Witness Name: Professor Sir Christopher Whitty
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UK COVID-19 INQUIRY
MODULE 1

SECOND WITNESS STATEMENT OF PROFESSOR SIR CHRISTOPHER WHITTY

Contents

I, PROFESSOR SIR CHRISTOPHER JOHN MACRAE WHITTY, will say as follows:

Section 1: Introduction

1.1. I am the current Chief Medical Officer ("CMO") for England. I make this corporate statement on behalf of the Office of the Chief Medical Officer ("OCMO") and in response to a Rule 9 request received from the UK COVID-19 Inquiry ("the Inquiry") on 24 November 2022.

1.2. This is the second corporate statement submitted on behalf of the OCMO and in response to a Rule 9 request from the Inquiry dated 24 November 2022. The first corporate statement, prepared for Module 2 of the Inquiry, explained the role of the OCMO, the part it played in the Governmental response to the COVID-19 pandemic and addressed the matters raised in a Rule 9 request dated 21 September 2022 insofar as they related to the activities of the OCMO ("the OCMO Module 2 corporate statement").

1.3. Although I refer to the OCMO as a useful shorthand for all the work covered, it is important to make clear that it is not in the normal sense a corporate entity. The CMO, and the Deputy CMOs (DCMOs) past and present give their advice as senior public health and medical doctors, and therefore as health professionals, individually or occasionally collectively. For many issues Private Secretaries may act for the CMO and/or for a DCMO, but this is based on their understanding of the professional views of the CMO/DCMO in post.

1.4. This second statement examines the role of the OCMO in the UK's resilience and preparedness for the COVID-19 pandemic (Module 1 of the Inquiry).

1.5. The statement has been prepared to assist the Inquiry with identifying key issues. It addresses a range of issues but is not intended to be a complete account of all advice that was given, meetings that took place, or other developments that occurred between 11 June 2009 and 21 January 2020.

1.6. Several of the questions posed in the Rule 9 request are better addressed to other parts of Government, including the Government Office for Science ("GO-Science") in relation to, for example, the functioning of the Scientific Advisory Group for Emergencies ("SAGE") and the Cabinet Office for structures of Government. Where necessary and to assist the Inquiry, I identify these other bodies in this statement.

1.7. I understand that the Inquiry's preference is for a statement to be a standalone document even if that means the duplication of information already provided in a statement prepared for another module. Many of the questions raised in the Module 1 Rule 9 request were addressed in the OCMO Module 2 corporate statement, already with the Inquiry, and DHSC's Module 1 corporate statement to which I contributed as a member of DHSC's senior leadership team. Where appropriate, this statement repeats the content of those statements either for the benefit of those who do not have access to the OCMO Module 2 corporate statement or, in the case of the DHSC statement, because the words used were essentially my own transposed into a corporate statement. Some issues are covered by a personal Rule 9 statement for Module 1 submitted in parallel with this corporate statement, and so are not repeated here.

1.8. This statement addresses some issues that are outside of my personal knowledge and the knowledge of those who are currently working in the OCMO. As a corporate statement I have been assisted in its preparation by a team within OCMO. In respect of some information (and in the absence of easily retrievable records) I have relied upon information kindly provided to me or my team by my predecessors, Professor Sir Liam Donaldson and Professor Dame Sally Davies. Likewise, the former Deputy Chief Medical Officer for England covering the health protection brief, Professor Sir Jonathan Van-Tam, has contributed material in respect of his time in office. I have tried, where possible, to identify these contributions within the body of this statement.

1.9. To assist the Inquiry, I have quoted from some of the documents exhibited to this statement. Quoted text is shown in italics. In a few instances, quoted text is followed by an explanation shown as regular text in square brackets.

1.10. A draft of this witness statement was provided to the Inquiry on 14 March 2023. Whilst I have not been asked any follow up questions by the Inquiry, I have considered whether there are any further matters that I should address. In light of the fact that I have provided two additional statements (each of which go into further detail in respect of the OCMO's involvement in the pandemic) and having not yet considered the evidence of other witnesses, there are no immediate matters that I have felt it necessary to add. I am however happy to continue to assist the Inquiry either before the oral hearings or during my oral evidence (or at any other stage) and address any matters pertinent to Module 1 that the Chair or Counsel to the Inquiry considers would be of benefit.

Glossary

1.11. In this statement I refer to a number of acronyms, committees and groups which it may be helpful to summarise at the beginning so that they can be easily understood when reading this statement in isolation:

- BEIS: The Department for Business, Energy and Industrial Strategy.
- CDC: The Centers for Disease Control and Prevention in the United States.
- COBR: The Cabinet Office Briefing Rooms is the term used to describe the Civil Contingencies Committee convened to coordinate the response of Government departments and other agencies in times of national emergency.
- CSA: Chief Scientific Adviser to a Government Department. CSAs provide independent scientific advice to their main department, and individually and collectively give scientific advice across Government in their specialist areas.
- DCMO: Deputy Chief Medical Officer.
- DHSC/DH: The Department for Health and Social Care DHSC (prior to January 2018, the Department of Health, DH)
- DPH: Director of Public Health. Based in local authorities these are the lead public health officials in the authority, providing public health advice to local leaders and the public in their locality.
- GCSA: This is the Government Chief Scientific Adviser. The GCSA is responsible for providing scientific advice to the Prime Minister and members of the Cabinet, advising the Government on aspects of science for policy and ensuring and improving the quality and use of scientific evidence and advice in Government. The GCSA is a permanent secretary level post, reporting to the Cabinet Secretary, and is supported by GO-Science.
- GO-Science: An office of BEIS during most of the timeframe of this Module (now the Department for Science, Innovation and Technology), GO-Science is responsible for: giving scientific advice to the Prime Minister and when required Cabinet committees; ensuring and improving the quality and use of scientific evidence and advice in Government; providing scientific advice in the case of emergencies, through their secretariat role with SAGE; helping the independent Council for Science and Technology provide high level advice to the Prime Minister; supporting strategic long term thinking in Government through Futures

and Foresight; and developing the Government Science and Engineering profession.

- JCVI: This is the Joint Committee on Vaccination and Immunisation. It is an independent committee and a statutory body with a statutory and advisory role to advise the Secretary of State for Health and Social Care on the provision of vaccination and immunisation services being facilities for the prevention of illness.
- NERVTAG: This is the New and Emerging Respiratory Virus Threats Advisory Group. It is a standing committee of DHSC. It advises the Government on the threat posed by new and emerging respiratory viruses.
- NIHR: National Institute for Health Research (the National Institute for Health and Social Care Research since April 2022). The main Government funder of applied research in health and social care.
- PHE: Public Health England. The forerunner to UKHSA on health protection, PHE also had responsibility for health improvement (primarily non-communicable diseases). These functions were separated in 2021, when UKHSA and the Office for Health Improvement and Disparities (OHID) were established, and PHE disbanded.
- SAGE: This is the Scientific Advisory Group for Emergencies. SAGE is an independent advisory group, convened to provide scientific advice to support decision-making in COBR in the event of a national emergency.
- SPI-B: The Independent Scientific Pandemic Insights Group on Behaviours provides behavioural science advice aimed at anticipating and helping people adhere to interventions that are recommended by medical or epidemiological experts and other behavioural issues.
- SPI-M and SPI-M-O: The Scientific Pandemic Infections Group on Modelling and Scientific Pandemic Infections Group on Modelling, Operational subgroup are two groups of modellers who advise Government on infectious emergencies. Their membership is drawn from academia and the Government service. SPI-M operates in a non-emergency situation while SPI-M-O is stood up in an emergency and can become a sub-group of SAGE.
- UKHSA: UK Health Security Agency. Established in April 2021 and formally operationally from October 2021, UKHSA leads on health protection (infections and emergencies in the main) for the UK.

- UKRI: UK Research and Innovation. The umbrella body of the seven Research Councils, including the Medical Research Council (MRC).
- WHO: World Health Organization.

Other terminology:

1.12 In this statement, I use various pieces of terminology which relate to pandemics and disease outbreaks. I define the terms below.

- Epidemic: The epidemiological definition of an epidemic is an increase in the frequency of occurrence of a disease in a population significantly above its baseline level for a specified period of time. Administrative definitions can be set for different diseases in which an arbitrary threshold is selected above which the term "epidemic" is applied. In the case of influenza, DH introduced in 1996 an administrative definition of an "epidemic" as a rate of consultation (across a sample of general practices) of 400 per 100,000 population in a week. An epidemic may cause substantial mortality but on a smaller geographical basis than a pandemic.
- Pandemic: An epidemic occurring worldwide, or over a very wide area, crossing international boundaries and usually affecting a large number of people. It may be a new infection (e.g. COVID-19) or a known infection (e.g. influenza) of humans. The WHO usually declares a pandemic.
- Emerging infectious disease: Infectious diseases that have newly appeared in a population (e.g. zoonoses from animals) or have existed in humans but are rapidly increasing in incidence or geographic range.
- HCID: In the UK, a High Consequence Infectious Disease ("HCID") is a disease which requires very high-level isolation in specialist infectious disease centres and is defined according to the following criteria:
    i. acute infectious disease;
    ii. typically has a high case-fatality rate;
    iii. may not have effective prophylaxis or treatment;
    iv. often difficult to recognise and detect rapidly;
    v. ability to spread in the community and within healthcare settings;

vi. requires an enhanced individual, population and system response to ensure it is managed effectively, efficiently and safely.

- Infection fatality rate. The percentage of people infected with an infection who die.
- Case fatality rate. The percentage of people diagnosed with an infection who die.
- Seasonal influenza: This occurs every year, with seasonal peaks usually during the winter in temperate countries. Deaths in the UK typically average about 9,000 a year but can be over 20,000 a year with wide variation.
- Pandemic influenza: A new strain of influenza sufficiently different from existing seasonal influenza so as to cause a pandemic, usually with an expectation it will lead to considerably higher than usual mortality (but this is not always the case- for example H1N1 in 2009). Normally it will have emerged from an animal host.

Section 2: How scientific, technical and medical research, advice and support is organised generally across the UK Government.

2.1. Over the period covered by this module there have been 3 CMOs for England: Professor Sir Liam Donaldson (in post from 1 September 1998 to 31 May 2010); Professor Dame Sally Davies (in post from 1 June 2010 to 30 Sep 2019); and myself from 1 October 2019 to the present. Sir Liam and Dame Sally are best placed to answer the questions specifically referring to the periods that they were in office and have assisted in the preparation of this witness statement as I set out below.

2.2. Over the same period, the substantive Deputy Chief Medical Officers were Professor David Walker (2013-2015), Professor John Watson (2013-2017), Professor Gina Radford (2015-2019), Professor Sir Jonathan Van-Tam (2017-2022), Professor Dame Jenny Harries (2019-2021) and Dr Aidan Fowler (2018-present) (whose main role is as the Director for Patient Safety in NHS England). Professors Watson and Van-Tam were specifically and sequentially DCMOs for health protection, which includes infectious emergencies.

2.3. My brief biography was contained in OCMO's corporate witness statement for Module 2 but I repeat it below to assist those who do not have access to that statement.

2.4. I am Chief Medical Officer for England and Chief Medical Adviser to the UK Government, a post I assumed in October 2019. For much of the early pandemic (to August 2021) I was also Chief Scientific Adviser ("CSA") to the Department of Health and Social Care ("DHSC") and head (chief executive officer) of the NIHR, a role I had held from 2016 and passed on in August 2021. I continue to chair the UKVN, a role I have held since 2015 when UKVN was established. I am an NHS consultant physician in infectious diseases at University College London Hospitals ("UCLH") and the Hospital for Tropical Diseases where I have been a consultant since 2001; prior to becoming CMO I was also a consultant physician in acute medicine at UCLH from 2001.

