote to the Head of Civil Service about this (exhibit Exhibit IY/31 - INQ000353635, Exhibit IY/32 - INQ000353636 & Exhibit IY/33 - INQ000277966). We were clear in advice given to Ministers about the risks of increasing interactions in indoor settings where social distance was unlikely to be maintained and face coverings could not be worn, but were not specifically asked about "Eat out to help out". However, if the scheme was successful my view at the time was that it was clear that the characteristics of the settings involved would inevitably lead to some increase in virus transmission; if asked, this is the advice I would have given, consistent with views which I expressed at that time in relation to the opening of non-food hospitality and return to work. The issue of return to work more broadly was raised in an Executive meeting on 06/08/20, specifically in relation to opening Civil Service offices. WhatsApp messages between CMO and myself which have been shared with the Inquiry indicated that I strongly discouraged this. Given the numerous changes which occurred in August – September 2020 (including "Eat out to help out", schools reopening, and return to work after summer holidays) and lack of data, it was not possible to assess any specific impact of the "Eat out to help out" scheme on virus transmission. The increase in virus transmission in autumn 2020 was in all likelihood inevitable, given limited population immunity, ease of transmission and increased interactions indoors, although the relaxation of measures around this time would have somewhat accelerated the process.

120. During the same period, I advised on the risk of schools reopening in September in relation to SARS-CoV-2 transmission, which Ministers weighed against the societal, economic and educational importance of keeping schools open. In seeking to balance all of these considerations, I agreed with the re-opening of schools as planned.

121. At its meeting on 21st September 2020, SAGE recommended consideration of a package of measures (including a circuit breaker as one of those options) to reduce Rt to less than 1, and minutes were forwarded to Minister and TEO. At that stage hospital pressures in NI remained relatively modest, and it was not until early October that the CMO and I advised that significant intervention was required (including the option of a circuit breaker set of restrictions) at the Executive meeting on 8 October 2020. Notes of that meeting of 8 October 2020 [INQ000065756] record a discussion about the need for restrictions. The Minister for DAERA is recorded as having said that the CSA was "looking for v damaging approach" and that "people are not listening to us…not going after where problem exists. Afraid to say where problem is". This was during a period when there was a rapid increase in the pandemic, as discussed in papers submitted to the Executive meeting (exhibits Exhibit IY/34 - INQ000353644, Exhibit IY/35 - INQ000353645, Exhibit IY/36 - INQ000353653, Exhibit IY/37 - INQ000353654 & Exhibit IY/38 - INQ000353655).

122. Information about transmission in different parts of Northern Ireland was shown to the Executive on many occasions, including the meeting on 8 October 2020; I also identified geographical differences in transmission and those council areas where transmission was higher in my verbal update. Indeed, this was something which was done consistently throughout the pandemic, and during the period when local restrictions were under policy consideration data on transmission was broken down into postcode areas (exhibit Exhibit IY/39 - INQ000353667). There was no concern on my part about doing this and I considered it helpful in terms of informing understanding of pandemic progression rather than being a matter of particular sensitivity.

123. This was at a time when Rt was likely to be above 1.5, case numbers were increasing rapidly and hospital pressures were also increasing rapidly; from a Covid-19 perspective both the CMO and I were seriously concerned and believed that urgent NI wide action was required to avoid the hospital system from becoming overwhelmed and resulting deaths, and that realistically this was likely to need a circuit breaker / lockdown. The primary objective of our advice at this stage (as at other times) was to avoid the hospital system from being overwhelmed. Although staff and systems were under severe pressure, thanks to the dedication of staff and behaviours of the vast majority of the public I believe

that this objective was achieved. At the same time, we wished restrictions to be as limited as possible and in place for as short a time as compatible with our primary objective, with the aim of allowing time for effective vaccination to be widely rolled out. As on other occasions during the pandemic, I felt that Ministers were seeking to balance medical and scientific advice with other considerations – economic, societal and impact on family life – as they sought to decide on the most appropriate response. Other than the delay in reaching a consensus position as Ministers sought to balance the range of relevant considerations, I did not think there were any particular areas in which there were issues, obstacles or missed opportunities during this period, although purely from the Covid-19 perspective, an earlier lockdown / circuit breaker would probably have reduced the peak size of the autumn wave.

