Witness Name: Nick Phin
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UK COVID-19 INQUIRY

WITNESS STATEMENT OF PROFESSOR NICK PHIN

I, Professor Nick Phin, will say as follows: -

1. SOURCES OF ADVICE; MEDICAL AND SCIENTIFIC EXPERTISE; DATA AND MODELLING

1.1 Professional Background

1.1.1 In May 2019 I was appointed as Deputy Director, National Infection Service, Public Health England (PHE). This appointment was preceded by a period as the Consultant Epidemiologist for the Pandemic Flu office and Legionnaires' disease, Colindale, Health Protection Agency (later PHE) from 2007 to 2015, Interim Head of the Respiratory Diseases Department, Colindale, PHE from 2015 to 2016 and interim Director of the Centre for Infectious Disease Surveillance and Control, Colindale, PHE from 2016 to 2019.

1.1.2 The Division I managed as Deputy Director was made up of the following units:

Tuberculosis
Acute respiratory infections (including the response aspects of avian influenza and Legionnaires' disease),
Gastro-intestinal infections
Emerging and zoonotic infections
Travel/international issues

1.1.3 The key roles of these units included national surveillance in their respective areas, drafting and providing technical and scientific input into various topic specific policy and guidance documents, disease specific expert advice and analysis (nationally and internationally), topic support to incidents and outbreaks and national leadership for national incidents.

1.1.4 I also had the role of the UK National Focal Point for the World Health Organization (WHO) International Health Regulations 2005 and, before Brexit, the National Focal Point for the European Centre for Disease Prevention and Control (ECDC). Both these functions involved the receipt and dissemination of communications and alerts on any new or emerging threats. For ECDC it also included the coordination of the UK response to the Early Warning and Response System of the European Union (EWRS) and the provision of UK surveillance data to The European Surveillance System (TESSy).

1.1.5 In this role, on receipt of information about the emergence of a new respiratory infection in China in late December 2019, I convened the first incident response meeting in early January 2020. I was one of the national incident directors for the pandemic response until I left PHE in December 2020.

1.1.6 I refer to my witness statement (NP/01 INQ000130153) which provides more detail on my career and background and expertise around pandemic planning.

Public Health Scotland

1.1.7 I joined Public Health Scotland ('PHS') as Director of Public Health Science on 6 January 2021. I was also given the Medical Director role when the incumbent Medical Director, Dr Mahmood Adil, resigned in April 2021.

1.1.8 In general terms, the role of Director of Public Health Science is to lead, plan and design initiatives to protect the health of the people of Scotland, and support PHS' efforts to increase healthy life expectancy and reduce health inequalities. This includes providing expert advice to the PHS Chief Executive,

the PHS Executive Management Team, the Scottish Government, COSLA, NHS Scotland, Directors of Public Health colleagues, and other organisations as required.

1.1.9 Specifically, the Director of Public Health Science is to provide a joined-up approach to the leadership of PHS and to maximise the opportunities to drive forward clinical excellence. The role involves leading on all aspects of professional and clinical public health leadership and governance within the organisation. In relation to health protection, the post is responsible for the provision of health protection services; co-ordinating the national health protection system; monitoring health hazards; incident and outbreak management; raising standards in health protection; developing the health protection workforce; monitoring emerging infections; screening and immunisation advice and communications; marketing and production of resources related to these areas. The post is required to lead, direct, inform and implement the clinical strategy for PHS and lead system-wide research and innovation. The post also has cross organisational professional responsibility for specialist public health professionals and will lead PHS's externally facing activity on learning and workforce development for public health professionals.

1.1.10 The Director also provides leadership and acts in support of emergency and contingency planning in relation to serious threats and events that could cause damage to the public's health. In addition to providing leadership at a national level on all aspects of public health and health protection, to provide national professional leadership across Scotland on Health Protection.

1.1.11 I started with PHS in January 2021 and am, therefore, unable to give an account of most events, decisions and issues in Scotland for the period January 2020 to December 2020. The major elements of my account are therefore framed with respect to the time period 06 January 2021 to 02 April 2022. It is also important to note that during my first year with PHS, my priority was to understand the context and the environment in which PHS was operating and trying to ensure that systems and processes were put in place

to maintain the pandemic response, provide corporate assurance and accountability around finance and decision making, coordinate our efforts and deal with issues around staff welfare and wellbeing. When I arrived in PHS operational systems had been put in place to respond to the pandemic and it was only towards the end of 2021 I started to become more involved in contributing views on activity and future direction. This is reflected for example in my membership of the Scottish Covid-19 Advisory Group (SCAG) which I joined in December 2021.

1.1.12 At the outset I think it should be noted that providing definitive clinical and scientific advice during a pandemic caused by a new pathogen is challenging. Until evidence accumulates that helps understand disease dynamics, including transmission, incubation period, impact on human health, control measures, treatment and vaccine options, an empirical approach using a broadly similar pathogen is often used. For example, Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS) are both caused by coronaviruses closely related to the virus associated with COVID-19 and were used as possible models for helping to respond to the new virus. This also means that the advice will evolve and change over time as more is found out. For example, people with COVID-19 were not initially considered infectious unless symptomatic (similar to MERS and SARS).

1.1.13 In addition, advice tends to be contextual, and it can be challenging to develop generic advice applicable to all situations without there being the danger of this being misinterpreted or over interpreted. In settings where people are unfamiliar with the science, it is possible for people to hear and process information in a way that means important information or details can be filtered out or misinterpreted. This can be a particular challenge in dealing with people translating what they hear or read into advice provided for policy makers.

1.2 Advisory Bodies

1.2.1 I was not a member or observer of the Scientific Advisory Group for Emergencies ("SAGE"); Scientific Pandemic Influenza Group on Modelling

("SPI-M"); the Scientific Pandemic Insights Group on Behaviours ("SPI-B"); the Joint Committee on Vaccination and Immunisation ("JCVI"); the Joint Biosecurity Centre ("JBC"); or the New and Emerging Respiratory Virus Threats Advisory Group, ("NERVTAG").

1.2.2 I joined the Four Nations' Chief Medical and Scientific Officers group as the Director of Public Health Science for PHS from 17 January 2021 to March 2022. Meetings were initially weekly but towards the end of 2021 they became fortnightly and then monthly from 2022 onwards. I was there to contribute to topic discussions and provide updates on activities within Scotland.

1.2.3 I attended various meetings with UKHSA, often on an ad hoc basis, on a range of topics over the period 06 January 2021 to 02 April 2022. These were either to gain insights on the epidemiology or scientific aspects of SARS-CoV 2.

1.2.4 My understanding is that for all, or most of the meetings described above, the Scottish Government was either a member or observer. Scottish Government therefore had first hand access to the advice from these groups. I am unable to comment on how this changed over the course of the pandemic in Scotland given I started with PHS in January 2021.

1.2.5 For the reasons explained my understanding of the overarching principles that guided core political and administrative decision-making within the Scottish Government during the pandemic is limited to the period January 2021 to April 2022. At this time the Four Harms approach had been in place for several months and was being utilised to guide the response. The four harms comprised, the direct harm to patients, the impact on health and social care services, the impact of measures to control the pandemic on society and the wider impacts of control measures on the economy. Initially, understandably, the focus was predominantly on the first two harms but as the duration of the pandemic lengthened and the impact of the response on society and the economy became more evident, the emphasis changed to the latter two harms.

1.2.6 My understanding is that clinical and scientific advice was provided through several routes depending on the topic. From a PHS perspective, our principal route for clinical and scientific advice to Scottish Government was through the Chief Medical Officer (CMO). This was provided in two ways, either in response to a direct request from the CMO usually e-mailed, verbal or via WhatsApp or by the National Incident Management Team (NIMT). The NIMT brought together representatives from Health Boards (local and national), local authorities, Scottish Government and the Antimicrobial Resistance & Healthcare Associated Infection (ARHAI) team in NHS Assure. The team met each week to consider the most recent epidemiological and scientific data and information and the consensus and advice would be summarised by the Chair and forwarded to Scottish Government. Initially these were framed as recommendations from the NIMT but at the request of the Scottish Government these changed to advice. This change took place before I joined PHS and Dr Jim McMenamin, the chair of the NIMT, who prepared the advice would be better able to explain the background to this change.

1.2.7 There was very little opportunity for PHS to interact with Ministers directly or to attend Cabinet meetings and it would be the exception if this occurred. This contrasts with PHE where there were regular meetings with Ministers and regular attendance at Cabinet Office Briefing Room (COBR) meetings. Nevertheless, very good relationships, both personal and work related, developed between staff in PHS and staff in Scottish Government. This helped considerably when having to seek clarity on requests, negotiate timescales and highlight any issues of concern.

1.2.8 There was more opportunity for PHS to attend the Scottish Government Resilience Room (SGoRR) and the Four Harms group. One of the PHS incident directors, Dr Jim McMenamin, was a member of the Four Harms group and was regularly invited to SGoRR. Latterly, I joined the Four Harms group and attended one or two SGoRR meetings. At these meetings we tended to provide clarification or supplement the epidemiology or assessments of the overall state of the pandemic. The bulk of the content would have been provided to SGoRR as Scottish Government Situation Reports. These were

government produced documents drawing on information and data that PHS and others provided on daily basis. There was good congruence between these reports and the ones produced by PHS and so little if any room to contest the data. The report would also be augmented by the work of the Scottish Government modelling team. I would say that our epidemiological insights and information updates were well received and found to be informative. Advice tended to be channelled through the CMO and other officials.

1.2.9 Given our very limited access to Ministers, I am unable to comment on the degree to which reference to 'following the science' or scientific advice was made. In terms of how effective Scottish Government and its advisers were in managing the messages, I am not aware that such work was undertaken. Generally, it is accepted that the public have a considerable degree of trust and confidence in messages from the medical profession and less so in those from politicians.