2.5. I am by training and experience an epidemiologist and physician specialising in infectious diseases. I have a medical degree, a doctorate in science (DSc) in infectious diseases and a degree in physiological science from the University of Oxford; MSc in epidemiology from the University of London and other relevant qualifications. I am a Fellow of the Royal College of Physicians, Fellow (and Hon. Fellow) of the Faculty of Public Health, Fellow of the Royal Society, Fellow of the Academy of Medical Sciences, and Hon. Fellow of the Royal College of Paediatrics and Child Health, Royal College of Pathologists, Royal College of General Practitioners, Royal College of Physicians and Surgeons of Glasgow, Faculty of Pharmaceutical Medicine, Royal Society for Public Health and other learned bodies. I am on the GMC specialist register for infectious and tropical diseases. Prior to becoming CMO, among other roles, I was substantively Professor of Public and International Health at the London School of Hygiene & Tropical Medicine ("LSHTM"), a position to which I was appointed in 2006 and from which I was seconded into Government on a part-time basis from 2009. This was first as CSA to the Department for International Development (DFID) from 2009 to 2016 and then as DHSC CSA and head of the NIHR. Between 2017 and 2018, I was the interim Government Chief Scientific Adviser. I am emeritus Gresham Professor of Physic at Gresham College and remain visiting Professor of Public Health at Gresham and an honorary professor at LSHTM.

2.6. When not in Government I chaired the independent National Expert Panel on New and Emerging Infections, the Advisory Committee on Dangerous Pathogens ("ACDP") and served on other scientific advisory committees to the UK Government and the WHO. I was an honorary consultant epidemiologist for PHE. I was involved in the response to several previous emergencies, including the HIV pandemic (as a clinician and researcher in Africa and UK), the Ebola epidemic of 2014, the H1N1 influenza

pandemic of 2009 ("swine flu"), the Novichok poisonings (chairing SAGE), and Zika (co-chairing SAGE). I worked as a doctor and epidemiologist in Africa and Asia as well as the UK.

The role of the CMO

2.7. The simplest way to understand the role of the CMO is as a doctor and public health leader who happens to be working in Government, giving medical, public health and scientific advice.

2.8. The CMO role in England has evolved several times since its inception in 1865 but in its current incarnation, and throughout the period covered by this Module, it is principally a senior advisory role to Government at Permanent Secretary level. The CMO provides independent advice to Ministers across Government on medical and public health issues. This is however not an exclusive responsibility. PHE (as it was for the period 2012 to the end of the period of this Module) had a large body of experts in health protection (including epidemics and other emergencies) and health improvement (principally non-communicable diseases). NHS England and the wider NHS has many clinical experts including in infectious diseases.

2.9. Alongside this are a number of scientific advisory committees covering many aspects of health and, of particular relevance to this Inquiry, infectious diseases. The work of several of these committees have been covered in the OCMO Module 2 statement (my first witness statement) including that of the JCVI and NERVTAG.

2.10. In addition to clinical, public health and scientific advice within Government the CMO has always had a responsibility to communicate to the public on health matters in times of emergency, and to be part of the collective leadership of the medical and public health professions.

2.11. Prior to 2012, the CMO also had some of the responsibilities within the NHS now held by the National Medical Director, since January 2018 and currently Professor Sir Stephen Powis, and from 2013 to 2018 Sir Bruce Keogh. Before this Sir Bruce was Medical Director of the NHS from 2007-2013.

2.12. The Chief Medical Officer for England covers all of England, but health being a devolved matter there are separate CMOs for Scotland, Wales and Northern Ireland. There are however a limited number of public health issues, for example international

health, which would normally be seen as UK wide. As the CMO England is also Chief Medical Adviser to the UK Government, he or she may take the lead on such matters. For example, the WHO has a formal relationship with the UK Government rather than with each constituent nation. When the UK holds a seat on the WHO Executive Board, the CMO England will be the board member.

2.13. The CMOs for Scotland, Wales and Northern Ireland have some responsibilities for the NHS in those nations (or their equivalent) which are different to those of the CMO England.

2.14. The DCMOs support and act for the CMO but, as senior medical advisers, can also act on their own behalf. The DCMOs provide advice as senior clinical or public health experts in their own right. Usually, there is a principal DCMO for health improvement (mainly focused on reducing the impact of non-communicable diseases such as cancer and cardiovascular disease) and one for health protection (e.g. infectious diseases and other emergencies).

Public Health in Government

2.15. Directors of Public Health (individually DPH, collectively "DsPHs") are public health leaders in local authorities who have both advisory responsibilities in their local authority (similar to the CMO in central Government) and statutory responsibilities including for communicable diseases. If the Inquiry is interested in these responsibilities the Association of Directors of Public Health ("ADPH") is the professional body for all Directors of Public Health and is well placed to provide details. Some DsPHs have come from a medical background and some via alternative routes to become specialists in public health, and they have to be either on the specialist register of the General Medical Council ("GMC"), the General Dental Council or the UK Public Health Register. Like the CMO, they are expected to communicate to the public in their local area around health emergencies and liaise with the local NHS. The CMO has professional leadership responsibility but not line management responsibility for DsPHs.

2.16. Various other public health professionals have statutory or other roles in outbreak and epidemic control, in particular the Consultant in Communicable Disease Control / Health Protection ("CCDC/CHP"). These are public health specialists who specialise in communicable diseases and may be in national, regional (e.g. PHE/ UKHSA) or

local roles. They investigate, declare and manage outbreaks of infectious diseases. To note, these are distinct from NHS consultants in infectious diseases, who are usually medical practitioners who specialise in treating patients with infections, generally in a secondary care (hospital) or tertiary care (specialist hospital) setting.

2.17. The public health profession is wider than DsPHs and its definition is less exact, and less precise, than the medical profession (which can be defined as being on the Register of the GMC). It includes public health professionals on national specialist registers as above. There are however also a wide range of practitioners who have important roles in public health who are not trained in all aspects of public health or have it in their title. An example would be Environmental Health practitioners. Many public health academics would rightly perceive themselves as members of the public health profession. Those who come from a medical route into the public health profession are usually members or fellows of the Faculty of Public Health. The much wider understanding of public health can be seen for example in the wide membership and fellowship of the Royal Society for Public Health. The CMO is part of the collective leadership of the public health profession nationally, and of the public health profession in Government.

2.18. Within the UK Government there are a number of medical specialists, who constitute the medical profession in the UK Government. The CMO is the Head of Profession for them. Examples include Dr Dipti Patel (Chief Medical Officer, FCDO), Dr Judith Richardson (Director of Health and Social Care, National Institute for Health and Care Excellence ("NICE")) and Dame June Raine (CEO, Medicines and Healthcare products Regulatory Agency ("MHRA")). Most have roles which are not principally and directly relevant to preparation for national medical emergencies or public health.

The Chief Scientific Adviser to DHSC

2.19. The DHSC and its predecessor DH have over the period to be investigated by this Module had and still has a CSA. Most Government departments have a departmental CSA, although the model differs between departments and may be held at Director-General or Director level. In most instances, the relevant CSA is a senior academic at professorial and often National Academy level seconded into Government. In DHSC the role is held at Director General level, and the incumbent provides independent scientific advice in much the same way as the CMO gives medical and public health

advice. They work closely with the CMO. In DHSC, the CSA has responsibility for a substantial research budget (over £1 billion a year). For, most of the period covered by this Module, this budget was mainly distributed through the NIHR, and the CSA is head / chief executive officer of the NIHR. As noted above, prior to being appointed as CMO, I held the role of CSA/head of NIHR in DHSC from 2016 to 2021, taking over from Professor Dame Sally Davies who was the founder of NIHR in 2006 as well as CSA. Dame Sally held the posts of CMO and CSA concurrently from 2010 to 2016. I held the CSA post from 2016 and the CSA and CMO posts concurrently from 2019 to 2021. Since August 2021, the CSA and CEO of NIHR has been Professor Lucy Chappell. To enable me to deputise for Dame Sally if both CMO and DCMOs were away or unavailable, I had the title of 'deputy CMO' when CSA but almost never used it as the need did not often arise; CSA and head of NIHR are significant roles in Government.

2.20. As CSA I reported to Dame Sally as CMO, and Professor Chappell reports in the same way to me. The CMO therefore currently, and for much of the period of this Module, has some responsibilities for research, as well as a wider responsibility to ensure research relevant to public health is considered and conducted.

2.21. CSAs work collectively as well as individually in Government, co-ordinated with and by the GCSA. The GCSAs over the period of this Module were Sir John Beddington (from 2008 to 2013), Sir Mark Walport (from 2013 to 2017), myself (as interim GCSA from 2017 to 2018) and Sir Patrick Vallance from 2018 to 2023. The current GCSA is Dame Angela McLean. The GCSA leads professionally but does not manage the CSAs. The role of the GCSA has many parallels for the science professions in Government, and the wider UK, as the CMO does for medicine and public health.

Section 3: Scientific, medical and technical support for UK Government decision-makers in civil emergencies

3.1. OCMO is a small office (fewer than 20 people, including the CMO and DCMOs, even at peak size in the pandemic and now around 12) and in emergencies its role remains advisory rather than executive. Between emergencies the same applies, and it covers

all public health matters and many other areas of medicine including providing clinical advice to Ministers.

3.2. Separately, there are a number of scientific advisory committees, which provide expert advice on different matters. NERVTAG formally provide their advice to the CMO. Some provide advice direct to Ministers in DHSC, for example the JCVI on vaccination. Others provide advice to multiple parts of Government, for example the ACDP on dangerous pathogens. For these the CMO may be asked to comment on, or sometimes act on, that advice, but the structures, advice given and reporting lines, are independent of OCMO.

3.3. Most of the executive technical support to Government, including delivering secretariat functions to the relevant scientific committees for this Inquiry, is provided by UKHSA. Previously this function was undertaken by PHE and, prior to that, by the Health Protection Agency ("HPA"). Some expert groups are supported by DHSC and its predecessors.

3.4. The relationship between UKHSA and the CMO has been formally and publicly set out **(CJMW2/001 – INQ000183357)**:

UKHSA will work closely with the Chief Medical Officer (CMO), who is the UK's most senior medical adviser and head of the public health profession. The CMO will be:

- *the ultimate arbiter for advice on scientific and medical matters*
- *formally consulted on wider health protection strategy*
- *the professional lead for UKHSA's most senior medical professional*

The CMO will co-ordinate closely with UKHSA in support of the agency's global health remit.

3.5. The CMO does not have executive functions in emergencies, which are largely held by DHSC, the NHS or UKHSA and their predecessor organisations. The executive functions of these organisations will, I anticipate, be covered in their corporate statements. The CMO would, however, normally expect to be part of, and in the period relevant to this Module has been part of, planning for infectious disease and other health emergencies at a national or international level where this required OCMO expertise. This is demonstrated by OCMO's involvement in the various planning exercises that are discussed below at paragraphs 6.42 to 6.59. Some exercises however will have been designed to test the operational aspects of any response, or

aspects unrelated to clinical or public health advice, and so would not have required OCMO input either at all or to a great extent.

3.6. I now discuss some of the key committees below.

Scientific Advisory Group for Emergencies ("SAGE")

3.7. Both the OCMO's Module 2 statement and DHSC's Module 1 corporate statement explain that SAGE is an independent advisory group, specifically convened to provide scientific advice to support decision-making in COBR in the event of a national emergency. COBR is the term used to describe the committee which coordinates the response of Government departments and other agencies in times of national emergency. SAGE provides UK wide advice to COBR.

3.8. Typically, SAGE meets in advance of COBR and the GCSA, who chairs it, subsequently represents SAGE at COBR. If there is a health component to an emergency, then the CSA in DHSC and/or the CMO would normally attend SAGE meetings, once the latter has been activated. Where health is the (or a) major part of the emergency, the CMO would normally be present at SAGE alongside the CSA and in major health emergencies the CMO co-chairs SAGE. GO-Science will be submitting more detailed evidence to the Inquiry in respect of SAGE, so I do not cover it in detail here.