124. On 19 October 2020, it was publicly reported that the Minister for DAERA said the difference in transmission between nationalist and unionist areas was "*around six to one…*". This analysis was not one which I conducted or oversaw, and the Department of Health responded to clarify that data on Covid-19 infections was not collected according to religious or political affiliation. We did collect and publish data indicating that the prevalence of the virus varied by geographical area as discussed above, and commented on this (as did a number of Ministers) when appropriate. However, it was clear that multiple factors were at play in such differences, and at no stage did we suggest or believe that one community (as defined by the DAERA Minister) was adhering to public health advice more than another, nor did we have any evidence to support such a conclusion. Where we had evidence to suggest demographic differences in adherence to public health advice (based on, for example, age, sex or socioeconomic differences) we did highlight this and consider how it might be addressed. In general, I did not find Ministerial comments on geographical differences in virus prevalence detrimental; although on this occasion the focus on perceived differences based on political affiliation caused controversy, I did not perceive any lasting detrimental effect.

125. The Inquiry has noted that following the briefing provided by members of the Public Health Agency to the Northern Ireland Health Committee on 15 October 2020, there was a suggestion that modelling work had significantly underestimated the development of the pandemic in Northern Ireland at that point. I do not believe that this is correct. While the modelling group were monitoring the epidemic and producing weekly estimates of Rt, there was not any forward modelling of projected

case numbers which covered September 2020 and the first half of October 2020 because the main driver of policy decisions and the need for Covid-19 restrictions from a health perspective was likely to be potential hospital pressures. Concern about hospital pressure did not impact on the ability to provide forward modelling, but while hospital pressures remained relatively low there was no demand for forward modelling.

126. In addition, there were other reasons why the modelling group did not produce forward projections for case numbers at this time. When testing increased, more cases were detected, and this was not something which the modelling group could predict. For example, during this period test numbers increased by over 40%, between 23/09/20 and 08/10/20. However, it was clear that Rt was above 1 and rising throughout September 2020 and the first half of October, and the implications of this, including projected doubling times for case numbers, were discussed at the modelling group in the presence of PHA members (Modelling Group minutes for 30 September 2020 note a doubling time of around 9 days for case numbers, based on a seven day rolling average) (exhibit Exhibit IY/40 - INQ000353668). The case number data discussed and used for projections by the modelling group was a seven day rolling average of case numbers; numbers of cases on any individual day could be significantly higher or lower than this, as occurred throughout the pandemic. This was well understood by all members of the modelling group (including several PHA staff). At the Health Committee on 15 October 2020, PHA indicated that "*modelling indicated 300 cases at end Sept*". Looking in retrospect at the actual data, 30 September 2020 was in fact the first day when the case number (seven day rolling average) exceeded 300 (it was 285 on 29th September 2020), so based on trajectory and doubling times this number is likely to have accurately reflected contemporary discussions at the modelling group. However, the comments at the Health Committee may also have reflected a lack of understanding in some parts of the PHA that this number was a seven day rolling average and a full appreciation of rapid increase in case numbers which was likely given the trajectory of the epidemic at that time. This is a question which would need to be answered by the PHA.

127. The discussion at the Health Committee on 15 October 2020 was in the context of the ability of the Test, Trace and Protect service to deal with the number of cases which were being identified. In this context, it should be noted that I

provided advice to the PHA on two occasions around the required size of the service. I advised PHA on 20 April 2020 that I estimated that 300 – 600 contact tracing staff would be required in NI, and was assured that over 500 were in training (exhibit Exhibit IY/41 - INQ000353669). Based on ECDC estimates from April 2020, this would have been sufficient for a contact tracing service to handle over 1000 cases per day (exhibit Exhibit IY/42 - INQ000353670). On 17 September 2020 I met with the PHA and indicated that the contact tracing service needed to be able to manage 500 cases and 5000 contacts per day. The PHA indicated that their current business case for the contact tracing service was on the assumption of 50 cases per day (exhibit Exhibit IY/43 - INQ000353671). In relation to the PHA rationale for employing a smaller number of contact tracers than I recommended, this was not discussed with me at the time and a response to this question would have to be sought from PHA. However, I have subsequently become aware of an article in the British Medical Journal where PHA representatives said the following:

"*Hyland..... was adamant that hundreds of staff were not necessary: she calculated that she'd need a maximum of 80-90, working shifts on a rotational basis. This was based on Northern Ireland's small population and the fact that, during lockdown, most people who tested positive would have a small number of close contacts to report, if any. That meant a reduced workload per case. As of 25 May, 78 tracers had been fully trained, says Hugo van Woerden, the PHA's director of public health.*" (exhibit Exhibit IY/44 - INQ000353675).

This was not in keeping with advice which I gave to PHA, which was based on best international practice. The contact tracing service was definitely understaffed in early October 2020, and on 3rd October 2020 the CMO commissioned a rapid review of the contact tracing service and its delivery mode to provide assurances on the capacity of the contact tracing system. At some later points in the pandemic the number of cases were so great that the ability to trace contacts was limited. However, at times of very high community transmissions it is unlikely that this made much difference to the overall picture.

128. The Inquiry has received disclosure of Executive minutes dated 12 November 2020 concerning a decision on whether or not to extend restrictions [INQ000065430]. This was a period in which there continued to be a significant increase in the pandemic and where Ministers were seeking to balance the need to retain or introduce measures to reduce virus transmission with a desire to avoid economic harms and damage to family life. As discussed above, my view was

that Ministers had to balance a range of considerations in coming to decisions about how best to respond at different stages of the pandemic. Medical and scientific advice from the CMO and I was an important consideration, but it was not the sole consideration; Ministers also needed to consider economic advice, financial considerations, impact on education, family life, and societal and cultural considerations. I think that the minutes of the Executive meeting show Ministers attempting to balance all of these considerations.

129. It is clear that Ministers had a range of views as to the importance (in particular) of economic factors and risks to health, and to an extent views on the best course of action differed among different political parties. These views were genuinely held and expressed and were teased out over a prolonged period of time in an effort to find an agreed position, as described. The CMO and I provided advice on an ongoing basis while this process continued. From a policy perspective, the process of finding a shared or compromise position by Executive Ministers was undoubtedly difficult but seemed entirely reasonable to me. I do not think that the majority of Ministers wished to take action contrary to the advice of the CMO / CSA or contemplated a compromise agreement which ran contrary to advice. This would only have been the case if the CMO/CSA input was the only advice being considered. Rather, Ministers were appropriately in my view taking into account a range of advice (including economic advice) in reaching a policy decision.

130. It is always possible in retrospect to think that things might have been done differently. However, at the time and now, I think that a significant Covid-19 wave in autumn 2020 with a need for NPIs was inevitable, and a lockdown was probably the only intervention which would have been effective in the absence of effective anti-viral treatments or vaccination. It is likely that a circuit breaker at an early stage might have meant than less prolonged restrictions would have been required later that winter, though such an intervention (without obvious evidence of acute hospital pressures) might not have gained wide public acceptance.

131. From November to December 2020 included the period of the run-up to Christmas and the emergence of what became known as the alpha variant of SARS-CoV -2, and I was concerned that this would be a period of particular risk in terms of the pandemic. As at other times in the pandemic, the alpha variant appeared somewhat later in NI than in GB, which meant that we had some

advance warning of its potential to cause problems. There was likely to be increased mixing and close contacts, as a result of the traditional desire to socialise at this time of year. Due to the weather much of this interaction would be indoors and would involve eating and drinking, so face coverings would be of limited value and good ventilation difficult to maintain. In addition, it was likely that there would be increased contact between younger people and older vulnerable individuals as a result of family events and visits, and significant numbers of students would return to NI from universities elsewhere in the run up to Christmas. The prevalence of infection was already relatively high, and by this time we knew that virus transmission was possible from asymptomatic or mildly symptomatic individuals. Christmas is a very important time of year in terms of family life, and it was clear from discussions that Ministers placed considerable weight on this. The possibility of allowing family meetings and mixing over Christmas clearly weighed significantly as a factor in terms of policy decisions from a Ministerial perspective and therefore the CMO and myself considered Ministers' views in the context of the advice which we gave, although the fundamentals of the advice remained the same.