1.2.10 My attendance at meetings of the advisory committees of which I was a member was limited to the period after I joined PHS. I saw little interaction between these advisory bodies and public bodies in the management of the pandemic.

1.2.11 PHS was a key source of data, information and advice around various aspects of the pandemic for territorial health boards, local authorities, primary care services, independent sector care providers or other major public authorities or sectors. Given our role in operationalising and developing guidance for many of the policies decided on by Government we were central to helping other bodies contextualise and interpret guidance and policy.

1.2.12 Inevitably there were occasions when the advice provided by PHS was not immediately acted on nor accepted by Scottish Government. Two examples were in relation to mask wearing by pupils in school and the testing of schoolchildren. The details can be provided by Diane Stockton, Consultant in Public Health, but my understanding is that the group that PHS led on advising on school and children related issues recommended that 1) testing of

schoolchildren was not required and was disproportionately disruptive to their education given the usually mild illness seen in children and that children were not a major route for transmission (NP/02 INQ000189574); 2) the wearing of face coverings by schoolchildren should be discontinued given the impact on their mental health and socialisation and the very limited, if any, impact of transmission (NP/03 INQ000189576).

1.3 Informal Decision Making and Communication

1.3.1 In addition to the formal routes for communicating information and advice, there were also informal routes. These tended take the form of phone calls, WhatsApp, and Teams meetings either with individuals or small groups. Apart from WhatsApp, these meeting were unrecorded, and no notes or minutes were kept, often reflecting the pace at which events occurred or staff were unavailable to minute or make notes. Latterly, some of the WhatsApp groups instituted a delete after seven days function to manage content.

1.3.2 The informal routes were often used for ease of communication or where time was of the essence either to clarify a point or get additional information/data. It should be appreciated that in many situations the speed with which some responses were expected and the pressure on time was acute. These informal routes provided a way of rapidly communicating on urgent issues. It is difficult for me to say to what extent any such information was used to underpin or inform any decisions outside of the formal government processes or how effective this was in ensuring consistency and accuracy of data and information.

1.3.3 Apart from the WhatsApp records and the regular informal meetings held weekly between myself, Jim McMenamin/David Goldberg (Incident Directors, PHS), and the CMO, it's difficult to be able to provide a list of all informal meetings I participated in. By their nature these were usually unplanned or spontaneous. The WhatsApp groups I belonged to included Quantum of Omicron, Camera Stellata and Soothsayers. These WhatsApp Groups have been provided to the Inquiry.

1.3.4 I was not aware of any specific PHS or Scottish Government guidance, policies or frameworks which governed or guided any such informal communications and messaging or described the data retention policy.

1.4 Scottish Government Covid-19 Advisory group ("SGCAG") and SAGE

1.4.1 I was a member of SGCAG from 09 December 2021 to 03 February 2022 and attended six meetings of the group. For my first two meetings (19/11/2021, 02/12/2021) I attended on behalf of Angela Leitch, Chief Executive, PHS. I was subsequently sent a personal invitation by the secretariat of the SGCAG to attend the remaining four meetings (09/12/2021, 17/12/2021, 11/01/2022 and 03/02/2022).

1.4.2 The formation of SGCAG preceded my appointment to PHS. My attendance at SGCAG was limited to six meetings. I am therefore unaware of why SGCAG was formed or able to assess whether it or other groups were sufficiently representative of the various competing interests which would be affected by core-decisions relating to the management of the pandemic or the expertise available to the committee.

1.4.3 One of the significant challenges faced by those involved in responding to the pandemic was the need for the definitions used for certain, key, data items, their significance and the frequency of reporting to change over the course of the pandemic. For example, in the early stages of the pandemic when there was uncertainty about mortality associated with SARS-CoV 2 then any deaths following infection with the virus needed to be identified and investigated to understand whether the cause of death was coincidental or may indicate a longer-term consequence of the infection. Once there is clarity on this then there is no longer the need to use this case definition and more reliance would be put death certificates. Keeping the original definition will, over time, overestimate the numbers of deaths. Proposals to Scottish Government to change this were met with resistance by senior decision makers in Scottish Government. Similarly, people with a positive COVID-19 test in hospital remained as a case for 28 days, they were not retested or removed if no longer symptomatic. This was fine if

people were discharged within a few days but it did mean that long stay patients would be counted as cases for the full 28 days, whether recovered or not. When used as a way of counting patients in hospital with COVID, over time this erroneously inflated the true number of cases thus exaggerating the impact. I believe, this was raised with senior decision makers in Scottish Government who initially resisted changing the definition. In general, there was considerable resistance to changing data definitions or how they were presented because as I understood it, people had got used to using them. There was a failure to understand or appreciate the need to change over time either because the purpose of the data had changed or what was needed at a particular point in the pandemic required a different approach.

1.4.4 Having groups such as SAGE/SGCAG that are independent and composed of appropriate experts, grounded in the art of the possible, is needed in a pandemic. I was not involved on the operation of SAGE and only for a short time with SGCAG so I am unable to comment on whether these structures achieved this or how effective they were in advising the Scottish Government during COVID 19. This would also apply to the lack of access in nearly all situations that PHS had to Ministers. Most advice was channelled through senior staff in Scottish Government. PHS had therefore minimal opportunities to provide Minsters with a first-hand account of the thoughts of senior staff in PHS or to make them aware of the practical implications of policy decisions. The main mechanism by which PHS was able to provide advice to Scottish Government was through the NIMT. Following each meeting, the notes complied by the chair were sent to senior advisers in Scottish Government. This would include details of points where there was no consensus or there were alternative options to consider.

1.4.5 Apart from the CMO and the DCMOs working for him, I am unclear what roles the CSA and NCD played during the pandemic or the roles they played on the SGCAG and its sub-groups. Given the limited access PHS had to core decision makers (Ministers) I am unable to say whether differences of opinion amongst advisers and experts were communicated to them.

1.4.6 My understanding is that the CMO usually provided briefings, situation reports about the state of the pandemic or other such regular advice to Ministers. These were often based on reports produced by PHS or other groups at the request of

CMO and other senior government staff. I am unable to say how the format was set or how effective they were in communicating the necessary medical and scientific information.

1.4.7 I think it would be fair to say based on my experience from January 2021 onwards that PHS was commissioned to provide data and information and scientific briefings rather than advice which tended to be provided by senior government staff to inform policy. Interacting with Ministers at the policy formulation stage would be one way of ensuring that what was developed as policy could be implemented and operationalised as we had a key role in operationalising policy through the development of guidance. My understanding is that the final sign off of any guidance was with Scottish Government Ministers and at times this was slow, resulting in delays to final sign off such that on occasions it was out of date and the cycle needed to be started again. Dr Maria Rossi, who led on the PHS guidance development is better placed than I to give examples of where this happened and the impact this had. PHS note within their corporate statement, at paragraph 4.2.8 (NP/04 INQ000237820), that "*the use of different language to express policy intent led to challenges for PHS in the development of guidance*". I would agree with this statement.

1.4.8 PHS assisted as far as possible the CSA, CMO, NCD, the DCMOs and SGCAG and its sub-groups to ensure that the information and advice provided to the Scottish Government, including the First Minster, was transparent, clear and comprehensible throughout the pandemic. Ultimately the final decision on what and how this was presented rested with these groups and advisers. This would also include how conflicting medical and scientific information and advice and data modelling were reconciled and communicated to key decision-makers within the Scottish Government. The challenge in these situations is to ensure that there are mechanisms to address conflicting medical, scientific information and advice arising from these bodies and that advisers to key decision-makers within the Scottish Government are aware of these. I am unable to say what these mechanisms were or how effective these were given my limited involvement with these groups. I joined SGCAG late in the pandemic and I did not get an opportunity to see how significant meetings were conducted and the advice from SGCAG was formulated.

1.4.9 The balance of expertise needed to address the issues that present during a pandemic will vary over the course of the pandemic. Epidemiology will be needed throughout the pandemic to monitor the course of the pandemic, assess a change in the impact and to assess the effects of control measures. During the initial phase, understanding the virus, its effects, how it is transmitted etc will place a heavy reliance on virological, infectious disease and epidemiological expertise. As the evidence accumulates in these areas, expertise in public health, modelling, infection control approaches, communications, logistics and behavioural science come to the fore. The challenge is to ensure that the balance of representation adapts to address the needs as the pandemic evolves. My limited involvement makes it difficult to assess whether this was the case in Scotland or not.

Mechanisms of the Provision of SGCAG Advice

1.4.10 I became a member of SGCAG late in the pandemic and attended four meetings in that capacity. I am therefore unable to comment on the advice or working of the group prior to joining it in December 2021, this would include early advice on NPIs, lockdowns, school, care homes, face coverings and physical distancing or the mechanics of the provision of the group's advice either in the form of "deep dives" with Scottish Government, its role in any impact assessments or the provision of advice to SGoRR or the Four Harms group. I am also not aware of the process by which advice was formulated, including how dissent was resolved or recorded, nor how Scottish Government requested advice or the circumstances in which SGCAG would provide advice on its own initiative and how that advice would be received or used.

1.4.11 As stated, the balance of expertise needed to address the different issues that will present during a pandemic will vary over the course of the pandemic. Ensuring that groups have the appropriate expertise and that this is weighed appropriately in the deliberations and advice of the group is akin to a conductor leading an orchestra. The role of the Chair would be key to this. This would also include identifying any other sources of information or advice that would assist the group in considering any advice to Scottish Government.

SAGE

1.4.12 I was not involved with the establishment of SAGE nor a member or observer of it or any of its subgroups so I am unable to comment on its membership, composition and how the devolved administrations were represented or interacted at meetings and the subsequent effect that may have had on the management of the pandemic in Scotland. Given my brief period of time with SGCAG and the timing of my membership with SGCAG it is not possible for me to comment on whether there were any differences in approach taken by SAGE and SGCAG, how the data, modelling and advice from SAGE were used alongside that from SGCAG in the provision of medical and scientific advice to key decision-makers in the Scottish Government and how any conflicts were reconciled and explained or departures between the two were communicated. I am not able to comment on whether there were any situations in which Scotland had limited access to data, information or advice from SAGE.