<u>The Scientific Pandemic Infections Group on Modelling ("SPI-M") and the Scientific Pandemic Infections Group on Modelling, Operational subgroup (SPI-M-O")</u>

3.9. SPI-M and SPI-M-O are two groups of modellers who advise Government. Their membership is drawn from academia and the Government service. SPI-M operates in a non-emergency situation while SPI-M-O is stood up in an emergency and can become a sub-group of SAGE.

3.10. Advice provided by SPI-M and SPI-M-O represents a consensus view of the group, with the chair or co-chairs responsible for reporting the scientific advice to DHSC (SPI-M) or SAGE (SPI-M-O) and ensuring the scientific integrity of the group's discussion and outputs. SPI-M and SPI-M-O participants are typically from the academic

community and public health agencies and contribute as experts in the field of epidemiological modelling, epidemiology and statistics.

The Scientific Pandemic Insights Group on Behaviours ("SPI-B");

3.11. GO-Science is best placed to provide evidence to the Inquiry in respect of SPI-B. In summary and as explained in the DHSC's Module 1 corporate statement, SPI-B is comprised of behavioural scientists. It provides behavioural science advice aimed at anticipating and helping people adhere to interventions that are recommended by medical or epidemiological experts and other behavioural aspects of an emergency.

3.12. During COVID-19, SPI-B advised SAGE, having been stood up as a sub-group in February 2020.

The Scientific Pandemic Influenza Advisory Committee ("SPI"), formerly known as the Scientific Advisory Group on Pandemic Influenza ("SAG")

3.13. DHSC's Module 1 corporate statement explains the role of this committee as follows:

> "144. In 2005, as part of the UK's pandemic influenza preparation, the Department of Health ("DH" - so named prior to the creation of DHSC in January 2018) established a Scientific Advisory Group (SAG) on Pandemic Influenza, to advise on the scientific evidence base for health-related pandemic influenza policies. The Scientific Pandemic Influenza Advisory Committee (SPI) was an enhanced group, covering a wider range of scientific disciplines, that replaced SAG in 2008.
>
> 145. NERVTAG replaced the former SPI and extended the role, to cover not only pandemic influenza, but any new, emerging (or re-emerging) respiratory virus threat to the UK.
>
> 146. The modelling subgroup of the SAG on Pandemic Influenza first met in September 2005. This was the predecessor of Scientific Pandemic Infections Group on Modelling (SPI-M).
>
> 147. SAG was chaired by Dr David Harper. SPI was chaired by Professor Sir Gordon Duff. The remits of the groups were UK-wide".

The New and Emerging Respiratory Virus Threats Advisory Group ("NERVTAG")

3.14. The following paragraphs draw upon material from the OCMO Module 2 corporate statement, which I have adapted for the benefit of Module 1 of the Inquiry:

> NERVTAG is a DHSC committee advising the Government on the threat posed by new and emerging respiratory viruses. Its members are independent experts who volunteer to provide their expertise and are competitively appointed. NERVTAG provides clinical and scientific advice and is supported by a scientific secretariat from UKHSA.
>
> NERVTAG was established in 2014, replacing the UK Scientific Pandemic Influenza Advisory Committee (SPI) and extending the role of the group to cover not only pandemic influenza but any new, emerging respiratory virus threat to the UK. With this expanded remit, NERVTAG has routinely considered a range of respiratory viral threats, including avian influenza viruses and MERS. On its establishment, it was agreed the group would draw on the expertise of scientists and health care professionals, including clinicians, microbiologists and public health practitioners, and colleagues in related disciplines. It is scientifically independent.
>
> Between 2014 and the beginning of 2020, NERVTAG met 2 to 3 times per year.
>
> The current chair of NERVTAG is Professor Sir Peter Horby of the University of Oxford (from 2018 to the present day). Professor Sir Jonathan Van-Tam was the previous chair (from 2014 to 2018) before joining Government. Professor Van-Tam attended NERVTAG as a DHSC observer following his appointment as DCMO.

The Advisory Committee on Dangerous Pathogens ("ACDP")

3.15. The ACDP is an independent scientific expert committee. It provides scientific advice on the risks of exposure to various infectious pathogens, including their handling in laboratories and in clinical settings. Its work cuts across a number of organisations, including the Health and Safety Executive (HSE), UKHSA and the Department for Environment, Food and Rural Affairs (DEFRA) as well as DHSC. The current Chair is Professor Thomas Evans of the University of Glasgow; I was briefly the chair prior to him when not working in Government and prior to that it was Professor George Griffin.

The Human Animal Infections and Risk Surveillance ("HAIRS") Group.

3.16. This group of mainly Government scientists and public health officials identifies and assesses emerging infection risks to human health from animal sources (zoonoses). It aims to identify and review zoonotic or potentially zoonotic or interspecies infectious incidents which may pose a change in risk to animal or human health in the UK, whether these are acute clusters or outbreaks or increasing trends in reports of known or new infections or syndromes. It operates on a multi-agency basis, and across the four nations of the UK.

The UK Zoonoses, Animal Diseases and Infections ("UKZADI") Group

3.17. UKZADI is an independent committee made up of experts from across the agricultural and public health departments. It provides advice on important trends and observations which impact on animal and public health, including where necessary preventative and remedial action. The secretariat is based in DEFRA.

The Joint Committee on Vaccination and Immunisation ("JCVI")

3.18. As explained in the OCMO Module 2 corporate statement, JCVI is an independent Departmental Expert Committee ("DEC") and Scientific Advisory Committee ("SAC") and, unlike most other DECs/SACs, has a statutory basis in England. It is formed of a main committee with subject specific sub committees. JCVI was originally an advisory board for polio immunisation that became the JCVI in 1963. It was put on a statutory footing when it became a Standing Advisory Committee, established in England and Wales under the NHS Act 1977. NHS (Standing Advisory Committees) Order 1981 (SI 1981/597) established the JCVI in its current form. That order specifies that it is constituted for the purpose of advising on '*The provision of vaccination and immunisation services being facilities for the prevention of illness*'.

3.19. Appointments to the JCVI committee are made on merit and in accordance with the principles of the Code of Practice for Scientific Advisory Committees and the Cabinet Office's Governance Code for Public Appointments, which is regulated by the Commissioner for Public Appointments. New member appointments are routinely made through an open competition.

3.20. JCVI provides advice and recommendations for all UK Health Departments based on consideration of scientific and other evidence that is used by Government to inform, develop and make policy. All four nations have observers on the JCVI and while it has no statutory basis in Scotland or Northern Ireland, on most vaccine programmes JCVI advice is adopted.

3.21. JCVI when providing advice on COVID-19 was chaired by Professor Wei Shen Lim, standing in for JCVI Chair Professor Sir Andrew Pollard who had a perceived conflict of interest arising from involvement with what became the Oxford/AstraZeneca vaccine.

3.22. The previous chair was Professor Sir Andrew Hall (2006-2013).

Integration of expert scientific, medical and technical research, advice and support into Government decision-making structures in civil emergencies

3.23. The interrelationship between the advisory entities described above, SAGE and the OCMO was described in detail in OCMO's Module 2 corporate statement. However, for reasons already explained, I set out a further summary below.

3.24. The CMO, DCMOs and the OCMO are advice-giving. However, before advising Ministers and the public there is, when time allows, ideally a process of information sharing and view gathering across the spectrum of clinical and scientific opinion. SAGE and the other advisory entities play a key role in that process.

3.25. In an emergency the advisory entities described above take scientific outputs from potentially thousands of scientists in the UK and internationally to form a central view in their area of expertise. The agreed views arising from these committees can then be fed into SAGE. SAGE, in turn, provides a formal forum for combining scientific expertise from multiple strands to provide a unified view, which can then inform the advice that is ultimately given.

3.26. By way of example of how the system works, the hierarchy of scientific advice on health issues during the COVID-19 pandemic was as follows:

1. Where a request required technical advice on a point of detail or was very time-sensitive, then advice would come from the CMO or DCMOs either individually or collectively, or from PHE experts. This was often after obtaining informal advice

from experts in the field, including sometimes a discussion with the Chair of a specialist committee, if required and practical, and informed by SAGE central views, or medical and public health principles.

2. To ensure a range of expertise and challenge, advice on larger issues with wider impact, but relevant only to health, would, wherever possible, be given on the basis of advice from specialist medical advisory committees such as NERVTAG.

3. Advice that was required for Cabinet, Cabinet sub-committees, Cabinet Office or cross-Government decisions would be informed by SAGE where possible, which in turn was informed by entities such as SPI-M-O, NERVTAG, and SPI-B. It is important to note that the advice of the subcommittees was, in turn, informed by a very major national and international scientific effort. The GCSA and I were usually both present at major No.10/Cabinet Office decision-making meetings and provided joint scientific advice based on SAGE outputs.

3.27. The UK Government has several systems in place to identify, at a high level, significant risks to the UK, with a broad quantification of likelihood and a reasonable worst-case scenario. The OCMO and the CSA both feed in as appropriate, with GO- Science often providing or coordinating input from CSAs across Government. The methodologies for doing this have evolved over time and are led out of the Cabinet Office, who are best placed to provide details. These include the National Security Risk Assessment ("NSRA") and the National Risk Register ("NRR").

3.28. The NRR is short and public facing. It outlines malicious and non-malicious risks that could affect the UK over the next two years and provides some public information. The NRR is published roughly every two years.

3.29. The NSRA is the Government's classified principal tool for identifying, assessing and comparing risks. It is developed and owned by the National Risks Team in the Resilience Directorate of the Economic and Domestic Secretariat (EDS) of the Cabinet Office. It includes the most significant risks facing the UK, covering both malicious and non-malicious risks over the next 2-5 years. It does not include all risks but focuses on those that drive significant consequences. For example, for an extended period of time pandemic influenza has been considered a high risk based both on its likelihood and its impact.

3.30. The CMO and the DHSC CSA feed into assessments for health threats including pandemics and epidemics. Unsurprisingly, pandemics and epidemics appear in all of

these assessments, generally in the publicly available versions. Pandemics and epidemics were considered to be a major potential threat to the UK throughout the period covered by this Module. However, these risk assessment tools are not designed for nor granular enough to provide detail for planning purposes. They are intended to prioritise risks rather than as a tool for responding to an identified risk.

3.31. In the event the CMO was not available or incapacitated during an emergency the DCMOs provide resilience for public health or clinical advice. The CSA in DHSC provides an additional line of resilience. The CMO, DCMO for health protection and CSA maintain security clearance sufficient to be able to receive information, including highly classified information, needed to advise on planning for, or responding to, any health emergencies where that is needed.

Formulating and communicating expert advice to UK Government decision-makers in civil emergencies

3.32. The CMO and DCMOs operate under several codes. As medical practitioners they are subject to the principles laid out in the publication, *Good medical practice* from the GMC. As senior civil servants they are bound by the civil service code based on honesty, integrity, impartiality and objectivity. Independent scientific advice to Government including scientific advisory committees should follow the principles laid out in the publication, *Principles of scientific advice to government* and, although the CMO is not explicitly bound by this, most of the principles are good practice for all scientific advice including CMOs and CSAs. It therefore provides a useful resource.

3.33. I have laid out above at paragraph 3.26 the hierarchy by which scientific advice is, when time allows, given; with the more important decisions informed by expert committees such as JCVI. In emergencies sometimes this is not possible, but it has the major advantage of allowing for a range of views and expertise, and internal expert challenge.

3.34. In almost all emergencies the initial scientific and technical advice will be given in a situation of considerable uncertainty. If it is a new-to-the-world threat this uncertainty will inevitably be greater. The COVID-19 pandemic and the last major pandemic on a similar scale, HIV/AIDS, are examples of these. They also demonstrate the very different initial scientific challenges an infectious threat can pose. HIV is a predominantly sexually transmitted infection of mainly young adults with lifelong

infection, 100% mortality and no vaccine to date. COVID-19 is a transient respiratory infection with very high numbers infected but much lower per-person mortality but significantly increased mortality in the elderly. Recent emerging epidemics that did not become pandemics, including Zika (mainly mosquito-borne), Ebola (mainly touch), Bovine Spongiform Encephalopathy/new variant Creutzfeldt–Jakob disease ("BSE/nvCJD") (oral) and Mpox (sexual touch), again provide very different challenges with different scientific insights needed.

