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. Northern Ireland participation in SAGE is not recorded prior to 29th March 2020, when I joined, although the minutes may not record the presence of NI Government observers and in this respect are incomplete. There was a Northern Ireland observer present at some meetings, who provided a read out for internal use in the Department. 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.

16. Northern Ireland did not have established capacity in pandemic modelling which could be immediately stood up at the outset of the pandemic. 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 groups) was helpful, but generally lagged behind NI local modelling which used the most up-to-date data to inform advice to the Minister of Health and NI Executive.

17. At the direction of the CMO, core pandemic modelling capacity has now been established within the PHA and will be immediately available in the event of any future pandemic. I will continue to liaise with PHA modellers from a CSA perspective.

18. There was not initially any independent group of scientific experts 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. In 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 stages 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. The SIG

advice was important and helpful, and a similar group should be stood up at the start of any future emergency situation as discussed below.

Learning during the pandemic:

19. There was continuous learning throughout the COVID 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.

20. 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.

21. 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 Northern Ireland Statistics and Research Agency). The Department has recently published a Data Strategy [Exhibit IY0001 INQ000183443] 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. In contrast, we were able to look at the influence of social deprivation on various impacts of the pandemic.

22. 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 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 COVID.

23. 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.

24. 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