1.4.13 All pandemic planning was made on the assumption that the next pandemic would be caused by a new strain or variant of influenza. Plans were therefore in place for this eventuality and, as intimated at the beginning of this report, based on what was known about SARS-CoV 2 at the time, it was reasonable to manage the response on the same basis as influenza. It is fair to say that most countries in the world took an approach like this at the outset. I am unable to say how this translated to the management of the pandemic in Scotland. It is worth noting that the lockdowns that were implemented by many countries were not planned for, nor were they one of the measures that it was anticipated would be used during a pandemic.

1.4.14 Considering the roles of SAGE and SGCAG as part of a whole systems approach and being clear about how the respective roles and remits of these groups within that whole systems approach complement and supported each other, rather than duplicating the roles within a UK and Scottish context, would help to minimise opportunities for duplication and differences. I cannot give specific examples of the duplicating roles within a UK and Scottish context. This is based on comments

from various colleagues but unless the two bodies have very clear remits, the primacy and hierarchy of the advice is recognised (SAGE trumps SGCAG or are they both equivalent) and there is excellent communication then it is likely that there will be occasions when different advice or conclusions are drawn. It will also be important that there is input at some point from those with an understanding what is practically possible within the available operational resources to avoid valid, but unworkable proposals being offered. By way of explanation, members of these committees are often appointed for the expertise they can bring and inevitably these predominate in academia and may not have insights into operational practicalities, availability of resources, legality, and achievability in practice. For example, I have seen statements saying that more extensive testing should have been carried out in the early days of the pandemic. I wouldn't disagree but the reality was that the available testing in the early days was extremely limited. There were calls to have a vaccine available in 100 days; these people clearly had no insight into what is needed to develop and safely deliver an effective vaccine en masse. This was barely possible in a flu pandemic where all the approvals were in place, there was an understanding of the vaccine efficacy and safety and manufacturers were geared up to produce the vaccine in quantity. It is this lack of understanding that needs to temper purely academic views.

1.5 Data and Modelling

Daily data

1.5.1 Daily data about transmission, infection, mutations, re-infection and death rates in Scotland came from a variety of sources;

- Testing data came from Health Board laboratories, from the Glasgow Lighthouse laboratory (one of a network of laboratories commissioned by UK Government to undertake high throughput testing for SARS-CoV-2. The UK nature of its operation created practical difficulties for sequencing Scottish samples in a timely way – it was not possible to identify Scottish samples until after they had been sent down to the Sanger Institute for sequencing and this impeded the operation and

effectiveness of the Scottish sequencing service) and the three Scottish Hub laboratories undertaking PCR testing. The data was collated and processed by PHS to create useful intelligence on infections and re-infections. When linked with epidemiological data, insights into disease transmission were obtained.

- Whole genome sequencing (WGS) is a technique used to identify the different variants (mutations) of SARS-CoV 2. At the start of the pandemic, capacity in Scotland to undertake WGS was rudimentary and there was a heavy reliance on sending isolates to the Wellcome Sanger Institute in Cambridge under the auspices of the COVID-19 Genomics UK Consortium (COG-UK), a group comprised of the UK's four public health agencies, National Health Service organisations, academic partners and the Wellcome Sanger Institute. This was created in April 2020 to collect, sequence, and analyse genomes of SARS-CoV-2 as part of COVID-19 pandemic response. During late 2020 and early 2021 work, led by PHS, was undertaken to develop the infrastructure and capacity to deliver the service in Scotland.
- Death data was obtained from National Records Scotland and linked with data held by PHS to provide insights into mortality rates and vaccine effectiveness measures.

1.5.2 Much of this analysis was possible because of the use of data linkage to bring together data from a variety of different systems to answer key questions such as hospitalisation rates and disease severity. A key development was EAVE 2, Early Pandemic Evaluation and Enhanced Surveillance of COVID 19, a tool that was derived from a project using data linkage that had been kept in hibernation since the pandemic in 2009 and that was activated to address issues such as spread of the disease, impact on health and critically, vaccine effectiveness. My colleague, Dr Jim McMenamin, would be better placed to provide more detailed information in relation to this and the other aspects of surveillance given I joined PHS in January 2021 and my role was at a more strategic level.

1.5.3 The pandemic and the need for rapid and reliable clinical data highlighted several areas where the systems across Scotland were in need of investment, in terms of

infrastructure and manpower. Coding of data is labour intensive and it was several weeks before results were available for analysis, the Electronic Communication of Surveillance in Scotland (ECOSS) that held all positive microbiology laboratory specimen results was in need of urgent updating, and infectious disease surveillance systems in the community and secondary care settings were rudimentary. This hampered initial surveillance and understanding but as the pandemic moved on, and systems and support were put in place, this improved.

1.5.4 There was little if any designated modelling capacity in PHS and there was reliance on modellers from academic institutions, the Scottish Government and UKHSA (latterly PHE) for modelling input to assist with understanding the trajectory of the pandemic and the impact of various interventions.

Digital solutions

1.5.5 During the pandemic, several digital solutions, both government and private sector sponsored, were introduced to help manage and understand the evolution and impact of the pandemic. Some were used to collect data to inform an understanding of what was happening e.g. the PHS Covid-19 Dashboards and Zoe app, and other digital solutions such as NHS Scotland Covid status app, the Protect Scotland app and the Check In Scotland app were used to manage operational aspects of the pandemic. People will have differing views on the relative benefits depending on which aspect of the pandemic they were involved with and what they did with the data.

1.5.6 The PHS Covid-19 Dashboards were developed to provide public, real-time data on how the numbers of cases were changing daily and over time by locality and other key characteristics. It provided a common narrative, one version of the truth, to allow informed discussion and debate and a means to explain and justify policy and guidance. There can be no doubt when one examines the data on usage, the frequency with which the dashboards were accessed and the use of the data by a wide range of organisations as to the usefulness of this initiative. However, over time its usefulness waned and, as described at 1.4.3, there is a need for the data being provided to be in line with what is happening within the pandemic.

1.5.7 In the early days of the pandemic, counting infections, positive COVID tests, in a naïve population was a good marker of spread and disease impact but, once widespread population immunity becomes established, either through vaccination or natural infection, then the significance of a positive test changes. As population immunity grows and the virus adapts and changes then disease severity, hospitalisations and deaths, reduce and the significance of positive tests diminishes. Changes to who or what groups testing is offered to also impacts on the numbers reported and therefore the interpretation of the figures. During the pandemic, the media and government continued to use the number of positive tests as a measure of impact even though this was no longer a useful marker of impact and to what was happening in the population. It is therefore important that the data and parameters used to assess impact on the population are kept under review and, based on the science, these are changed when needed and the rationale clearly explained.

1.5.8 The Zoe Health Study, formerly the COVID Symptom Study, is a health research project of British company Zoe Limited (formerly Zoe Global limited) that used a mobile app created in 2020 in response to the COVID-19 pandemic. The initial purpose was to track COVID-19 symptoms and other salient data in many people, to enable epidemiological results to be calculated and allow, not just tracking of the pandemic, but an indication of how the disease was changing over time.

1.5.9 The NHS Scotland Covid status app, the Protect Scotland app and the Check In Scotland app are all examples of digital innovations to help to manage the pandemic. The NHS Scotland COVID app provided an official means of allowing people to demonstrate their COVID vaccination status. This was at a time when countries across the globe were introducing travel restrictions requiring evidence of COVID 19 vaccination in the belief that vaccination might reduce transmission. There was also discussion in Scotland about using this as a way of allowing the gathering of people at events. While reduction in transmission was a hoped-for benefit, studies have now shown that vaccination does not prevent transmission and asymptomatic and mild symptomatic infection can occur. This app allowed people to travel at a time when many countries only allowed the travel of

vaccinated travellers but I am not aware that the data from this app was reported or used nationally.

1.5.10 The Protect Scotland app to potentially alert people that they had been in contact with someone with COVID was used to manage the pandemic response. It relied on people taking action to self-isolate on receipt of information about contact with a person who had tested positive. This created enormous staffing issues in the NHS and other organisations as people were informed and implemented self-isolation advice. It was known in England as the "pingdemic" and created substantial staffing challenges at a time when the NHS was responding to the pandemic. I am not aware that the data from this was used to inform policy or any assessments.

1.5.11 The Check in Scotland app was to enable places where people gathered, such as restaurants and bars, to record the contact details of people visiting the premises so that in the event a case of COVID-19 was identified, those attending at the same time could be contacted and asked to self-isolate. It was posted as a way of allowing use of restaurants and bars. I am not aware that the data captured by this app was used either by PHS or presented nationally. I suspect that it would have had limited use in practice – a representative of a Health Board would be better placed to say what, if any, use was made of this app.

Access to data

1.5.12 Although, PHS had access to most data that it needed; the challenge was access to primary care data and data in social care. In England, the Secretary of State made the provision of primary care data obligatory, this did not happen in Scotland and initially permission needed to be sought from each practice in order gain access to the data. Over time PHS reached an agreement with the Royal College of General Practitioners and the British Medical Association that, for a time limited period, data could be provided from primary care through a third party to allow projects such as EAVE 2 to estimate the impact of the pandemic and vaccine efficacy. I am not familiar with the issues related to social care, in particular care

homes, and Dr Maria Rossi in PHS would be better placed to provide background and the detail.

1.5.13 I am unable to provide any insight into how effectively the systems for the collection and dissemination of data between Scottish Government directorates and between the Scottish Government, PHS, the NHS and the care sector worked or how, in general, data sharing was improved, if needed, given that these were issues that preceded my appointment in PHS. Dr Jim McMenamin would be better placed to provide information on this issue.