3.35. Emergencies differ on their speed of onset. The initial advice provided in a sudden emergency will usually have to be based on first principles whilst information specific to the incident is gathered, and before a full scientific committee can begin their work. This means that theoretical knowledge or knowledge gleaned from similar but not identical threats will need to be used. A recent example within the timeframe of this Module was the Novichok poisonings in Salisbury.

3.36. The Salisbury emergency was additionally complicated by the need to keep much of the material classified to a high level, significantly restricting the number of scientists who could contribute. I chaired the SAGE for that emergency (as interim GCSA) and the limitations having to classify material imposes on giving wide ranging scientific advice to policymakers are considerable; science is at its most useful when it is open, including to challenge from others with expertise or experience in the field.

3.37. The majority of infectious disease emergencies are rapid (days, weeks or months), rather than sudden, onset (an earthquake is an example of a sudden onset emergency with the difference between normality and disaster a matter of minutes). With rapid onset emergencies there is greater scope for use of networks of expertise and scientific committees. If the emergency is from a known risk, for example influenza, the speed with which a reasonable central view can be achieved, based on solid prior knowledge, is greater than if it is a novel threat like COVID-19 where there will be much greater initial uncertainly and many unknowns.

3.38. As time goes by in an infectious disease emergency the ability to provide a steady, measured scientific response to inform policymakers using science from multiple disciplines becomes much greater. Initially this will be from observational quantitative and qualitative data, but over time by more structured information such as epidemiological studies and cohorts (groups of people followed over time) will become available, as they did with both COVID-19 and HIV. There may then be outputs of trials

of existing, repurposed drugs and diagnostics, and in due course outputs of trials of new drugs or vaccines designed for the new threat.

3.39. A key component of scientific advice in an emergency is to provide a realistic assessment to decisionmakers. In a major infectious emergency this includes being clear that there are almost no pandemics or epidemics in which there are "good" options; most options are bad, and include significant loss of life, with the least worst being the outcomes to aim for. One of the least helpful interventions from scientists is to imply there is or shortly will be an easy solution with no downsides: this is almost never true.

3.40. For any new infectious emergency for which there will not be existing medical countermeasures (i.e. drugs, vaccines and diagnostics) the range of countermeasures available will be largely societal to reduce transmission. What societal countermeasures (also known as non-pharmaceutical measures - NPIs) will be effective, proportionate and potentially appropriate will depend on factors such as the route of transmission, force of transmission, severity of disease including mortality, attack rate, age structure of infection and mortality/morbidity and the availability of diagnostics.

3.41. The aim of much of the scientific work responding to an emergency will be to try to identify as soon as possible medical countermeasures such as drugs and vaccines which reduce, and then largely eliminate, the need for societal countermeasures. Societal countermeasures (NPIs) are of necessity disruptive and potentially seriously socially or economically damaging.

3.42. There is therefore a progression over time in a new infectious emergency, including pandemics, from initial scientific advice based on first principles, to scientific advice based on early observational data, to possible societal interventions based on observed characteristics of the infection (this usually requires diagnostic tests to have been developed), to early medical countermeasures based on repurposed existing drugs developed for a different reason, to medical interventions based on interventions designed for the new threat.

3.43. During pandemics and other infectious threats, especially early on, there is a strong reliance on observational data to inform decisionmakers. This often takes the form of epidemic curves and other data showing growth of epidemics over time. In an immune naïve population, the epidemic curve will either be doubling or halving in the population

at risk; the speed of this will vary substantially from days to months or in some cases years.

3.44. There is often confusion between observed data (these data are simply what we see plotted out), short term mechanical extrapolations (e.g. projecting out what happens if nothing changes for the next 3 weeks) and more sophisticated modelling.

3.45. For modelling, in general, the longer the time period over which a model seeks to predict the course of an epidemic, the greater will be the uncertainty around its central estimate. If for example, there has been steady doubling in cases of a particular disease every 7 days for 16 weeks, then it is reasonably likely that the number of cases in a week will be around twice what it is now. A model that aims to predict the course of the same epidemic 3 months out is inevitably subject to substantially greater uncertainty. Even very good models are least able to predict when an epidemic curve will turn over (move from doubling to halving).

3.46. In emergencies of sufficient seriousness, a cross-Government rather than departmental response will be needed. In the UK, COBR, explained earlier in this statement, is the usual mechanism for achieving this response in times of national emergency. COBR is chaired, depending on the threat level and subject, by the Prime Minister or other Ministers. The scientific input to COBR, when relevant, is usually through SAGE. SAGE aims to provide Ministers and other decisionmakers with a single scientific view, but with the level of uncertainly reflected. The SAGE mechanism evolved over the period of this Module. In particular following the 2014 Ebola crisis in West Africa, SAGE introduced the concept of a 'pre-SAGE', i.e., a precautionary SAGE that would aim to convene in advance of a COBR meeting being called where the threat was potentially of national importance.

3.47. SAGE is not convened for those many usually smaller but serious emergencies which do not need a cross-Government response. Scientific advice may still be needed for the response but will come through the relevant department, usually by a combination of the CSA, the existing scientific committees and the specialist scientists of that department. For example, for a major rail accident scientific and engineering advice would usually be provided by experts to the Department for Transport and its CSA. A significant outbreak of an infectious disease in a hospital would be responded to by DHSC and the NHS with advice from UKHSA, CMO/CSA and potentially medical scientific advisory committees in slower time.

3.48. The balance of scientific disciplines that are needed will depend on the emergency. The West African Ebola epidemic of 2014-16 is an example. Ministers wanted the UK to support the Government of Sierra Leone and its neighbours to minimise mortality and prevent the risk of an emergency escalating epidemic. Transmission was within hospitals, at funerals and in the community. The science to underpin civilian, medical and military efforts in combatting Ebola therefore required, amongst other things: science from epidemiology, modelling and virology for the initial analysis, public health and engineering to minimise in-hospital spread; anthropology to assist with safe and dignified burials and clinical trials; vaccinology and pharmacology to assist with developing medical countermeasures. This had to be integrated both in the UK for Ministers (ultimately via SAGE), in West Africa for Ministers there who rightly had the principle decision-making responsibility, and for local and international responders.

3.49. There are risks in any emergency response, both from excessive caution leading to a slow or minimal response and from lack of caution leading to major decisions with significant social or public health implications being taken based on minimal data. Waiting until all the key data are present and analysed to a level that would be ideal for policymaking under non-emergency conditions is not possible, sensible or safe in a rapidly moving epidemic or other health emergency where the risk is doubling over time.

3.50. The role of scientific and medical advisers is to provide technical advice. This is a specific and circumscribed role, albeit an important one in many emergencies. Elected leaders have a responsibility on behalf of the population to balance the scientific and medical advice against wider societal, economic and political factors. As CMO I and my predecessors and DCMO colleagues seek to ensure political leaders have heard and understood the best available relevant scientific, medical and technical information prior to taking decisions including, where possible, the likely public health implications of taking different decisions.

3.51. Where political leaders choose to take a path that is not the optimal one for public health, that is not a failure of the system of advice, provided they have fully understood the implications of their actions, and the strength, or lack of strength, of the scientific information. There will often be many important competing factors they are having to balance, including societal and economic ones, that do not fall within the remit of scientific, clinical or public health advice.

3.52. The CMOs and DCMOs have to balance several tensions. Whilst they are civil servants in Government they have to give independent technical advice. Just as with other technical advice (such as legal, engineering or military advice) this is only useful to the extent it is independent and starts from the facts as they are at that point in time knowable, rather than the facts as some might want them to be. When giving independent advice confidentially within Government this independent role does not, in my experience, create a major tension. The responsibility of technical advisers to give unbiased technical advice is, and has been, understood by Ministers.

3.53. When giving advice in public the potential tension is greater, but not usually in a major way, provided the advice is on a medical or scientific subject. The role of the CMO or DCMO is to be a doctor, albeit in a Government role, and this is widely understood. It is the job of doctors to give advice based on their professional view and the known facts, even if that advice is unpalatable, and all doctors are experienced in this. The tension is greater when journalists or others try to get CMOs and DCMOs to comment on non-technical, and in particular political, issues. Wherever possible we try not to answer those questions (or give a minimalist answer), as it is not our role either to support, or undermine, Government policy, only to give technical answers.

3.54. It is a long-standing convention that advisers do not say what advice they gave a Minister- again this is absolutely in line with any other professional, including legal, advice. It is also in line with medical advice to, or information about, individuals, which is always confidential.

3.55. Since the role of CMO is to be a doctor in Government, there should be, and in our experience is, no contradiction between the CMO functions and those of standard medical ethics laid out by the GMC.

3.56. The integration of different aspects of technical advice is one of the more complex in Government. If the advice is narrowly medical, for example which of three drug options to adopt, it will be done within the medical sphere, including by CMOs and DCMOs.

3.57. For wider scientific advice in major emergencies, the SAGE system is designed to integrate multiple sciences with the narrow medical advice for decision-makers. For an epidemic or pandemic this will be likely to include epidemiology, modelling, virology/microbiology, public health, engineering, clinical medical sciences, diagnostics, pharmacology, immunology, vaccinology, behavioural sciences and anthropology, among others.

3.58. There may be a need to look at operational issues and the cost-effectiveness of particular interventions within CMO or SAGE advice, so health economics (a branch of microeconomics) may be relevant to the medical and scientific advice. This is because giving advice which is operationally unfeasible or substantially disproportionate in cost or difficulty is not especially helpful.

3.59. It is, however, not within the expertise, nor is it the role, of the CMO and DCMO, GCSA or SAGE to give advice on the wider social, economic, fiscal and political issues elected political leaders need to balance. For example, for the CMO to give advice on issues of geopolitics or macroeconomics would clearly be inappropriate. Government has many distinguished and highly competent macroeconomists and diplomats to do this.

3.60. An example to make this less abstract might be port measures for travellers arriving from overseas (i.e. provisions relating to quarantine etc). CMOs and SAGE can give technical advice on the likely impact epidemiologically of such interventions on an epidemic. Where the impact on the port and travel is minimal (e.g. providing information to travellers) this may not need wider advice. If on the other hand the policy decision is whether to cancel all flights from a country, multiple additional factors will need to be taken into account, including freedom of movement, impact on trade, maintaining public confidence, diplomatic relations, consular implications for UK nationals now stranded overseas, legal issues including refunds and insurance and so on. The CMOs and DCMOs cannot give professional advice on these issues.

3.61. There is a legitimate question as to whether a SAGE-like mechanism would be helpful in emergencies for integrating economic or other non-science technical issues in giving advice prior to decision-making. However, it is for Ministers, the Cabinet Office and HM Treasury (HMT), rather than OCMO, to give a view on whether this would be helpful for their decision making.

3.62. In addition to the integration of science through the formal mechanism of SAGE, the OCMO has close bilateral or group relations with, among others, the CMOs in Scotland, Wales and Northern Ireland, the GCSA, the National Medical Director of the NHS, the Medical Director/Chief Medical Adviser of PHE/UKHSA, the Chief Nursing Officer for England, the wider departmental CSAs, the Chief Veterinary Officer ("CVO"), the National Statistician, the Surgeon General and other technical leaders across Government.

3.63. These relationships complement the interactions that occur with senior clinicians outside Government. For example, there are frequent interactions by the CMO with the Presidents and Chairs of the Medical Royal Colleges and academic leaders and experts in the UK and around the world.