132. Advice from CMO and I to Ministers was included in a paper submitted to the Executive on 16th December 2020 ([Exhibit IY/45 - INQ00000] This included discussion of a number of options and modelling illustrating their likely impact, which Ministers considered alongside the range of other factors of relevance. The CMO and I attended an Executive meeting on 17 December 2020 when this advice was discussed and we answered questions. So far as I was concerned, Ministers considered the advice appropriately and reached a balanced decision taking all of the relevant factors into account. Purely from the point of view of short-medium term Covid-19 impacts, restrictions introduced at an earlier time point would have been more effective, as discussed above, but as the pandemic progressed policy decisions were never taken solely on this basis (which was appropriate, in my opinion).

133. At this time, as at other times, the progression of the pandemic was not identical in NI and GB. The UK government approach to Christmas in England was certainly discussed, but I did not directly advise on it. There would have been some advantages to all UK jurisdictions taking the same approach (in terms of communications, particularly) but in NI I think this would have been less effective if the ROI approach to Christmas was not also aligned. I was not aware of any

approach or discussions involving the Northern Ireland Office or the Chancellor of the Duchy of Lancaster with regard to UK alignment (INQ000148325, page 48, paragraphs 139-140).

134. The Executive decided to impose a complete lockdown immediately after Christmas 2020. At the time, my view was that this was the last possible moment to impose restrictions sufficient that would prevent the hospital system being overwhelmed, and I still believe that this was the case. Hospital inpatient numbers peaked around the 20th of January 2021, at the highest levels which they attained during the pandemic. As during wave 1, the primary objective of the advice which CMO and myself gave to Minister and the NI Executive at this stage (as at other times) was to avoid the hospital system from being overwhelmed. Although staff and systems were under severe pressure, thanks to the dedication of staff and behaviours of the vast majority of the public I believe that this objective was achieved. At the same time, CMO and myself wished restrictions to be as limited as possible and in place for as short a time as possible, compatible with our primary objective, with the aim of allowing effective vaccination (which had commenced) to be widely rolled out. In this context, I believe that decisions about the relaxation of restrictions were generally appropriate in wave 2.

Learning during the pandemic

135. There was continuous learning throughout the Covid-19 pandemic as a consequence of increased scientific understanding of the virus, its transmission, disease severity and development and persistence of immunity; increased availability of testing; improvements in pandemic modelling; improved understanding of individual and population behaviours and how they were influenced by modelling; development of vaccination; the impact of non-pharmaceutical interventions (including contact tracing and isolation) and novel therapeutic treatments. This is covered and summarised in the CMOs' Technical report on the Covid-19 pandemic in the UK, to which I contributed. I will not repeat this material here but will highlight some of the key areas which I think were of particular importance in the context of Northern Ireland.

136. As discussed above, the importance of NI specific modelling capacity was recognised early in the course of the pandemic, and played an important part in informing policy decisions. Modelling continued to evolve throughout the

pandemic, as knowledge about virus transmission, immunity and the effectiveness of interventions accumulated. Modelling capacity has now been embedded within the PHA and will be immediately available in the event of any future pandemic or other relevant emergency.

137. Pandemic modelling is dependent on the provision of accurate and timely data, and the importance of this was recognised early in the course of the pandemic. A range of measures were put in place to improve the quality and timeliness of data during the pandemic, with close working between Trusts, the PHA, the Department's Information Analysis Division (IAD) and NISRA. The Department has recently published a Data Strategy (exhibit Exhibit IY/46 - INQ000353672) which includes the establishment of an HSC data institute, and Northern Ireland will introduce a new patient Electronic Health Care Record in the near future. There is increased emphasis on data acquisition and data flows within the PHA, and all of these measures will collectively help to ensure that data flows should be improved during any future pandemic. In terms of inequalities, one area which requires improvement is coding of ethnicity within the Electronic Health Care Record. Due to inadequacies of ethnicity coding, it was not possible for us to analyse differential impacts of the pandemic according to ethnicity in our general population, although it is also important to note that Northern Ireland has a much smaller proportion of ethnic minorities than other parts of the UK as covered elsewhere in this statement. In contrast, we were able to look at the influence of social deprivation on various impacts of the pandemic.