Use of data

1.5.14 Data visualisation is a recognised and widely used way of presenting data in an easy-to-use format that make interpretation and understanding easier. It was incorporated into the PHS COVID-19 dashboard to help and provide context for the public. I am unable to comment on the extent to which this was used within government to help decision makers understand the advice they were given.

1.5.15 Data was used extensively to assess the impacts and effectiveness of non-pharmaceutical interventions – this included routine sources of data and data from novel surveillance systems introduced during the pandemic. The novel systems included the Office for National Statistic (ONS) survey which tested random samples of the population each week and the testing of wastewater. Both these systems provided an estimate of prevalence and incidence that was independent of the testing being offered. The wastewater scheme was also independent of peoples' testing behaviour and was therefore a closer match to what was actually happening in the population. This was a very positive innovation and one that should continue and be expanded to other infectious diseases such as norovirus, an important cause of vomiting and diarrhoea that is largely under reported.

1.5.16 I am unable to comment on the data available to Scottish Ministers or how it was used relating to either the movement of individuals as a means of trying to control transmission, compliance with restrictions or contact patterns as I am not familiar with either the UK-wide CoMix study or the Covid-19 Scottish Contact Survey.

Modelling

1.5.17 I understand there were several components to the modelling inputs in Scotland. There was the modelling undertaken by the scientific pandemic influenza modelling group (SPI-M) under the auspices of SAGE. This was used by modellers within Scottish Government, with contributions from Professor Chris Robertson, to develop trajectories for the potential scenarios that were identified. Given I joined PHS in January 2021, I am not aware of what discretion/scope SGCAG had to commission its own modelling or what advice it provided to Scottish Ministers about sourcing modelling expertise and any views about how comprehensive such modelling was. This would also include how the different projections generated by different models were reconciled and their differences and any limitations explained to decision-makers in the Scottish Government.

1.5.18 From my observations from mid-2021 onwards I would say that there was timely access to modelling, but the adequacy and reliability was not clear. There were fairly wide confidence intervals in the projections making it difficult to say with any degree of reliability how the pandemic was actually evolving. Providing reliable modelling data was challenging at the start because of a lack of testing capacity and the absence of data on how the virus would impact the population. Over time it became more challenging as data from testing reduced due to changes in the way testing was undertaken. I am unable to provide a view to what extent there was a consensus approach to modelling adopted throughout the pandemic, the extent to which different scenarios were modelled, whether there was an overt or covert bias towards specific outcomes or whether the models were sufficiently transparent in relation to the key assumptions factored into the model including the sensitivity to errors.

1.5.19 Generally speaking, models are only as good as the assumptions that are factored into their creation. At the beginning of the pandemic when little was known about the new virus any modelling would provide a very wide range of possible outcomes. For example, basing assumptions on either SARS/MERS or influenza would give quite different outcomes, durations of pandemic etc. In the 2009

influenza pandemic, initial modelling suggested severe outcomes, but as evidence accumulated this was modified in the opposite direction. I believe the sharing of models should happen when there is some reliability around the basic disease parameters being built into the model, otherwise there is the potential for complacency or undue panic.

1.5.20 Understanding the data and modelling information advice (including its limitations) can be challenging and requires a good insight into the model parameters, the basis on which any assumptions are being made and the limitations of the data being used to run the model. This becomes increasingly problematic the more factors you try to build in and the outputs you require, particularly given the presence of so much uncertainty and, in certain issues, the lack of any useful source data. If the duration of the pandemic had been known would certain decisions affecting the economy, society, education, and health have been made? The same would apply to questions about the impacts on vulnerable and at-risk groups.

1.5.21 Throughout the pandemic PHS and others endeavoured to ensure that data was made available to academic researchers/modellers throughout Scotland to enable wide ranges of models to be generated and used in planning the management of the pandemic. There were a number of challenges to this that included data protection, having the systems in place that would facilitate the collection and sharing of data, and limitations on the quality and timeliness of data. Many researchers were ill informed about the types and quality of data that was available and the ease and speed with which this could be made available resulting in unrealistic expectations and disappointment.

Recommendations

1.5.22 I think there are several things that could be done to improve data usage:

- ensure that there is a robust digital infrastructure in place that will allow data sharing, the handling of large amounts of data and to do this in a timely way

- develop ways to share data with Health Boards and for them to access their own data
- accessing primary care data was a real challenge and systems and processes should be put in place to enable this to be shared in a timely fashion
- utilising all the available data sources was hampered by a lack of tools to easily share intelligence rather than simply data; this would include software and the staff able to adapt and utilise software tools across a range of data sources
- Scotland has different data sources and therefore different data definitions; agreeing standard case definitions in advance or very early in a pandemic would be useful
- Having robust data sharing agreements in place for routine and emergency measures with the other DAs and organisations within Scotland. This was a particular issue with England where the data flows were only one way – Scotland to England
- The Glasgow Lighthouse was part of a UK funded initiative to undertake high volume testing of samples. Unfortunately, the way testing was configured given the locus of control was in England, meant that it was not possible to identify positive Scottish samples before they were sent to England for sequencing. This resulted in delays to the sequencing of important isolates and the transfer of the isolates resulted in a degradation of the quality of the viral isolates leading to an increase in the proportion of samples for which sequencing could not be undertaken. Despite months of effort this could not be resolved. It seriously impacted on the ability of Scotland to develop and fully utilise the investment in WGS equipment and people that had been made by Scottish Government

1.5.23 I have nothing to add that may be of substantial interest to the Inquiry in relation to modelling. This was something that had been established prior to taking up my post in Scotland and I am not familiar enough with the detail of the modelling that took place in Scotland in order to highlight what worked well or where there were issues, obstacles or missed opportunities, during this period.

1.6. Other sources of information/advice

International sources of information/advice

1.6.1 I am aware that PHS collaborated and liaised with the United States Centre for Disease Control and Prevention (CDC), WHO, ECDC and the Ministry of Health in Israel on work related to vaccine effectiveness, the sharing of data on variants and their impact and the early outcomes of the analysis of EAVE 2.

1.6.2 Sharing information and data with international colleagues allowed assumptions to be tested and validated and gave early insights into new findings and information. Such exchanges may have guided the interpretation of Scottish data and provided potential insights into advice provided to Scottish Government.

1.6.3 Covid-19 was a new infection with multiple sources of evidence and commentaries across the globe and in the UK. Early advice was based on parallels with what was known about the generic nature of coronaviruses rather than the specifics of SARS-CoV-2. This evolved over time as data accumulated. For example, there were concerns about the quality of the data coming out of China and this was a concern given the reliance on the data from China in the early stages of the pandemic.

Other sources of information/advice

1.6.4 PHS had little direct access to decision makers, eg Ministers, and our advice, when asked for, was channelled through either the NIMT or senior advisers within Scottish Government and it would therefore be for them to help core decision makers understand the context and limitations of any advice .

1.6.5 Consistency of case definitions and terminology across the UK was an issue and consistency was essential to assess the progress of the pandemic across the UK and between different countries, the impact of the measures that were being taken, and to provide a common language and way of presenting complex data. While UKHSA tended to take the lead there was nothing to stop each Devolved Administration (DA) taking a different approach or pushing UKHSA to change its approach. For example, within the context of contact tracing, Scotland considered the date of onset of symptoms as day 1 whereas in England the date after the onset of symptoms was considered as day 1. This was problematic when trying

to estimate how long someone should be in isolation for and was in place for over 12 months before finally being changed.

1.6.6 I am not aware of any medical or scientific advice, evidence or data, beneficial to inform the decision-making processes, that was not provided to key decision-makers in the Scottish Government.

1.7 Intergovernmental working

1.7.1 There were a number of routes by which working among the medical and scientific advisers of the four nations would be coordinated – SAGE, SPI-M, the four CMOs meeting, UKHSA facilitated meetings, SPI-B, JCVI, JBC; or NERVTAG. I can provide the list of four CMOs meeting that I attended and minutes/notes from them however these may already have been provided to the Inquiry by others.

1.7.2 The only group I attended was the UK Senior Clinicians group from January 2021 onwards. The meetings were well established before I was invited to become a member in my role as Director of Public Health Science in PHS so I am unable to comment on the objectives. My recollection is that action notes were taken (there were no formal minutes) and there was the occasional paper. I expect that these documents will already have been provided by the CMO's office. I believe the outcomes of the meetings were communicated by CMO's office. I had no role in relation to that.

1.7.3 I can only speak from my understanding and say that the discussions in the senior clinicians' group, involving as it did, key scientific and clinical experts and policy advisors, were helpful in providing approximate timescales and insights into the general approach being adopted to manage the pandemic in each devolved administration. I understood that as an advisory group there were further steps that formed part of any final decision or timeline.

1.7.4 I was not aware of the relationship between the Scottish Government and the Office of the Secretary of State for Scotland and am therefore unable to comment on how well this worked.

1.8 Conclusions and Lessons Learned regarding medical and scientific advice

1.8.1 PHS came into being in April 2020 and had just formed as an organisation, it was therefore working through staffing, relationships, and internal organisational structure and processes. There were just over six whole time equivalents (WTE) staff in the respiratory team, no emergency response team or field epidemiology team and therefore the capacity to prepare and communicate medical and scientific advice was limited. Moreover, there was little, if any, direct access to key decision makers such as Ministers and advice from PHS came through the lens of Scottish Government staff. Appropriately trained and experienced public health staff were in short supply and there was little evidence of any workforce planning in this area and therefore the ability to respond appropriately and speedily was impaired. Preparation should start in the period before any pandemic and the establishment of a pandemic preparedness centre supported or coordinated by PHS would provide a way of considering and advising on many of the issues that it could be anticipated would be needed in a future pandemic. For example, developing surveillance systems and looking to ensure primary and secondary data is available in a timely way when needed or considering what laboratory and diagnostic capacity might be needed and looking at how this could be achieved.