3.64. The papers used for SAGE discussions and the minutes from meetings are all published in an online repository (except for issues relating to national security). The minutes of expert committees are also publicly available. Medical science works by open publication and peer review, and most key papers are published online either in peer-reviewed journals or repositories. This process sped up during COVID-19.

3.65. The OCMO, and specifically the CMO and DCMOs have always been, and would always be, expected to communicate with the public about health emergencies that are of national importance as they arise. Over the period of this Module, the OCMO has communicated with the public on, among other risks, pandemic influenza, Ebola, Novichok and COVID-19.

Role of officials and experts in medical science, clinical care and public health in formulating advice to Government

3.66. The governance and leadership of medicine and medical science is dispersed. Important components within Government and NHS England include the UK CMOs, in England the National Medical Director of the NHS (Professor Sir Steven Powis), and the Medical Director of PHE (now UKHSA).

3.67. More widely, the Presidents/Chairs of the Medical Royal Colleges (e.g. the Royal College of Physicians, of General Practitioners, of Surgeons and others) and the Faculties (e.g. Faculty of Public Health) are responsible for postgraduate training and have a major professional leadership role; they are assembled in the Academy of Medical Royal Colleges with a Chair, currently Dame Helen Stokes-Lampard. For medical research the head or chief executive of the NIHR, the DHSC CSA (usually the same person), the Chief Executive of the Medical Research Council, and the Director of the Wellcome Trust have significant influence over funding decisions.

3.68. The GCSA is influential in health as well as wider science. The President of the Academy of Medical Sciences represents the UK's National Academy of Medical Sciences, alongside the President of the Royal Society for science more widely. The

President and Chair of the GMC are responsible for registration of doctors and medical standards, and the Chair of the Medical Schools Council ("MSC") represents the undergraduate years. The Chief Executives of NICE and the MHRA regulate and advise on drugs and devices. The Surgeon General is responsible for healthcare in the armed forces. There are many influential specialist societies and professional groupings including in infection or public health the Association of Directors of Public Health, the Royal Society for Public Health, the British Infection Association, and the Royal Society for Tropical Medicine and Hygiene. The British Medical Association has a professional as well as a trade union role. Each major NHS trust has a medical director or equivalent (sometimes known as CMO). There are many specialist committees ranging from ones whose membership is appointed on a competitive basis and statutory, to others advising the Royal Colleges and ones which are ad-hoc and self-appointed. Many of these bodies have UK wide roles, some are England only. In an emergency, the CMO has to coordinate as well as is possible with all relevant parts of this collective leadership and understand and reflect their insights and concerns in Government, in turn reflecting the reasons for Government thinking to the profession.

Statistical analysis and data science advice to Government

3.69. Data is central to providing good scientific, clinical and public health advice. Inevitably in emergencies this is less good than in non-emergency settings, and especially so early in the emergency. Most infectious emergencies will initially emerge outside the UK, and we therefore have to rely on local clinicians and scientists, the local public health system and the WHO to provide data. The International Health Regulations ("IHR") of the WHO are a legal framework intended to ensure governments share data about novel outbreaks of potentially international importance occurring in their jurisdictions.

3.70. Certain data are particularly important in formulating the initial response to a pandemic. These include: the force of transmission (i.e. the R number which indicates how many people a typical infected person infects); the mortality rate and its age and sex distribution defined as the case fatality rate or the infection fatality rate; the doubling time; and the route or routes of transmission. These take different times to determine. The many difficulties that can arise in determining even these apparently basic numbers are discussed in a report published by the OCMO on 1 December 2022. Headed *Technical Report on the Covid-19 Pandemic in the UK*, it was prepared by the

UK CMOs (England, Scotland, Wales and Northern Ireland), the GCSA, the NHS National Medical Director and the relevant Deputy Chief Medical Officers (DCMOs) with input from many distinguished scientists to inform our successors. I was the lead senior author/editor.

3.71. Data come in many forms. For infectious emergencies these include clinical (descriptions of cases, response to treatments, case fatality rates); epidemiological (numerical data at a population level); virology/microbiology/parasitology (data on the pathogen from laboratory and clinical settings); genetic/genomic data; as well as data from the social sciences that may be qualitative as well as quantitative in nature.

3.72. Data in medicine are usually published, whether in peer reviewed journals, or official reports from bodies such as the WHO and PHE, or increasingly on online databases such as GISAID (genomic data) or ProMed (clinical or epidemiological data).

3.73. Sharing of data is central to medicine and public health in and between emergencies. Generally, this is in written form so that the data can be accurately reflected and interrogated by the reader, but in emergencies verbal communication is faster than publications and may give early indications of emerging trends. Online databases are common in medicine. CMOs and most public health specialists are trained in the interpretation of and production of clinical and epidemiological data, usually laid out in tabular or graphical form.

Public transparency and communicating expert advice to the public

3.74. A central and important aspect of the role of the CMO and DCMOs is to communicate to the public about significant health threats during an emergency. This is likely to be via the media, whether through television, radio, print media and websites. Generally, media interest in health emergencies are exceptionally high. This communication may also be indirect - for example through televised appearances at Select Committee hearings in Parliament, or lectures where journalists are present, or online. Between emergencies communication about Government readiness for emergencies would normally be by Government and CMOs have not traditionally provided a running public commentary on Government policy in this area. Since almost all medical emergencies, including pandemics, are very different from one another it is not realistic to have off-the-shelf communications ready to go except for a few very specific emergencies. This

does present practical problems because the period at the start of the emergency is when the public are most concerned and interested in it, and most need accurate information, but it is also the time the CMO and DCMOs are most busy in helping inform Government policymaking and advising Ministers, and have the least reliable data to share.

3.75. CMOs, CSAs and other scientists in Government will always have a presumption in favour of publication of data except where national security is at stake. This is a medical and scientific norm and allows for sensible critique. For official statistics there are clear rules on publication, but for data outside that publication of key data should always be the norm in our view. Much of the data Government relies on in an emergency is often from the academic sector and will also be published through the usual academic routes. Optimal timing of data release is sometimes more subjective. In general, for data produced for policy there is a presumption that Ministers will be given first sight with a sufficient delay to publication that they can formulate a policy response if they wish to. Academic data may also have some need for peer review, although it has been the shared view of myself, my predecessor as CMO and other senior scientific advisers in Government that in emergencies data should always be published or shared fast in provisional form. We expressed that view in an editorial to the Lancet published in 2015 **(CJMW2/002 – INQ000183358)**.

3.76. There is an inevitable tension between a need for early publication in an emergency and a need for data to be as robust as possible. Getting this balance right is a professional judgement and it is not easy to put hard-and-fast guidelines on it.

3.77. Data presented to Ministers, policymakers and the public has to be comprehensible to an interested lay person. Simplifying data so that the data are comprehensible, but without losing accuracy (including reflecting uncertainty) is a key professional skill for CMOs, DCMOs and CSAs. This is most difficult in public communication as the range of those listening and responding to the information provided will be wide – from the highly specialist to those with relatively limited, or no, scientific training- and the time available is often very short (minutes).

3.78. Science evolves, and especially in emergencies may evolve very rapidly and in different directions. Presenting data when the professional consensus or central view has changed is often challenging but is essential. This is particularly true in areas of public or scientific controversy; the place of facemasks in controlling COVID-19 is a recent example.

Role of Public Laboratories in the response to a pandemic

3.79. The United Kingdom benefits from having a system of public laboratories. Those public laboratories concerned with health primarily fall under the remit of the UKHSA (previously PHE), who are best placed to assist the Inquiry in respect of their function, and the extent to which the need for mass laboratory testing and contact tracing was anticipated prior to COVID-19.

Section 4: Inter-organisational cooperation

The Emergency Preparedness, Resilience and Response Partnership Group ("EPRRPG")

4.1. The EPRRPG was a Director-level group (attended by the EPRR Directors for DHSC, NHSE and PHE) chaired by the DG Global Health. Its role was to oversee emergency preparedness across the three organisations and to receive annual assurance on readiness. There was no role for the CMO or DCMOs. The group met quarterly and was disbanded around 2017/2018 when the EPRR programmes were de-prioritised so that teams could be redeployed to planning for the UK's exit from the EU.

Prime Minister's Council for Science and Technology ("CST")

4.2. The Council for Science and Technology (CST) advises the Prime Minister on science and technology policy issues across Government. The council is supported by a secretariat in GO-Science.

4.3. The council is an expert committee, co-chaired by the GSCA and an independent chair. The council has 19 further independent members. The OCMO is not part of this structure.

4.4. CST advises the Prime Minister on the opportunities and risks that science, technology and disruptive innovation present; using horizon scanning to highlight issues about:

- research and science capability
- innovation and the economy
- health and quality of life within the UK
- sustainable development and resilience
- how science, engineering, technology and mathematics (STEM) can be developed and sustained in the UK; this can be through education and skills, and the promotion of international co-operation
- what the Government's high-level priorities for science and technology should be.

4.5. They have not, as far as I am aware, played a significant role in pandemic preparedness and the CMO does not play a significant role with CST (although I have attended it in other capacities).

International

4.6. In considering the role of international bodies in relation to preparation for a potential infectious disease response, it is simplest to divide them into global, regional and national.

Global bodies

4.7. The WHO is the most important global body. It has a standing technical capacity, but also significant convening power and moral authority to request information and give advice.

4.8. The UK is, and remains, a very active member and financial supporter of the WHO, and the CMO either sits on the Executive Board ("EB") in rotation or leads UK delegations. Day-to-day liaison with the WHO is jointly between the FCDO (previously the FCO), especially via the Ambassador and Geneva Mission to the UN, and the international directorate of DHSC. The UKHSA also has close links into WHO (as did its predecessor organisations).

4.9. The senior decision-making body of the WHO is the World Health Assembly, which meets once a year. Normally, the UK delegation is led by a Minister, with the CMO deputising where requested.

4.10. Individual UK scientists also contribute to WHO technical groups.

4.11. The WHO has powerful regional offices with substantial autonomy. The UK is in the EURO region. They also maintain some national offices. Information about epidemics will often come via that route. The WHO can both help collate epidemiological data and provide technical advice on response.

Regional bodies

4.12. In parallel, there are a number of technical bodies which undertake epidemiology at a regional level. In Europe this would be the European Centre for Disease Prevention and Control ("ECDC"). This is mainly limited to providing epidemiological data and advice. Recently, the African Union sponsored the setting up of Africa Centres for Disease Control and Prevention ("Africa CDC") which aims to provide epidemiological data across the African continent.

4.13. All countries have some level of surveillance of infectious diseases domestically. Some additionally have an international component to their work. The most important is the CDC in the USA which has substantial capacity to identify and respond to outbreaks of potential importance in countries with less well developed surveillance systems as well as domestically within the USA. UKHSA and its predecessor organisations also has some international presence.

National bodies

4.14. At a national level, countries vary in their ability, and in some cases willingness, to detect outbreaks and share data about them. Often ability is linked to the strength of the local health system, willingness is a political issue.

4.15. International non-governmental organisations ("NGOs") often play a major role in the response to outbreaks and epidemics. In the Ebola epidemic in West Africa, for example, Médecins Sans Frontières ("MSF") and Save the Children ("SCF") played important roles. MSF can be one of the earliest organisations to identify a local outbreak of importance in areas of conflict or complex emergency given their geographical footprint.

4.16. There are several mechanisms by which information about outbreaks is disseminated irrespective of the initial reporting source. The formal mechanism is via the WHO, including through the operation of the International Health Regulations. Often as important are open information sharing systems, for example the website ProMed.

4.17. OCMO has a formal role in the WHO and with UKHSA, and informally via networks of professional peers and scientists. The main organisation providing continuous

intelligence on important outbreaks in the UK is the UKHSA, formerly PHE, which maintains close relationships with other health protection agencies globally and is and is best placed to explain how these relationships work. FCDO Missions (Posts) overseas may also be alerted by local contacts of outbreaks or health protection emergencies in their host countries.