138. As discussed above, I believe that it would be better for representatives from the devolved administrations to participate fully in SAGE meetings as soon as SAGE is stood up in an emergency. While advice from SAGE and SAGE subgroups is helpful, there is a need to consider the implications and applications of this advice specifically in the context of Northern Ireland. In the early stages of the pandemic, this was done principally by the CMO / deputy CMOs and me; SIG was helpful in allowing a broader range of perspectives to be formally considered, and consideration should be given to standing up a similar body in NI at the outset of any future emergency situation. In this context it is important to remember that during the spread of an infectious agent, the island of Ireland tends to behave as a single epidemiological unit somewhat separately to Great Britain, as was apparent to a variable extent throughout the Covid-19 pandemic. In addition, while the common travel area remains in its current form, the UK and Ireland forms a larger

epidemiological unit. From the scientific perspective serious consideration should be given to how policies can best be aligned in this context, although this is a matter for political decision.

139. Virus testing capacity was a significant limiting factor which influenced policy decisions early in the pandemic and as testing capacity increased, and reliable lateral flow tests were introduced, a different range of policy decisions became available as the pandemic progressed. SARS-CoV-2 was a completely new virus, and testing capacity was limited initially, partly as a result of global shortages of reagents and consumables. This was partly addressed at an early stage by assembling a NI testing consortium, which included local Universities and DAERA laboratories. It is difficult to see how this issue could have been addressed more rapidly in the circumstances; however, in the event of another pandemic I believe that there should be greater emphasis nationally (and globally) on rapid expansion of testing capacity.

140. The Department sought to develop a contact tracing service from the beginning of the pandemic, through the Public Health Agency. Initial contact tracing was done on a case by case basis, and evolved as the pandemic progressed with the establishment of the Test, Trace and Protect service. I provided advice as to the number of contact tracers who would be required in Northern Ireland, based on best international practice, although the PHA ultimately decided on a different and smaller model, employing fewer contact tracers. Contact tracing is most effective when the prevalence of an infectious disease and the number of cases are relatively low. The PHA maintained contact tracing throughout the epidemic once fully established in May 2020, following a temporary pause across the UK on the 23rd March. Though at times of very high prevalence the efficiency of the service was reduced and the impact, in terms of reducing transmission, will have been minimal, the maintenance of the service was important in terms of public messaging and perception. In the context of another pandemic a more rapidly established and larger contact tracing service should be established in an effort to prolong the contain phase, aligned with reverse contact tracing and best international practice.

141. Rapid deployment of research infrastructure and capacity to support Covid-19 research was an area of significant success during the pandemic, both nationally and in Northern Ireland. Northern Ireland researchers and patients participated in

all of the major UK national studies, recruiting very well. Studies were approved with unprecedented rapidity in many cases. As research in other areas resumes following the pandemic, there is important learning from experience during COVID and new good practice which we are keen to maintain and embed. I am currently refreshing the NI strategy in relation to research in health and social care, and learning from our experience during the pandemic will be incorporated in this.

142. During the pandemic, one of my main roles (along with the CMO) was to provide scientific advice not only to the Minister of Health, but also to the NI Executive and to other Ministers as required. Mechanisms for doing this evolved as the pandemic progressed; I had no previous experience of being asked to provide advice beyond the Department of Health during my tenure as CSA. From my perspective attending Executive meetings and other Ministerial briefings worked well, as there were opportunities to answer questions and verbally explain some of the nuances of emerging / evolving science to aid Ministers in making decisions, and in particular to make clear the uncertainties involved in modelling and other aspects of the science. Ministers and other officials will be able to comment on the extent to which they found this helpful.