1.8.2 There is a case for and against publication of advice during a pandemic. On the one hand this would show transparency, demonstrate how consensus was achieved if there were differing views, and make clear the rationale and information used to advise core decision-makers. This could help to inform the population, encourage compliance and would be explicit as to what the current scientific advice views are and how that is used by Scottish Government to make policy. On the other hand, there might be a tendency for advice to be written in such a way as to be ambiguous and therefore unhelpful, and a difference in views could undermine confidence. On balance however, I think it would have been beneficial as, in my experience, once trust is lost it is very difficult to regain.

1.8.3 Although not working for PHS in 2020 there were issues that made me reflect on how information was communicated and interpreted by senior decision-makers

within Scotland. The initial policy objective of Scotland was to eradicate COVID 19 from Scotland. It was evident to myself and others working in infectious disease control that this was never going to be a feasible option for Scotland given its land border with England and the asymptomatic nature of transmission. New Zealand was able to do this for a period but not indefinitely. This approach therefore focused activities in areas which would not achieve the desired outcome at the cost of other activities and other impacts on society.

2. INITIAL UNDERSTANDING OF AND RESPONSE TO COVID-19 IN THE PERIOD FROM JANUARY TO MARCH 2020

2.1 Initial understanding of nature and extent of threat

2.1.1 I first became aware of Covid-19 when I was working for PHE. I do not have access to my PHE e-mails and therefore the following is based solely on my recollection. There are some areas that I am not able to address at all without access to emails.

2.1.2 I first became aware of the possibility of a cluster of cases of pneumonia of unknown origin appearing in China in late December 2019/early January 2020. By the time the virus sequence was released by China on 11 January 2020 PHE had already established an incident management team to monitor events and consider what action was needed within PHE. It was only on 11 January when the virus sequence was released that the closeness to SARS was noted and efforts became focused on managing a SARS like infection.

2.1.3 Given the similarity to SARS I was concerned about the real possibility this could be the next pandemic and that it was only a matter of time before the UK was affected. There was a hesitancy to initially act within the UK government, partly I suspect because of what was interpreted to be an overreaction to what happened with the 2009 influenza pandemic; that this might be managed like the SARS outbreak in 2002 and the need to gather evidence to justify next steps.

2.1.4 Information was slow to come out of China and very limited. Most information came from Promed rather than any official Chinese channels which stated that the situation was under control and played down the extent of the problem. Inevitably, parallels were drawn with the 2002 SARS outbreak when the information coming out of China was sparse and the Chinese Government initially denied that there was a problem. There was therefore the view that the situation was likely to be worse than that being reported. WHO are reliant on the information provided by China and in the early days were limited in what advice they could provide.

2.1.5 Given the genetic similarity to SARS, at the outset it was considered that COVID-19 could be spread by the respiratory route (droplet and a lesser extent aerosol), through fomites and possibly enterically. Thus, close range transmission was considered the predominant method of spread. As more information became available the focus remained on respiratory (droplet) and fomite transmission. As in SARS, long range transmission through aerosols[1] (NP/05 INQ000319418) was considered as a route of transmission but, like SARS not considered the predominant route. Using SARS as the initial model was therefore appropriate.

2.1.6 It was assumed at the outset that COVID-19, like SARS, could be spread person to person. It was not until later that pre-symptomatic and asymptomatic spread was recognised (unlike SARS). Community transmission, exponential growth and keeping the R-rate below 1 are basic tenets of infectious disease epidemiology and control – they were considered at the outset. The incubation period of Covid-19 was considered similar to SARS but later found to be shorter. The potential severity of the consequences of infection was always assumed to be serious given the parallels with SARS and the early data (even unofficial) from China. This would evolve over time as data from our own studies and those of others, became available.

[1] Yu IT, Li Y, Wong TW, Tam W, Chan AT, Lee JH, Leung DY, Ho T. Evidence of airborne transmission of the severe acute respiratory syndrome virus. N Engl J Med. 2004 Apr 22;350(17):1731-9. doi: 10.1056/NEJMoa032867. PMID: 15102999.

2.1.7 I am unable to comment on whether the essential features of the virus and diseased were properly understood by core decision makers in Scotland as it preceded my appointment with PHS. However, given the parallels being drawn with SARS at this time, the asymptomatic nature of the infection and its potential to spread from asymptomatic people was not initially considered likely, it only started to emerge towards the end of this period.

2.2 Pre-lockdown response

2.2.1 Again I highlight that I do not have access to my PHE emails and I did not join PHS until January 2021. This should be borne in mind when considering my comments in this section.

2.2.2 Generally speaking, the response in Scotland was inhibited by a lack of access and capacity to undertake widescale testing. Identifying cases early in an outbreak has the greatest potential to bring it under control quickly and effectively.

2.2.3 The FF100, was an approach developed prior to 2009, that attempted to undertake an in-depth assessment of the first few hundred cases, in order to provide important insights into transmissibility, incubation period, severity and clinical markers. I am not able to comment on how useful FF100/other such surveillance was in aiding understanding of the nature and spread of Covid-19 in the UK and in Scotland during this period.

2.2.4 Scotland introduced a requirement to wear face coverings in advance of the rest of the UK. The benefit of this was questionable given that evidence of an impact on transmission of respiratory infections by trained healthcare workers using surgical face masks (manufactured to prescribed standards and quality controlled) is weak. The protection offered by face coverings of unspecified quality/manufacture by a population not used to wearing masks or face coverings is likely to be very low to absent. Pandemic preparedness plans for influenza acknowledged this issue. The downside was not really

acknowledged either as it is possible that this measure may have resulted in people thinking they are protected and not taking other steps with more impact, such as staying at home or keeping a safe distance. Face coverings, usually cloth, would themselves have posed an infection risk if not handled correctly, washed each time or disposed of properly.

2.3 Flattening the curve

2.3.1 In outbreaks, epidemics, and pandemics, the epidemic curve is a term used to measure and show the case counts as they occur over time. Typically, there is an initial surge of cases that rapidly reaches a peak and that then starts to diminish more slowly over time. The peak, when cases are at their highest, is the point at which health services and other public bodies across society are most likely to be unable to cope with the sheer volume of cases. By using interventions that sufficiently slow down the number of new cases and "flatten the curve", it is hoped that the peak in cases will be reduced allowing services to cope, albeit at a heightened level of activity. The idea of flattening the curve is well established in pandemic preparedness planning and was a strategy deployed in the 2009 pandemic. In this case, it was the distribution of antivirals to people in order to mitigate symptoms and relieve the pressure on the health services.

2.3.2 The shape and size of the epidemic curve tends to be population/country specific, reflecting background immunity, general state of health, population density and behaviours, and degree of societal movement and interactions. Using early case data, models are developed taking into consideration what is known about the infection and its effects on health, and societal structures and behaviours. These models are then used to estimate what the likely impact might be and the effect of any interventions to prevent or contain spread of the infection. The models are only as good as the assumptions they incorporate and the data on which they are based. Generally, the more data that is available and the more an infection is understood the more accurate the model. It is therefore important to understand that whether the data is adequate or not it is all there is at the start of a pandemic. You only really know what the curve

is and the impact of any measures retrospectively. The measures utilised during the pandemic were based on well-established public health interventions tailored to what is known about the infection, transmission etc.

2.3.3 Minimising case numbers to limit spread was a key component of the UK strategy. I cannot comment on the Scottish strategy as it pre-dates my time at PHS.

2.4 Herd Immunity

2.4.1 Herd immunity is a well-established immunisation concept usually used to describe the point at which population coverage of vaccine for a specific infection is high enough to minimise the risk that those who are unvaccinated will become exposed to an infection. The level at which this protection becomes relevant will vary depending on the effectiveness of the vaccine and the transmissibility of the infection being considered. For example, measles is highly infectious and coverage of over 90% is aimed for. Herd immunity can also be acquired through a combination of vaccine and naturally induced immunity. Where there is no vaccine there will be a point in an outbreak, epidemic or pandemic at which sufficient people will have developed natural immunity to an infection so that transmission of the infection is controlled. The impact of measles in the Americas illustrates this. The native population of the Americas had no immunity to measles and this had devastating effects when introduced by European settlers who, over a long period of time, had reached the point where enough of the population had been exposed to minimise the impact of the infection. Herd immunity is something that arises over time or because of active immunisation of a significant proportion of the population. I am not aware of any strategy to achieve herd immunity outside of active immunisation of the population.

2.4.2 I am unable to comment on whether 'herd immunity' formed part of the Scottish Government's initial strategy as it preceded my appointment with PHS. However, I am not aware that herd immunity was ever part of the UK Government's response to the pandemic. I am unaware of any such

recommendation by SAGE. Again I am unable to comment on SGCAG as it preceded my appointment with PHS.

2.4.3 The most effective protection that can be offered to vulnerable groups is vaccination. Herd immunity will offer a degree of protection to those who cannot or will not be vaccinated by reducing the level of people with an infection circulating in a community. Extensive efforts were made by PHS to try to understand why vaccine uptake was low in certain groups of the population or geographic areas. The attached evaluation describes the work that was done and how this was used to try to identify what the blocks to vaccine uptake were so that we could then consider what could be done to address these (NP/06 INQ000147517).

3. TESTING

3.1 From January to February 2020 tests were relatively few in number. I can only comment on the factors that would need to be considered rather than the detail. There was no existing test for SARS-CoV-2 so this had to be developed de novo. The virus or the genetic sequence was needed to develop the test. Decisions had to be made about which part of the virus to test for. The test that was developed then needed to be validated. It needed to be rolled out to laboratories. Commercial manufacturing was needed – there were issues with access to reagents given the platform used relied on testing kits and equipment manufactured in Germany. It all pointed to future considerations as to how mass testing could be readily stood up within the UK. There simply was not the capacity to undertake mass testing from February 2020.

3.2 Testing is essential to identify cases in order to build our knowledge of the disease and infection, understand transmission and put in place measures to control the spread of the infection. Access to testing was very limited in the initial phases of the pandemic for reasons already described – reflecting a historic lack of

investment in manufacturing capability. More generally there had also been a reduction in overall laboratory capacity, so that the ability to flex in situations like this were limited.