Devolved, regional and local Government

4.18. Each nation of the UK has a Chief Medical Officer. The counterpart CMO is the obvious contact point for another CMO when engaging across the four nations. During COVID-19, the 4 UK CMOs had regular (at least weekly and sometimes daily) meetings in which we discussed technical issues, and where possible aligned the technical advice we were giving.

4.19. The UK CMOs sometimes give advice collectively. This can be either to provide a basis for cross-UK decision-making, to give clarity across the four nations, to add strength of weight to the clinical advice being given in Government or to make a clear public statement reflecting a collective clinical view.

Business, industry and unions ("private sector") and the Voluntary, Community and Social Enterprise Sector ("VCSE sector")

4.20. The OCMO engages with industry in several ways.

4.21. The most direct engagement is with the life sciences industry. This includes companies specialising in pharmaceuticals ('pharma'- drugs and vaccines in the main), devices including diagnostics, and digital health products. This can either be direct engagement or indirectly via the Office for Life Sciences (which a joint unit between DHSC and the new Department for Science, Innovation and Technology ("DSIT"), and formerly BEIS). Such engagement has several aims, including understanding the direction of scientific research and as support for a major UK industry. During COVID-19 this included engagement on companies specialising in vaccines, drugs and diagnostics. OCMO would not normally be involved in contract negotiations or questions of supply except where these had a clinical component.

4.22. OCMO also engages with industry bodies, and in some cases with unions and voluntary, community and social enterprise sector ("VCSE sector") organisations

outside the health sector, in an emergency to help provide information they would find useful. This occurred at several points during the COVID-19 pandemic. Largely this is limited to information-sharing, and generally it is more effective and transparent to have this information available to the general public as a whole rather than subgroups of it. OCMO provided a lot of public health advice to BEIS, which had direct interactions with industry. As explained earlier in this statement, the OCMO is very small and the range of bodies outside health it has the capacity to engage with during an emergency is therefore limited by available time even were that desirable.

Section 5: Planning for a Pandemic

Policies and operational strategy for emergency planning

Background

5.1. The following paragraphs have been taken from DHSC's Module 1 corporate statement, to which I contributed, but also include further details which may be of assistance to the Inquiry in this Module:

5.2. Pandemics and major society-changing epidemics are rare. Much of what we understand on how to combat them in the initial phases, and hence how to plan for them, therefore comes from data over decades and centuries. Since the start of the 21st century, we have had a single, relatively minor (by historical standards) pandemic prior to COVID-19 that affected the UK. This was the influenza pandemic of 2009, covered below. There have however been several significant epidemics globally, and the HIV-AIDS pandemic (which was the last major pandemic) continues.

5.3. All pandemics in recent history have eventually been addressed by medical countermeasures based on scientific understanding of the disease at the time, whether sanitation (cholera), vaccines (COVID-19, influenza) or drugs (HIV). Until these medical countermeasures are available, pandemics have to be addressed by societal measures to reduce transmission, also known as non-pharmaceutical interventions ("NPIs").

5.4. The initial countermeasures which will be useful for an emerging infection depend on the route of transmission. The five main routes of transmission are: respiratory (influenza, COVID-19); sexual and intravenous (HIV, syphilis); oral from water or food (cholera, typhoid); vector transmitted from insects or arachnids (plague, malaria,

dengue, typhus, Zika) and touch (Ebola, Lassa). Non-pharmaceutical countermeasures have to be based on the route of transmission, mortality rate, and the age structure of disease, among other factors.

5.5. The last major pandemic with significant mortality was HIV-AIDS (ongoing) which spread globally in the 1980s and has killed over 35 million people to date according to the WHO. When it emerged, mortality was 100% of those infected.

5.6. HIV-1 and HIV-2 are predominantly sexually transmitted, with additional blood-to-blood (intravenous) transmission, and morbidity and mortality are concentrated in young adults. NPIs therefore targeted sexual behaviours such as condom-wearing in this age group and reducing needle sharing between intravenous drug users. Development of a vaccine for HIV has had substantial effort and resource but, over 40 years later, we still do not have an effective vaccine against HIV, and drug treatments have underpinned medical countermeasures.

5.7. In the 20th century, three respiratory pandemics resulted from variants of influenza; 1918-19 ('Spanish flu'); 1957 ('Asian flu') and 1968 ('Hong Kong flu'). Mortality rates often vary by age. Age-specific mortality curves for 1957-58 and 1968-69 show a U-shaped pattern with an increased case fatality ratio in the very young and then increasing case fatality ratio with increasing age. The 1918 pandemic also mainly affected the very young and elderly, but additionally had relatively high mortality rates in young adults. During the COVID-19 pandemic, children were fortunately much less affected. Influenza is discussed in more detail below.

5.8. There was also one major cholera pandemic in the 20th century starting in 1961, with multiple outbreaks. Cholera is a faeco-oral disease mainly spread via water and affecting all age groups; it remains a threat where health and sanitation services break down. Although the UK was not affected by that cholera pandemic (the seventh), it was significantly affected by previous cholera pandemics in the 19th century, which lead to the development of epidemiology and of the sewer network among other things. Faeco-oral epidemics are currently less likely in the UK due to clean water and sewerage (when operating as intended), although food-based oral outbreaks can still be serious threats as evidenced by the spread of nvCJD following the consumption of beef from BSE-infected cattle.

5.9. Plague, a vector (flea) and respiratory transmitted pathogen, malaria (mosquito) and louse-borne typhus were historically significant epidemic threats in the UK. However, although some important vector-borne diseases still occur in the UK, such as Lyme

disease, vector-borne transmission is currently the least likely route for a major epidemic here although climate change may increase the risk again. Vector-borne diseases remain a major threat globally.

5.10. It is however important to acknowledge that much of our current response to new pandemics and epidemics, until medical science develops disease-specific medical countermeasures such as drugs and vaccines, depends on measures which were developed in response to plague and other historic epidemics often over many centuries. These measures include quarantine at borders, self-isolation of infected people, closure of venues where households mix indoors (such as theatres and hospitality) and restricting higher-risk close-contact professions such as barbers.

5.11. Whilst vector-borne, water-borne and food-borne pandemics are now less likely in the UK, respiratory infections retain their ability to travel rapidly around the world including in high-income countries and therefore are the group most important to plan for in the UK. Sexually transmitted and touch-transmitted pandemics and epidemics also remain a risk to the UK but will usually expand more slowly. High societal mortality may come from a high case fatality rate in smaller numbers (e.g. HIV, Ebola) or moderate mortality in an infection with a very high attack rate, which is defined as proportion of the population infected (1918 H1N1 influenza, COVID-19). Mortality in pandemics ranges from 100% (HIV) to less than 0.1% (H1N1 2009). It is therefore unrealistic to have a plan for all possible pandemics given the range of threats, routes of transmission, mortality rates and age structures affected, amongst other variables.

5.12. Every year multiple outbreaks with fatalities, or of potentially fatal diseases, occur around the globe, some of unknown cause, reported to the WHO and national public health systems, and described on professional websites such as ProMed. For each one on emergence, the probability of it turning into a major epidemic is low, and a pandemic exceptionally low. For those that do emerge as major threats the evidence that it is going to become a national and then international threat accumulates slowly, and probabilities gradually change.

5.13. To give some sense of the frequency of these, in September and October 2022 global outbreaks that were unlikely to, but could, cause major epidemics have included an ongoing Mpox epidemic in Europe and elsewhere, declared a PHEIC by the WHO in July 2022 but with low mortality; a respiratory outbreak in the Argentine Republic (Argentina) with high mortality which concerned the WHO but turned out to be Legionella; an Ebola Sudan type (for which we have no rapid vaccine) in the Republic

of Uganda (Uganda); a hantavirus outbreak in Panama City (Panama); Marburg virus detected in the Republic of Ghana (Ghana); plague cases reported in the Democratic Republic of Congo (DRC); vaccine-derived polio detected in London and New York sewers and cholera in the Republic of Haiti (Haiti). In addition, there are various outbreaks of avian influenza globally and multiple animal outbreaks such as chronic wasting disease in deer where the probability of it becoming a zoonotic infection in humans is low but never zero.

5.14. When COVID-19 was first reported to the WHO on 31 December 2019, it was already an infection of significance in a localised part of China. Over the first 21 days of January 2020, which Module 1 covers, the evidence gradually accumulated suggesting that this could be a serious international threat rather than just a local one. This gradual change in probabilities with new data emerging is typical and is reflected by the fact that the WHO did not declare a PHEIC until 30 January 2020, and a pandemic until 11 March 2020.

5.15. I turn now to some specific predominantly respiratory pandemics and epidemics of relevance to UK planning prior to COVID-19, which occurred after the turn of the 21st century; influenza and the two prior new severe coronaviruses affecting humans, SARS and MERS.

Pandemic influenza

5.16. Pandemic influenza has been at the top of national emergency planning since the UK's first NRR in 2008. This is because influenza has a proven ability to cause repeated pandemics with substantial mortality including in the UK.

5.17. Any new pathogen transmitted by the respiratory route is likely to share characteristics with influenza in that it can spread rapidly via close proximity, can travel swiftly and there are few easy immediate countermeasures. It has therefore been a planning assumption that a plan for pandemic influenza would have considerable overlap with one for other diseases easily transmitted by the respiratory route. This was set out in the UK Influenza Pandemic Preparedness Strategy 2011 (developed jointly across the four UK Governments) as follows:

"*A pandemic is most likely to be caused by a new subtype of the Influenza A virus but the plans could be adapted and deployed for scenarios such as an outbreak of another*

infectious disease, e.g. Severe Acute Respiratory Syndrome ("SARS") in health care settings, with an altogether different pattern of infectivity". (page 14).

5.18. In particular, the potentially rapid spread via the respiratory route, without physical contact and including to strangers who are in the same room or vicinity, leads to a very different pattern of transmission than other transmission routes, and potentially can lead to very high hospitalisation and mortality in short periods of time if there is a significant infection fatality rate.

5.19. Pandemic influenza emerges as a result of a novel influenza virus which is markedly different from recently circulating strains (antigenic 'shift' rather than 'drift') and which affects humans. This virus usually emerges from birds or mammals.

5.20. The emergence of a new strain of the influenza virus and a lack of pre-existing immunity within the human population would mean that international spread is sometimes almost inevitable and rapid; population attack rates are high; and the illness itself may be (but is not always) more severe than is seen with seasonal influenza.

5.21. Influenza pandemics are highly unpredictable in terms of when they will occur, how many waves there will be, and the precise timing, duration and severity including case fatality of each wave. Past influenza pandemics have varied in scale, severity and consequence, ranging from the 1918 outbreak of Spanish flu which probably killed many tens of millions globally, through to the 2009 'swine flu' pandemic which had a lesser impact on society than some normal flu seasons. In contrast to COVID-19 mortality in influenza pandemics is usually seen in young children as well as the elderly.

High Consequence Infectious Diseases (HCID)

5.22. In the UK, a HCID is a disease which requires very high-level isolation in specialist centres and is defined according to the following criteria: i) acute infectious disease; ii) typically has a high case-fatality rate; iii) may not have an effective prophylaxis or treatment; iv) often difficult to recognise and detect rapidly; v) ability to spread in the community and within healthcare settings; vi) requires an enhanced individual, population and system response to ensure it is managed effectively, efficiently and safely.

5.23. MERS and SARS are classified as HCIDs in the UK, alongside a number of other acute infectious diseases, typically with very high case fatality rates. Their means of transmission can be either physical contact (e.g. Ebola virus disease and Lassa Fever) or airborne/respiratory (e.g. avian influenza H5N1 and pneumonic plague), although other routes including sexual or via breast milk are possible, usually as a secondary route of transmission. Classification of HCIDs is made by the UK public health agencies, the ACDP and the NHS and are kept under review.

5.24. HCIDs are rare in the UK and when cases do occur they are typically associated with recent travel to an area where the disease is endemic or where there is an outbreak. They are typically treated in NHS specialist isolation units. No HCIDs are currently endemic in the UK, and the known animal reservoirs are not found in the UK.