143. In general, as discussed above, I think that scientific advice from a health perspective was effectively conveyed to Ministers. It was less clear to me how effectively scientific advice in other areas (outside my areas of responsibility) was captured and conveyed (Education, Economy etc) in the absence of CSAs in other Departments or any overarching NI Government CSA. Partly as a consequence of this, there was no overarching cross-government scientific body where a wider range of scientific perspectives were brought together to provide consolidated advice. I am aware that the current Head of the Northern Ireland Civil Service is seeking to address this issue at present. In any future health-related emergency I believe that the Health CSA will be best placed to lead a scientific body on health-related advice, but that it is important to capture a full range of scientific perspectives covering the full range of policy considerations.

144. I played an increasing role in communicating scientific information and its implications to the public as the pandemic progressed, through written opinion pieces and press releases, participation in media briefings (with the CMO and others), radio and television interviews, and press conferences with Ministers. I believe that this was important in helping to provide scientific context for the range

of policy decisions which were made at different time points. I think it is important to clearly explain the evidence base which informs policy decisions more widely in a clear and consistent way, and hope that the experience of the pandemic will help to ensure that this is something which is carried forward both in relation to future emergency situations and other areas.

145. In general Northern Ireland was very well connected to UK scientific advisory structures and fully participated in discussions throughout most of the epidemic after the first couple of months. However, representation of Northern Ireland interests with full participation was not always automatic from the outset of the pandemic. Inevitably, discussion was dominated by the position in England (or more broadly in GB), as was appropriate given the relative distribution of the UK population. Full integration was achieved in some instances – for example, appropriate attention was paid to the position of Northern Ireland in modelling by UK groups, where separate modelling for progression of the pandemic in Northern Ireland was established from an early stage. There were regular meetings with ROI officials, which were co-ordinated by the respective CMOs, in which I participated and which were beneficial in understanding transmission of the virus in our respective jurisdictions and the likely general direction of policy decisions, albeit that our role in each case was to give advice, and decisions were a matter for Ministers. These meetings were underpinned by regular meetings between PHA and their ROI equivalents. There was limited participation by ROI scientific leads in our joint meetings, but their advice was conveyed through medical colleagues. ROI colleagues were mainly connected to European networks, and we were mainly connected to UK networks. We were able to share scientific insights emerging from our respective networks, but there was not the same degree of very close collaboration, which was a consequence of ways of working with UK colleagues in SAGE and its subgroups.

146. The Covid-19 response placed very considerable demands on many staff within the Department, and more widely within the health and social care system, but in particular on a small number of individuals in senior positions. This entailed working extended hours, seven days per week with essentially no leave over a very prolonged period. The Department was able to co-opt additional staff in a number of key areas, but despite this demands on staff were excessive at times, and relentless. Specifically with regard to scientific advice and support, we relied heavily on colleagues from outside the Department, including local universities and

the Strategic Investment Board (SIB). Personnel from these organisations were made available by their employers to support our response, through participation in modelling work or participation in scientific advice structures. Our success in doing this reflects the willingness of individuals and employers to respond to an emergency situation, and also pre-existing good working relationships between the Department of Health and other organizations. On a personal level, my role as CSA within the Department is a part time one, with no deputy or any supporting infrastructure in the Department. This was addressed in a flexible way as part of the pandemic response, but I believe that more investment in scientific expertise and advice is required both in the Department and in other NI government departments.

147. With regard to the future and the principal developments in public health and epidemiology which should now be taken into account in preparing for a pandemic, several seem to me particularly important. Firstly, the potential for timely, automated data flows and epidemic modelling expertise to inform policy decisions should be developed and are currently being actively addressed through the PHA and the Department's Data Strategy. Secondly, there should be a focus on the ability to rapidly develop and scale up diagnostic tests, including genetic tests and pathogen sequencing to understand pathogen evolution and transmission. This is being addressed insofar as it is Northern Ireland specific through the Pathology Network and related structures, but is also a national issue which is being addressed through UKHSA. Thirdly, there should be acceleration of the vaccine development pipeline through the use of novel mRNA technologies, which is being addressed nationally / internationally. Fourthly, there should be attention paid to the evolution of a wide range of channels of communication to reach different population groups with information, a matter both for the Department and a wide range of other bodies.

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: 31/1/24