3.3 PHS have led a needs assessment and gap analysis around laboratory diagnostics in Scotland. This included the following:

a. The Needs Assessment, **"Findings and recommendations of Needs Analysis Questionnaire and Workshop to identify the Scottish Public Health requirements from microbiology services report of 2012"** (NP/07 INQ000319424). This was published on 12 September 2022. This was approved by the Scottish Health Protection Network and by PHS Executive Team prior to publication rather than Scottish Government. This followed workshops held with a wide range of stakeholders including Scottish Government to agree and finalised the list of needs.

b. **Pathogen Genomics Strategy for Scotland 5 year strategic plan 2024-2029 (June 23)** (NP/08 INQ000319420). This was sent to Scottish Government on 13 July 2023. Scottish Government have responded to confirm that the policy lead for the Genomics Strategy shall be their Population Health Resilience and Protection Division. They ask that a business case be developed and confirmed they are content for it to be co-badged. They confirmed the document clearly sets out the rationale for why embedding pathogen genomic sequencing capability should be part of our business as usual approach and the benefits that will bring to our surveillance programmes and response to pathogens of public health concern including preparedness for future pandemics. This aligns with the direction of travel for other UK nations. The Health Protection Oversight Group has categorised exploring current and future cooperation across the 4 nations on pathogen genomics as a high priority work programme. It would create a positive legacy from the SARS-CoV-2 service, transitioning into a sustainable pathogen genomic service. However, given the challenging budgetary situation a key question is how it can be matched to

the resource available, which is unlikely to result in any additional investment for the foreseeable future.

c. **Executive Summary: Gap Analysis of Public Health Microbiology Services in Scotland (August 2023)** (NP/09 INQ000319421**).** This was sent to Scottish Government on 31 August 2023. As of the date of writing this statement we are awaiting their response.

4. DECISIONS IN RELATION TO NON-PHARMACEUTICAL INTERVENTIONS

4. 1 General regarding Non-pharmaceutical interventions

4.1.1 Most of the decisions regarding NPIs were made prior to my appointment at PHS, therefore my comments on this topic are very limited.

4.1.2 In relation to the strategy for schools my colleague Diane Stockton, consultant in public health, led on the PHS work relating to schools. In my view, given that for COVID 19, unlike flu, most transmission occurred outside of the school aged cohort, it is unlikely that the school closures were effective in reducing transmission of the virus.

4.1.3 Although I saw no written confirmation of this, my understanding on this issue was that schools remained closed during the second lock down because of concerns about the impact of COVID-19 on teachers. Colleagues have in fact undertaken work in this area that showed that teachers were at no greater risk than the general population.

4.1.4 In relation to face coverings, I was not involved in discussions directly related to this issue. However, I would question why face coverings were required given the lack of evidence of their effectiveness.

4.1.5 The use of a tiered approach to restrictions was also one that was adopted during COVID 19, both in Scotland and the rest of the UK. An example of how this was applied is that when restrictions were easing in Scotland, Glasgow and Moray

remained in level 3 restrictions. After the National Incident management meeting on 13 May 2021 (NP/10 INQ000197747) where this was discussed the Chair, Jim McMenamin, wrote to Scottish Government stating that *"the NIMT supported the Lockstep advice regarding the planned moving down from L3 to L2 across Scotland (excluding the Island NHS boards which will move to L1) for 17 May. However, this is with the further exception of the Moray Local Authority area in NHS Grampian which the NIMT advise should likely remain in L3".* The rationale for this was that, *"The continued increased cumulative incidence, high proportion of symptomatic cases and detection of unlinked cases is consistent with sustained community transmission in Moray. The NIMT are encouraged that there has been no further translation of increased cases into an increase in hospital admission. The NIMT will however continue to keep this situation under weekly review".*

4.2 Lessons Learned regarding non-pharmaceutical interventions

4.2.1 In terms of lessons learned, the following article, "An interrupted time series analysis of the short-term impact of social restrictions on incidence rates of COVID-19 in Scotland in late 2020" (Submitted in 3 parts - NP/11 INQ000319417, NP/12 INQ000319427 & NP/13 INQ000319415) has been submitted for publication based on work that has been done in PHS. It is currently in the peer review process. There is also a paper "Evaluating public health effects of risk-based travel policy for the COVID-19 epidemic in Scotland" (NP/14 INQ000340024 that has been submitted for publication and may have been published as a pre-print. Other lessons learned from the evaluation of NPIs can be found in an evaluation of shielding carried out by PHS (NP/15 INQ000202564).

4.2.2 It is often the case that when lesson learned exercises are carried there are a series of changes or recommendations made. The critical issue is whether there are mechanisms or systems in place to take forward and implement to any proposed changes. I am not aware that any system was put in place to ensure lessons were acted upon in the subsequent management of the pandemic.

5. DECISIONS RELATING TO THE PERIOD BETWEEN APRIL 21 AND APRIL 22

5.1. The move to level zero

5.1.1 I was not part of the discussions or the provision of advice to the Scottish Government regarding the COVID passport scheme and so am unable to comment on the information or advice the strategy was based on. However, I offer some general observations in relation to this.

5.1.2 Proof of vaccination has been used as a way of minimising the international transmission of certain infectious diseases for many years. This is on the basis that the vaccine prevents the spread of an infection from an area where it is endemic. Yellow fever is the only infection where there are currently international regulations requiring vaccination when visiting or returning from an endemic country. The vaccine provides excellent protection and is effective at preventing infection and transmission of the yellow fever virus.

5.1.3 The SARS-CoV-2 virus is continuously evolving and changing, with new variants emerging periodically. The current COVID vaccines are generally specific to a variant or closely related variant and provide limited cross protection to other more distantly related variants. The SARS-CoV-2 vaccines are primarily used to mitigate the severity of the infection in the population. They reduce, but do not prevent, transmission of the virus given the variable effectiveness of the different vaccines to different strains.

5.1.4 A COVID vaccine passport scheme would therefore not be an effective way of reducing the spread of COVID and may in fact provide false re-assurance if used in this way. However, if as a condition of entry, countries require evidence of COVID vaccination, it would be necessary for the government to provide an official way of confirming this.

5.2 Omicron

5.2.1 I first became aware of the omicron variant on 27 November 2021, when two cases of the new omicron variant were identified in London by the UKHSA. By the next

day we became aware of cases in Scotland. Over time we received information from UKHSA, WHO, and information coming out of South Africa, where the variant was first identified, about the rapid increase in growth of this variant, increased transmission but with less severe disease requiring hospitalisation. Like many places, within a matter 4-5 weeks, Omicron became the dominant strain across Scotland. There were a number of cases linked to NHS staff Christmas parties. The advice from the NIMT to Scottish Government on 10 December 2021 (NP/16 INQ000319419) was that "the effect of pre-Christmas day "Christmas – parties" has already generated significant NHS and Education incidents and resulting NHS service pressure (e.g. due to high clinical attack rates in these staff and self-isolation requirement) in NHS Lanarkshire. There is an opportunity to act prior to the peak in "Christmas party" activity as, if representative of future incidents, these parties could cause significant impact on NHS Services. From a Public Health harm 1 perspective advice was to discourage all such parties (PHS recognises. Failing this advice NIMT asked that consideration be given to an appeal to HSCW staff to avoid/defer such parties. The substitute of asking individuals to be as safe as possible through a combination of LFD test before attendance and other measures was deemed a distant third to the public health benefit that would otherwise follow from the first or second". This was later translated into government advice.

5.2.2 It also became clear through December and into January that the bulk of cases were in the young adult population. This was important for two reasons – in general, younger people did not experience the more severe symptoms of COVID-19 and given the greatest impact of the disease was in older people this inferred that the benefit of vaccination was still holding up or/and that this variant was less severe across the board.

5.2.3 Apart from the observation of clusters of cases in healthcare workers linked to Christmas parties and the advice to consider cancelling these, I was not directly involved in any further advice in relation to this matter. However, given the rapid spread of this variant, I am not sure that implementing further restriction (such as lockdown or other restrictions previously used) would have been that beneficial. Although the number of infections that were detected increased rapidly, the impact

of the disease was less severe and would have been a factor to weigh against the problems that the introduction of such measures generate. Simply focusing on the numbers of infections/cases does not give the whole picture.

5.3 Conclusions and Lessons Learned from the use of NPIs

PHS

5.3.1 In 2022 PHS undertook an internal 'lessons learned from Covid-19' exercise and on 5 May 2023, PHS published this. This document has already been produced to the Inquiry by PHS[2] (NP/17 INQ000187754). This report, produced by senior staff, detailed the role of PHS and the learning identified over the course of the COVID-19 pandemic response. The report contains 24 recommendations which were assigned to various individuals, teams, divisions and directorates across PHS. The recommendations included development of a PHS Concept of Operations and Incident and Emergency Response Plan, associated standard operating procedures and templates, training and communications, situational reporting, assessment and learning arrangements, mechanisms for rapid recruitment during the pandemic, workforce planning, the development of an emergency response team within PHS and a range of others.

5.3.2 I am unaware that Scottish Government have responded to or been formally asked to respond to the PHS Lessons Learned report. This was essentially an internal document but there are likely to be issues of interest and relevance to Scottish Government.

Scottish Government

5.3.3 I cannot recall participating in any lessons learned exercise undertaken by Scottish Government. I am unable to comment on why the members of SGCAG were not involved in any such lessons learned exercises undertaken by Scottish Government. I believe they should have been given they were one of the key

[2] Learning lessons from COVID-19, dated May 2023

scientific groups advising the government during the pandemic. I am not aware of any systems that have been put in place by Scottish Government to ensure lessons were acted upon in any subsequent management of pandemics.