5.25. The UK has had some experience of planning, exercising and incident management for HCIDs. An emerging infectious disease, likely to be an HCID, was included on the Government's NRR from 2010.

5.26. A novel emerging infectious disease is likely to be treated as an HCID whilst the characteristics of the pathogen are still becoming known. Wuhan novel coronavirus was classified as an HCID on 16 January 2020 and declassified on 19 March 2020, following advice from ACDP. These decisions took into account the available information and uncertainty about this novel disease at the beginning of the outbreak and mortality rates among other factors.

5.27. There are significant disadvantages to a disease being classified as a HCID when it is not one. At the individual patient level it makes treatment more difficult and alarming as very strict barrier care will be in place, and ill patients may have to be transported around the country to specialist units with attendant risks. At an NHS-wide level each case of a HCID is highly resource-intensive, and the specialist provision of beds is limited. At a population level contacts will be very strictly isolated and monitored. There are therefore few advantages, and several risks, to having a HCID classification in place when it is not needed. De-classifying diseases down to a non-HCID wherever possible should therefore be seen as normal practice once initial risk assessments are in place.

SARS-CoV

5.28. Prior to 2002, only four human coronaviruses were circulating despite there being many animal coronaviruses and these caused mild disease ('colds') in the great majority of people: 229E, NL63, OC43 and HKU1. SARS was a new coronavirus with significant mortality that emerged in China, probably in 2002, and which was reported to the WHO in 2003. It caused a widespread epidemic affecting several countries and territories with some spill-over cases including in the UK. It disappeared for reasons that are not entirely clear (although control measures contributed significantly) in 2004 and to date has not re-emerged in humans.

5.29. SARS is caused by the SARS coronavirus, known as SARS-CoV. This virus was spread mainly in small droplets of saliva coughed or sneezed into the air and probably also by aerosols. SARS can also be spread by fomites (infected objects), surface contamination and possibly faecally. This fomite transmission occurs when an uninfected person touches infected surfaces, and then touches their mouth, for example through eating, or their eyes. SARS has flu-like symptoms that usually begin two to seven days after infection. Sometimes, the time between coming into contact with the virus and the start of symptoms (incubation period) can be up to 10 days. There is currently no vaccine. Asymptomatic transmission of SARS is thought to be very rare although asymptomatic infection without transmission may occur.

5.30. In 2004 there was another smaller SARS outbreak linked to a medical laboratory in China.

5.31. During the main period of these outbreaks there were 8,098 reported cases of SARS and 774 deaths. The disease has a case fatality rate of between 3-10% depending on the method it is calculated, including younger adults.

5.32. There are some similarities between SARS-CoV and SARS-CoV-2, the virus which causes COVID-19, including that both are beta coronaviruses that are spread in large part via small droplets and respiratory secretions. However, SARS-CoV has a higher case fatality rate than SARS-CoV-2, and was much less transmissible, generally requiring close contact with symptomatic people. It was therefore a particular hazard for healthcare workers who as part of their work have to come close to, and handle, sick people.

MERS-CoV

5.33. MERS is a viral respiratory disease caused by a coronavirus that was first identified in the Kingdom of Saudi Arabia (Saudi Arabia) in 2012.

5.34. MERS has been reported in 27 countries since 2012, with approximately 80% of human cases reported by Saudi Arabia. There have been three cases of MERS imported into the UK since 2012, with 1,500 possible imported cases tested in UK labs in the same timeframe. There was transmission of two cases in 2013 and one subsequent death, with a total of five MERS cases in the UK. The most recent UK case was identified in August 2018, with previous cases diagnosed in 2012-13. The WHO report that up to September 2019, a total of 2,468 laboratory-confirmed cases of MERS have been reported globally, including 851 associated deaths.

5.35. Although most cases have been directly or indirectly linked to camel exposure in the Arabian Peninsula, there was a significant outbreak of MERS in the Republic of Korea (South Korea) in 2015, which involved 186 cases, including 36 fatalities, 44% of which were nosocomial (transmitted within a healthcare setting). All, or the great majority, of human-to-human transmission was from symptomatic people. Asymptomatic transmission of MERS from human-to-human is thought to be very rare, although asymptomatic infection without onward transmission may occur.

5.36. The mortality rate (case fatality rate) for people with MERS reported to the WHO is approximately 35%.

5.37. Unlike SARS-CoV-2, MERS-CoV does not currently pass easily from human-to-human and the risk to residents in the UK from imported cases with the existing variant of MERS remains very low. Identifying MERS and SARS patients by their symptoms and isolating them contained the spread of those outbreaks because a high proportion of patients displayed symptoms in the early stages of infectiousness whilst transmissibility only peaked later on, so were isolated for most of the time they were infectious.

Vaccines, PPE and Stockpiling

Vaccines

5.38. In general, the OCMO was not involved in detailed decisions relating to the precautionary stockpiling and procurement of personal protective equipment,

antivirals, antibiotics and vaccines. These operational matters fell to DHSC and PHE and I would refer the Inquiry to paragraphs 386-397 of DHSC's Module 1 corporate statement.

5.39. That said, the OCMO did contribute technical knowledge to the Pandemic Influenza Preparedness Programme ("PIPP") Board's work on pandemic vaccine strategy. It is anticipated that the process by which vaccines were developed in response to COVID-19 will form part of a separate Inquiry module, and so the matter is covered only briefly here.

5.40. It is helpful when considering the activities undertaken in respect of vaccines and pandemic preparations to briefly set out some background to vaccines, as well as how the considerations in respect of vaccines for an influenza pandemic differ from those for a novel respiratory pathogen such as COVID-19.

5.41. Vaccines capable of deployment in respect of pandemic influenza may take one of two forms, namely pre-pandemic vaccines or pandemic specific vaccines. Pre-pandemic vaccines can be stockpiled in anticipation of a pandemic caused by a particular strain of influenza. Put simply, pre-pandemic vaccines target a known extant pathogen which whilst not currently causing major problems in humans is felt to be of particular concern, for instance H5N1 avian influenza at present, and are stockpiled in anticipation that they may one day be required. In the event of a pandemic or major epidemic, these stockpiles may then be drawn upon to facilitate early vaccination of all or part of a population. It is unlikely such vaccines will be well-matched to the pandemic if it emerges, but it may be sufficiently matched to reduce the severity of infection in vulnerable populations. The disadvantages of pre-pandemic vaccines are the cost of acquisition and storage, inherent wastage if the target threat does not materialise in the form of a pandemic before the stock expires, or that the stockpiled vaccine is not sufficiently well matched to the form the pathogen takes. Pathogens circulating in animals would need to mutate to transmit effectively between humans, and such mutation may mean the stockpiled vaccine is not sufficiently well matched to have a useful clinical impact on severity and mortality.

5.42. The decision as to whether to stockpile a pre-pandemic vaccine for influenza is a political and operational one, informed by scientific advice. The role of the OCMO would be to advise on the technical science to be considered when making such a decision, such as potential pathogens of concern, and any proposed vaccine's likely

efficacy, with inevitably wide uncertainty. Expert groups such as JCVI will also play a key role in providing advice on vaccine stockpiles.

5.43. It is inherent that for there to be a pre-pandemic vaccine, the causative pathogen must already be known. Given COVID-19's nature as a novel respiratory disease, no pre-pandemic vaccine existed or was capable of being stockpiled.

5.44. Pandemic specific vaccines differ from pre-pandemic vaccines in that they are developed in response to a particular pathogen once it is known that such a pathogen is capable of causing a pandemic. The advantages of a pandemic specific vaccine are that they are targeted to a particular causative pathogen and avoid the costs associated with storage of a vaccine which may ultimately not be used. They are likely to be much better matched. There is however an inevitable time lag associated with the development and manufacture of a pandemic specific vaccine from the moment a pandemic is identified and there is a high chance that at least the first pandemic wave will pass without such a vaccine. In the case of pandemic influenza, the development of a pandemic specific vaccine may rely on the tried and tested technologies which underpin seasonal influenza vaccines (currently largely egg-based). Nevertheless, it still takes several months to manufacture such a vaccine at scale. In the case of COVID-19, the opportunity to rely on existing technologies was not available, and so development and trials of the vaccine needed to be undertaken. This activity employed vaccine platforms previously funded by the Government, which increased the speed at which vaccines were developed. Development of an effective pandemic specific vaccine for a novel pathogen such as COVID-19 will likely take longer, and may indeed not be possible, as has been the case with HIV so far.

5.45. The OCMO had identified the need for vaccine manufacturing to progress at speed in the event of a pandemic if and once a suitable vaccine had been developed. Accordingly, in 2018 and 2019 the OCMO contributed to a spending review bid led by DHSC to onshore new vaccine manufacturing technologies to augment the UK's domestic vaccine manufacturing capability. The bid was not successful.

5.46. Prior to January 2020, the OCMO had also been involved, predominantly through its representation on the PIPP board, in activity to develop sleeper contracts and advanced purchase agreements with vaccine manufacturers to supply a pandemic specific vaccine. These would then be triggered in the event of an influenza pandemic. Ultimately, such contracts were of no assistance during the COVID-19 pandemic given the disease's novel nature.

PPE

5.47. Decisions about procurement and stockpiling of PPE are operational in nature. The role of the OCMO is to advise policy makers so that they are equipped with the technical knowledge to make informed decisions. This does not extend to advising on, or taking decisions about, the size, composition, or cost effectiveness of any stockpiles except where this is a clinical judgement.

Research

National Institute of Health Research ("NIHR")

5.48. The NIHR is the main Government funder of applied research in health and social care. As DH Director of Research & Development, Dame Sally Davies spearheaded its creation in 2006. She continued as Director-General/Head of NIHR until January 2016, when I took over the role for the rest of the period of this Module.

5.49. As I explained in my first witness statement, following a review of the 2009 'swine flu' outbreak, the NIHR commissioned a portfolio of projects, put on stand-by in a maintenance-only state and awaiting activation in the event of a new influenza pandemic. The portfolio included studies covering surveillance, communications, triage, and clinical management. Some of those sleeping contracts were stood up and repurposed for COVID-19. These included:

- Evaluating and improving communication with the public during a pandemic, using rapid turnaround telephone surveys;
- Pandemic Respiratory Infection Emergency System Triage;
- Maternal and perinatal outcomes of pandemic influenza in pregnancy;
- Real time refinement and validation of criteria and tools used in primary care to aid hospital referral decisions for patients of all ages in the event of surge during an influenza pandemic; and
- The ASAP trial (a double-blinded randomised controlled trial of early low dose steroids in patients admitted to hospital with influenza infection during a pandemic). Whilst this was not activated during COVID-19, the study protocol was used to inform the dexamethasone arm of the RECOVERY trial.

5.50. The OCMO Module 2 corporate statement discussed the importance of the UK's research response to COVID-19, which was substantial. I briefly set out some of that detail here to give context to the important role of NIHR, amongst others, in that response.

5.51. The key purpose of research in a pandemic or major epidemic is to understand the disease itself, to improve information for both policy and clinical decision making, to optimise existing clinical treatment and to provide the tools to move from social to medical countermeasures. The central role of research in supporting the response is sometimes underestimated by non-medical planners and policymakers. Since the mid-19th century science has always been, and will almost always be, the exit strategy from pandemics and epidemics.

5.52. The UK has a centralised health delivery system through the NHS and two major Government funders of clinical research: the NIHR, and the MRC as part of UKRI. Additionally, the UK has a strong research charity sector including the Wellcome Trust as well as several other major research charities. It was therefore well situated for the Government funders of research, NIHR and MRC, to coordinate which research was prioritised in response to COVID-19, and to use the NHS and existing NIHR networks to deliver this. It was important to the UK's research response that we have pre-existing clinical funders, with significant budgets, well-established ways of working, effective independent ethical review and regulators (HRA and MHRA respectively), and a strong clinical research culture. In the event of a public health emergency, the UK's system of ethical approval benefitted from a mechanism by which applications could be accelerated whilst maintaining rigour. This served to expedite ethical approval for studies responding to emerging public health concerns.