5.3.4 That said, the Scottish Committee on Pandemic Preparedness has identified the need for mechanisms to consider[3] (NP/18 INQ000319425) how Scotland can be better prepared for the future and a key recommendation is exploring the establishment of a pandemic preparedness centre. PHS was asked to develop proposals in mid-2023 and following three consultation events, PHS will be submitting an options appraisal for such a centre towards the beginning of October.

5.3.5 In my view there are two principal considerations that impacted on decision making in Government, both UK and in Scotland:

i) Chronic disinvestment in the health protection aspects of public health: I understand that in the PHS corporate statement the decline in funding for health protection in HPS has been described. The principal mechanism for this decline was by something called CRES (Cash Releasing Efficiency Savings) which required Boards to identify 3% savings from baseline funding each year. Given that most of the costs in HPS were staff then effectively this meant that each year the number of available staff reduced, impacting on resilience and the ability to rapidly expand to meet the needs of the pandemic. This is described in more detail in my statement at 1.8.1.

ii) A lack of understanding or awareness of how health protection operates and the mechanisms in operation at a local level: Scottish Government works at a policy and legislative level and is not responsible for undertaking operational delivery so, like ideas generated by academics, there is often a lack of awareness of operational practicalities, availability of resources, legality, and achievability in practice. I have provided examples of this in my statement at 1.8.3 and 10.2.

[3] Standing Committee on Pandemic Preparedness: interim report

5.3.6 The work force and expertise in health protection has been in decline across Scotland for several years prior to the pandemic as a result of annual efficiency savings. In Scotland, there was therefore a depleted workforce with little resilience and a declining body of expertise at the start of the pandemic. There was poor coordination and microbiological diagnostic infrastructure to assist in discharging health protection functions at a national level.

5.3.7 I suspect that had senior decision makers had insight into the operational realities and feasibility of certain policies, then in some instances a re-think might have been considered. For example, there was the requirement for people returning to Scotland from travel abroad to isolate at home with the expectation that staff in Health Boards would visit or contact these people to check on adherence. Boards and staff were not equipped/trained to do this and there was simply neither the staffing nor legislative framework for this to happen. I am not aware of how this problem was reported back to Scottish Government by PHS and Boards but my understanding was that this approach was modified.

6. CARE HOMES AND SOCIAL CARE

6.1 My involvement in relation to the strategy for Care Homes and Social Care was peripheral. Moreover, much of the strategy was established prior to my appointment at PHS.

6.2 In its corporate statement (NP/04 INQ000237820), PHS states at paragraph 4.4.7:

"*The correspondence between PHS and the Scottish Government relating to the PHS care homes guidance was the subject of a Freedom of Information (FOI) request in February 2021. The FOI release*[4] (NP/19 INQ000235151) *illustrates the issues covered by the PAC process and the associated delays*."

[4] Scottish Government. FOI Response 202000090557. February 2021.

6.3 I understand there were several contributory factors to this issue: (1) Lack of involvement in advising decision makers of the implications of policy decisions created challenges for the policy to be operationalised. I understand this resulted in frequent e-mail/verbal exchanges with staff in Scottish Government trying to accommodate them, but within the realms of what was possible; (2) Becoming aware of policy decisions/changes late in the day – which was exacerbated by the point above and (3) Delays in getting ministerial sign off.

6.4 In my view the above process could have been improved by direct access to key decision makers at the point advice was being sought or when policy was being developed. This is important because what might be considered straightforward or easy to do at a policy level may be challenging or unworkable at an operational level because of lack of awareness of roles and responsibilities and context.

7. BORDERS

7.1 By mid-late January 2020, there was increasing evidence of cases being identified in countries other than China. These were either Chinese Nationals or linked to contact with Chinese Nationals. The first two cases of COVID-19 in the UK were in Chinese Nationals visiting the UK. So I believe there was strong case for closing the UK border to people coming from China at this point. Any British residents returning from China, either directly or indirectly, should have been isolated when entering the UK. This would not have prevented the spread as more countries became affected, but it may have slowed the introduction into the UK.

7.2 The genetic sequence for SARS-CoV-2 only became available from China on 10 January 2020. This allowed a PCR test to be developed targeting parts of the viral genome. Germany announced the development of the first test on 16 January 2020. In the UK, at about the same time, a test was developed by PHE and because of capacity issues this was available on a very restricted basis to potential cases. Developing a PCR test can be straightforward, but the test must be validated and is dependent on testing against the actual virus. For example, an early test developed by the Centres for Disease Control and Prevention (CDC) in the US had to be withdrawn as it failed testing. In the absence of a validated test,

much more complicated tests are required. It was not until late January that the UK had its first two cases that validation could begin in earnest. Throughout February efforts were made to increase production and availability but testing was still limited to cases meeting an agreed case definition. Expansion of testing was needed but hindered firstly because of a lack of manufacturing capacity in the UK and then by a shortage of reagents as countries all over the world competed to access what limited supplies were available. Germany was able to rapidly expand testing as it has a well-developed manufacturing capability in this area. Testing of passengers into the UK was therefore not a feasible option in the early days of the pandemic. The scenario would have been similar in Scotland however this predated my appointment in PHS and I am therefore unable to comment on the issue as it pertains to Scotland.

8. DECISION MAKING BETWEEN THE UK GOVERNMENT AND DEVOLVED NATIONS

8.1 Given the interdependencies and ease of travel between all four nations, a four-nation approach was seen by public health experts as the favoured way forward to minimise confusion and promote confidence and adherence to guidance. However, Scotland tended to take a much more precautionary approach to the pandemic and this influenced decision making. In addition, I felt that Scotland tried to compete with the UK government and either do things first or differently. For example, Scotland was the first, and without warning, to announce the wearing of face coverings, there were differences in travel restrictions between Scotland and England and Scotland continued testing after it had ceased elsewhere in the UK.

8.2 In terms of sharing and the use of medical and scientific expertise and data between the four nations there was a heavy dependency on English medical and scientific expertise. Data was an issue where differences in systems meant that sharing data could be challenging. Public health communications in Scotland were tightly controlled by the Scottish Government. There were also differences in approach between the four nations in respect of public health and coronavirus legislation and regulations, to some extent reflecting the differing legal framework for health protection in each country.

8.3 For my own part, I actively tried to ensure there was collaboration, coordination, and communication with my counterparts both while in PHE and latterly in PHS. However, the different structures and responsibilities between the two organisations tended to make this challenging at times (health protection teams in England are managed by UKHSA - this is not the case in Scotland; UKHSA deliver public health testing and diagnostics and are able to exert more control over what and how this is done, whereas in Scotland PHS is reliant on persuading laboratories to address public health issues; there are also different legal frameworks). I am unable to comment on what reforms may assist in the future as I have limited understanding of the intergovernmental structures that were operating during the pandemic and would operate in any future pandemic. However, I would suggest that any changes should acknowledge the need for joint decision making and assessments. In my view there was a tendency for England to try to impose solutions on the Devolved Administrations which did not foster and promote good relations or a unity of approach.

9. COVID-19 PUBLIC HEALTH COMMUNICATIONS

9.1 Public Health Communications/Public Confidence

9.1.1 Public communications were managed by the Scottish Government. In terms of transparency by the Scottish Government an example would be the data and methodology that was used for modelling the course of the pandemic. These were published and latterly described four scenarios in which various assumptions were modelled. Knowing which scenario you were in was challenging and key to understanding the potential course of the pandemic.

9.1.2 It is important that key figures model the behaviours they are expecting to see in others (such as the general public). Breaching these could affect the credibility and validity of the measures and/or promote an impression that the rules don't apply to senior figures. In either situation, the potential for undermining confidence is present.

9.1.3 I am not aware of any formal guidance or rules imposed by the Scottish Government on its senior civil servants and medical and scientific advisers in relation to professional opinions but I know from personal experience that providing unsanctioned public expressions of opinion were not tolerated and this was made painfully clear in a one to one with the First Minister after giving my view that people should consider whether their pre-Christmas parties should continue following the emergence of omicron. Earlier in my statement I refer to the advice of the NIMT which was attended by Scottish Government and reported back initially orally and then through the note of the meeting sent by the Chair. Following discussions with the then communication lead within PHS, Tom Fox, we sent/posted (I can't remember which) a short statement asking the public to consider postponing their pre-Christmas parties given the current activity of omicron. This statement was consistent with the advice of the NIMT. I understand that Tom communicated with Scottish Government and made it aware of this before we issued it, but it appeared that this was not escalated within Scottish Government. The media picked this up almost immediately and wanted further comment from PHS and SG and it became the story of the evening. Angela Leitch and I were required to attend a meeting in person with the First Minister first thing the next morning - I joined remotely as I was working at home in Runcorn. At the meeting she was clearly very angry and said she was incandescent (two or three times) that we had issued this advice. It was accepted that before we issued any statements that we should let Scottish Government know/clear this, but my understanding was that this had been done. In posting the statement I felt we were responding to what was a very clear and present danger to the NHS. The omicron variant was clearly highly transmissible and local Boards were involved in several instances where staff parties had resulted in several staff getting COVID and having to isolate, jeopardising the delivery of the service. Having had time for reflection, I can't recall ever having been spoken to in that manner in my 40 year career with the NHS. The view about considering postponing pre-Christmas drinks parties was shared by others and I refer to this in my statement at 5.2.1. The Scottish Government agreed with the statement as well and issued a note to the media I can only assume that the First Minister would have been aware of this. The ITV News article entitled *Public Health Scotland: 'Cancel your Christmas party to stop Omicron spreading'* (NP/20

INQ000335474) provides the key points of the note and also confirms the support of Scottish Government for this.

9.1.4 The SGCAG consisted of a range of experts from a number of fields providing their independent views and advice in their area of expertise. Statements were not tracked by the secretariat. Indeed, it would have been inappropriate for the secretariat to track any statements they would have made. Who would this tracking have been for and for what purpose?

9.2 Lessons learned regarding public health communications

9.2.1 I started with PHS in January 2021 and for the first 12 months I worked remotely and am therefore unable to comment on the how Scottish Government communications worked during the pandemic. However, as I understand it communications were tightly controlled by Scottish Government as alluded to in para 9.1.3. In my view it would be useful to understand whether the monotheistic approach that was taken improved confidence or overtime undermined it.

10. PUBLIC HEALTH AND CORNOVIRUS LEGISLATION AND ENFORCEMENT

10.1 Much of the discussion and decision making around regulations and enforcement preceded my appointment with PHS but I noticed a striking inconsistency across the UK. There was no legal duty for people who were positive for SARS-CoV-2 and their contacts to self-isolate in Scotland and yet there was in England, potentially undermining efforts and confidence in the measures.

10.2 There is also a similar inconsistency in the approach taken for isolation of cases and wearing of a face covering. In Scotland, there was no clear direction as to what constituted a face covering and there is no evidence that they play a part in preventing the transmission of any respiratory infection and yet the wearing of face coverings was mandated. In contrast, a positive case was clearly defined and the logic of isolating cases is clearly understood and yet there was no legal duty to self-isolate. There was a legal duty in Scotland to self-isolate after international travel but the enforcement mechanism had not been worked through. It had been assumed that consultants in public health would be able to visit people in their

home to check with compliance. This was neither practicable nor appropriate and there was no legal basis on which this could be done. Again, highlighting the disconnect between the policy and the feasibility of it being implemented. In addition if a person flew into England from certain countries they could get a train up to Scotland and would avoid the requirement to self-isolate. If they flew into Scotland directly, they had to self-isolate.

11. KEY CHALLENGES AND LESSONS LEARNED

11.1 Key challenges/lessons learned

11.1.1 I joined PHS in January 2021 and therefore I am unable to comment on decisions made prior to this date. There were four areas I feel are relevant to decision making after January 2021:

i) There was an inflexibility in the way data was used for decision making and a lack of appreciation that different data was needed for the different phases of the pandemic. In the early days using the number of cases was a reasonably good way of mapping the progress and impact of the pandemic and a basis for making decisions. However, once most of the Scottish population were immune, either though vaccination or natural infection, case numbers in themselves were an unreliable indicator of the impact of the pandemic. For example, in early 2020 – 4,000 cases would have had a profound impact on Health Services given the pathogenicity of the virus and the lack of any real immunity. Move forward to 2022, this same number would have a small impact on the NHS given population immunity and changes in the virus. There continued to be an overuse and reliance on case numbers, and this would have overestimated the impact of the pandemic and the level of measures adopted. Daily publication of figures was not useful after the initial phase and trends would have been more helpful given the fluctuations in numbers day to day and the smaller numbers. There was also an over interpretation of the numbers of people in hospital that were COVID positive, when in fact due to the introduction

of pre-admission testing, people were being identified where COVID was a coincidental finding – they were being admitted *with* COVID rather than *because of* COVID.

ii) There was an adverse impact on children arising from control measures that were introduced. It became clear early in the pandemic that children were less severely affected by COVID and that they were not a major factor in transmission (unlike flu). The impact of the measures introduced in schools had an impact on education and socialisation that outweighed any potential benefit of testing, mask wearing and school closures. This is in contrast to Sweden where the welfare of children was a primary concern and where children under the age of 15 years were allowed to attend school and mask wearing was not required.

iii) It is not clear why, given that each country in the UK had access to the same data and evidence, that they took differing positions on NPIs and other measures such as testing. Border controls are an example of where the position implemented in Scotland was undermined by a different position in England. Scotland continued to offer testing to the public after England and other countries stopped. There should have been a consensus across the UK and I think it is likely that the differences served to undermine control measures and public confidence in the handling of the pandemic.

iv) Across the UK, there were different approaches to the criteria used to lift restrictions in local areas. Again, there should have been a consistent approach across the UK. These differences caused confusion and potentially undermined confidence in the measures.

11.1.2 As already explained I joined PHS in January 2021 and therefore the following comments on decisions prior to this date are made without the awareness of much of the detail during this period and are generic in nature.

i) In my view the separation of ARHAI from PHS should not have gone ahead at the start of the pandemic. Trained and suitably experienced health protection staff, familiar with working in the national health protection structure, were in short supply and leaving them in NSS impacted on the ability of PHS to mount an effective response at a critical time during the

pandemic. It created artificial barriers to effective working at a time when this was desperately needed. Staff on both sides became distracted by trying to work through new arrangements etc. This was avoidable and unnecessary.

ii) PHS senior staff had little access to Scottish Government senior decision makers. Views and advice from PHS were therefore filtered through Scottish Government staff introducing the potential for misinterpretation and misinformation.

iii) The lack of investment in health protection services, in PHS and across Scotland, and the supporting infrastructure in the years preceding the pandemic meant that Scotland was ill-prepared to initially respond to the pandemic.

iv) The infectious disease diagnostic infrastructure and working arrangements did not facilitate a public health led and consistent approach to testing and the investigation of cases across Scotland.

11.1.3 As has been explained throughout my statement most of the Scottish Government's core decisions were made prior to my appointment. However, an area I would think requires closer attention in the future would be the provision of data and how that was presented. As I have explained in other questions the data needed to assess and understand the impact of the pandemic changes throughout the course of the pandemic. Numbers of people with positive tests were useful at the start of the pandemic in assessing the growth and potential impact, however with the development of population immunity through vaccination and natural infection mitigating the more serious effects of the infection, a test result on its own was of limited use. Despite this the number of people who tested positive were published daily and this data was used to inform policy decisions. The data should have been reported less frequently with more context and trends used rather than simply numbers.

11.1.4 Furthermore, as already mentioned, I consider that the policies with respect to schools and restrictions had adverse impacts on children's education, health and socialisation. In 2020, the number of five year olds who were overweight rose by 25% and this measure remains elevated.

11.2 Recommendations

11.2.1 I offer the following recommendations based on my knowledge and experience:

(i) In the years preceding the pandemic, there had been a steady reduction across Scotland in the public health capacity and capability, in particular senior health protection staff. When the pandemic struck, based on my observations within PHE and my subsequent understanding of PHS health protection budgets, staffing structures and manpower, there was little, if any, resilience, or ability to surge within the PHS health protection function. It was only the dedication and the long hours worked by many staff that saw Scotland through the early days. The long hours and stressful working conditions adversely impacted on staff health and wellbeing. It was not until mid-late 2020 that recruitment was undertaken, and even this was insufficient, as often those staff were relatively inexperienced. Looking to the future we need to ensure that there is sufficient experienced and appropriately trained public health capacity across Scotland, particularly in health protection, to enable the system to flex and surge to emergencies such as this.

(ii) The investment in respiratory surveillance systems needs to be maintained and expanded to include other infectious diseases. The reality is that we do not know what form the next pandemic might take and we need a range of systems in place that can be adapted and rapidly stood up. This includes the laboratory information and data management systems used to collect test results.

(iii) Having 14 independent health protection teams across Scotland introduces a level of challenge and inconsistency across Scotland. It is an inefficient way of deploying scarce health protection resource. The model being adopted by Forth Valley, Lothian, Borders and Fife whereby the health protection teams come together as a regional network is one that could be developed for the North and the West, creating three regional networks for Scotland. This has the potential to produce a more cost effective, resilient, consistent and responsive system for Scotland.

(iv) Microbiology diagnostic services across Scotland are relatively uncoordinated, have variable ranges of tests and work to different standards. Bringing them together in a similar way to the health protection teams, would increase capacity, resilience and consistency and be a more cost-effective way of delivering the services for Scotland. It will also be important to develop and sustain the public health microbiology function within Public Health Scotland. A paper has been submitted to Scottish Government[5] (NP/09 INQ000319421).

(v) Developing a sustainable infrastructure and resource for the whole genome sequencing of pathogens is absolutely critical for a public health microbiology service that is able to detect new pathogens and their variants and to understand transmission pathways and the source of outbreaks. Prior to the pandemic, Scotland had an extremely limited capacity to sequence pathogens. This was inconsistent with a safe and responsive health protection system. The resource that has been developed during the pandemic should be sustained and developed and transformed into a pathogen genomic service. A paper has been submitted to Scottish Government for consideration[6] (NP/21 INQ000319426).

(vi) In recognition of the diverse nature of the pandemic threat and to ensure that planning is sufficiently flexible to adapt to an unknown pathogen (e.g., broader vaccines and manufacturing facilities), the concept of a disease X, representing a hypothetical, unknown pathogen that could cause a future epidemic was adopted by the World Health Organization (WHO) in February 2018. Adopting a disease X approach in Scotland will necessitate a multi - hazards approach to surveillance, diagnostics, research, and response that is robust, flexible and adaptable. Developing the thinking and identifying the key systems and processes that will be needed in advance of the next pandemic will be essential for a rapid and effective response in order to minimise the impacts on human health and society in general. To address these challenges and avoid catastrophic health outcomes, sustained, coordinated health research investments in preparedness are essential, delivering critical evidence before, during, and after pandemics. This could be best achieved by the establishment of a Centre for Pandemic Preparedness. A UK centre would

[5] Executive Summary: Gap Analysis of Public Health Microbiology Services in Scotland (August 2023)
[6] Genomics in Scotland: Building our future September 2023

be a way of addressing the big issues but ultimately, we are seeing increasing divergence of the legislative frameworks and health systems across the UK and so understanding and working through the context in which surveillance and response might operate would be best addressed at country level.

(vii) The advice of senior staff in PHS during the pandemic was channelled through advisers and was therefore subject to re-interpretation or extrapolation that may not have been appropriate or warranted. The role of PHS in providing expert advice directly to senior decision makers should be reassessed.

(viii) Public communications related to the pandemic were almost exclusively dealt with by Scottish Government officials. PHS as the independent, national public health body should have had a more prominent voice.

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: PD

Nicholas Phin

Director of Public Health Science and Medical Director

Dated: 6th November 2023