5.53. The UK also had the UKVN. This was established in 2015 after the Ebola crisis in West Africa to address the perceived lack of incentive for the pharmaceutical industry to investigate the development of vaccines for intermittent infectious disease outbreaks and epidemics in low income countries. I chair the UKVN and have done so since its inception. UKVN created a priority list of pathogens published in 2019 **(CJMW2/003 – INQ000183359)**, with Disease X, a hypothetical new pathogen capable of causing an epidemic, and the coronavirus MERS the first two on the list. Recognising the risk posed by coronaviruses, in 2016 the UKVN funded Oxford University with a grant of £1.87m to develop a vaccine for MERS. It was this technology that was used to develop the Oxford/AstraZeneca vaccine for COVID-19. The UKVN is Overseas

Development Assistance (overseas aid budget) funded and was designed to fund products predominantly likely to benefit low income or low middle income countries (i.e. not the UK as the principal beneficiary).

5.54. The UK contributed significantly to the global understanding of COVID-19. This was possible because of the strength of its research, and the ability to prioritise studies and deliver clinical research through the NIHR managed Clinical Research Networks and Biomedical Research Centres. The creation of the NIHR was central to that work.

Assessing and planning for inequalities and vulnerabilities

5.55. The importance of identifying and mitigating as far as possible inequalities and disparities in health is one of the aims of all public health. Communicable as well as non-communicable diseases tend to be most likely centred in areas of deprivation. The mechanism by which this occurs and can be countered is however different between different pandemics and epidemics. In cholera where this was first studied systematically it was by exposure to unsafe water; in epidemic typhus by exposure to lice; in HIV through intravenous drug use; and in tuberculosis (TB) through overcrowding, poor housing and malnutrition, among other factors. Expecting pandemics to be more severe in deprived areas is therefore generic to most infections, but why, and therefore how to combat this depends on the pandemic and its transmission and biological characteristics, and in particular route of transmission.

5.56. COVID-19, and severe COVID-19 in particular, was more likely in more deprived populations due to a combination of risk factors for higher transmission. These included: greater employment rates in high-contact professions such as social care or taxi driving; employment in sectors with less ability to work from home; more crowded living including multigenerational families, and also a higher prevalence of risk factors for severe disease once people became infected, including higher rates of people living with obesity and diabetes.

5.57. The most important way in which public health measures reduce the risk to areas of deprivation is to control the pandemic or epidemic in society as a whole. There may also be specific measures which reduce the risks to the most vulnerable populations (which are almost inevitable) but they depend on the infection involved.

5.58. During the initial waves of COVID-19 in the UK the OCMO was involved in the assessment of which groups were most vulnerable and commissioned specific

research and other work to identify ways to mitigate that risk. This included, for example, work on risk by ethnicity commissioned by me as CMO in April 2020 **(CJMW2/004 – INQ000183360)**. SAGE also considered these issues, which I understand will be considered in more detail in subsequent Modules.

Section 6

Summary of OCMO's involvement in pandemic preparation

6.1. For the purposes of preparing this part of the witness statement (paras 6.1 to 6.41), former office holders at the OCMO were approached to provide their recollections from their time in office. Specifically, discussions took place with Professor Dame Sally Davies and Professor Sir Jonathan Van-Tam.

6.2. Professor Dame Sally Davies held the post of Chief Medical Officer from June 2010 until September 2019. Professor Sir Jonathan Van-Tam was in post as one of two DCMOs, with principal responsibility for the health protection portfolio (which includes infectious diseases and emergencies), from October 2017 to March 2022. Both are therefore well placed to describe some facets of the OCMO's involvement in pandemic planning and response during the respective periods through which they held office. In addition, Professor Sir Liam Donaldson, who held the post of Chief Medical Officer from September 1998 to May 2010, has kindly provided further written assistance.

This section of the witness statement reflects the outcomes of those discussions, as well as information contained within the contemporaneous documents from the time to which the OCMO has had access.

Activity prior to June 2010

6.3. The paragraphs that follow (6.4 to 6.6) reflect input from Professor Sir Liam Donaldson.

6.4. From June 2009 until April 2010, the H1N1 'swine flu' pandemic was active in the United Kingdom. Forecasting for non-influenza communicable disease pandemics was not a feature of the work undertaken by the OCMO during this time. The priority was to manage the ongoing influenza outbreak, and to learn lessons to inform both that response and future responses.

6.5. At the time of the 'swine flu' pandemic, both DCMO posts were vacant as the two prior incumbents had left their roles and recruitment for their replacements had not started. A Director General for Heath Protection, Professor David Harper, held a DCMO equivalent role, although he was not from a clinical background (he was a scientific rather than medical doctor). A Director of Pandemic Planning and Preparedness, Professor Lindsey Davies, had also been in post since around 2006. The most recent pandemic preparedness exercise had been Winter Willow in 2007, in which both the CMO and the Director of Pandemic Planning and Preparedness participated.

6.6. Following the 'swine flu' pandemic, Sir Liam recommended that Ministers commission an independent review into its management. This was carried out by Dame Deidre Hine ("the Hine Review"). A further response to the pandemic was the establishment of the Chief Medical Officer's Statistical Legacy Group ("CMO-SLG"). Its purpose was to review the data collection procedures instigated during the 'swine flu' pandemic for the benefit of any future influenza pandemic, highlight and record best practice, identify any lessons learned, and consider the balance between data gathering and NHS reporting burdens. Its report, dated 3 December 2010, was intended to support the review of the "National Framework for responding to an influenza pandemic" ('the National Framework – see further paragraph 6.11"). Once its work was concluded, the CMO-SLG was disbanded.

Report of the Hine Review – July 2010

6.7. The paragraphs that follow (from 6.8. to 6.41) reflect input from Professor Dame Sally Davies and Professor Sir Jonathan Van Tam.

6.8. Dame Sally became CMO in June 2010 in the wake of the H1N1 'swine flu' pandemic. Shortly thereafter, in July 2010, the Hine Review was published. As explained in its foreword, the Review examined *'the strategic response in the UK, including the way in which this was planned and implemented across the four nations'*. The review made a total of 28 recommendations, covering: i) the central Government response; ii) scientific advice; iii) the role of containment; iv) treatments; v) vaccines; and vi) communications during a pandemic.

6.9. Two of these recommendations were directed specifically to the CMO (as one of the four UK CMOs) and concerned the provision of scientific advice to central Government during a pandemic. This was identified as having been of fundamental importance, in

particular given the high levels of uncertainty regarding the pandemic's nature, and the consequent reliance placed on such advice by Ministers when determining the Government's response.

6.10. In response to this understanding of the importance of scientific evidence, NERVTAG was established in summer 2014, and a revision issued of the Government's existing approach to emergencies of any nature set out in "Responding to Emergencies: The UK central Government response – concept of operations" ("the Concept of Operations").

From the perspective of OCMO, the revision of the Concept of Operations addressed the process through which Ministers and the Devolved Administrations were to be presented with a unified, rounded statement of scientific advice. The Hine Review also made recommendations in relation to the revision of the National Framework ("the Flu Plan").

The 'Flu Plan' (the National Framework)

6.11. As the DHSC Module 1 corporate witness statement (§313) explains, the National Framework superseded the existing UK-wide contingency plan from 1997 and provided information and guidance to assist and support public and private organisations across all sectors. The National Framework was published on 22 November 2007 **(CJMW2/005 – INQ000183361)** and was intended to set out Government's strategic approach for responding to an influenza epidemic and to provide generic guidance to assist in preparing for a pandemic whose nature and severity is unknown.

6.12. One of Dame Sally's first actions upon her appointment as CMO was to consult widely on the draft revised framework that followed from the recommendations of the Hine Review. In particular, Dame Sally held meetings with clinicians and nurses to ensure that it was fit for purpose on a practical level.

6.13. Thereafter, Dame Sally agreed and signed off the final document, published in November 2011 as the *UK Influenza Pandemic Preparedness Strategy 2011* ("the Flu Strategy"). The Flu Strategy was developed jointly across all four UK Governments. As it explained, it reflected the lessons learned from the H1N1 'swine flu' pandemic, the recommendations of the Hine review and other reports. Actions arising either from

the Hine Review or, identified in the Flu Strategy, were advanced through the DHSC-led PIPP.

6.14. More recently, in November 2018, it was recognised that there was a need to refresh the 2011 Flu Strategy. This work was to be led by DHSC with oversight from the then CMO and DCMO, respectively Dame Sally and Professor Van-Tam. Work on this update ceased in March 2019, as a result of the reallocation of resources towards EU exit preparations.

The Pandemic Influenza Preparedness Programme ("PIPP")

6.15. DHSC's Module 1 corporate statement (§313) explains that the PIPP was a DHSC-led programme with responsibility for the health and social care system's planning and preparedness for any potential future influenza pandemic in England. The programme specifically focused on an influenza pandemic as this was the Reasonable Worst Case Scenario ("RWCS") identified in the NSRA.

6.16. The programme was governed by a programme board, the PIPP Board, which met for the first time in October 2007. The Board comprised representatives from NHSE, PHE, DHSC and the Cabinet Office and was responsible for setting the strategic aims and objectives of the programme. Further, the Board coordinated the work of stakeholder organisations to meet these objectives.

6.17. As CMO, Dame Sally was chair of the PIPP Board up to March 2017, following which the role was taken over by DHSC's Director General for Global and Public Health. From that time, the usual practice was for the OCMO to be represented at board meetings by DCMO Professor Van-Tam.

6.18. The OCMO's contribution to the PIPP board was to provide technical context to discussions, as well as high-level guidance. A further key function of the OCMO, and the CMO and DCMOs in particular, was to bring subject matter expertise to the Board's work. Partly, this relied upon their own specialisms and areas of expertise (e.g. virology, epidemiology, public health). More generally however, the office holders contributed an expert perspective as experienced clinicians. The aim was to help inform discussions by providing expertise which policy officials might otherwise lack.

6.19. The OCMO was not involved in the day-to-day practicalities of delivering the programme's objectives, a function which was delivered largely by DHSC or other

delivery partners. Nor did the OCMO dictate the overall direction of the programme. Its role was to advise so as ensure that the pursuit of policy objectives took account of scientific fundamentals.

6.20. As a result of COVID-19, the PIPP has been replaced by the PPP Board (Pandemic Preparedness Programme).

The Pandemic Flu Readiness Board ("PFRB")

6.21. One recommendation which followed from Exercise Cygnus (discussed below at paragraphs 6.53 to 6.56) was the establishment of a cross-Government group to work on pandemic preparedness. The PFRB, established in 2017 and co-chaired by the Cabinet Office and DHSC, was the result. The DHSC's Module 1 corporate statement (§177-192, 325) gives further information on the PFRB, which is not repeated here.

6.22. The activity of the PFRB took the form of five distinct workstreams. The first of these concerned increasing the capacity of the health service in the event of a pandemic through systems of surge and triage. The second focussed on the provision of community care and adult social care during a pandemic. Workstreams three, four and five covered respectively: excess deaths; critical sector resilience; and cross cutting enablers. The later of these referred to work touching on multiple areas of the pandemic response, and included a draft pandemic influenza bill, work on moral and ethical considerations and strategies for communications.

6.23. The OCMO was not represented at PFRB meetings. However, the then CMO and DCMOs were, from time to time, involved in reviewing work that emerged from the PFRB. The OCMO's contribution to the PFRB's work is outlined below at paragraphs 6.25 to 6.38.

6.24. In 2021, in response to the COVID-19 pandemic, the PFRB was replaced by the Pandemic Diseases Capability Board.

Surge and triage

6.25. The Flu Strategy recognised that a severe influenza pandemic would place considerable additional demands on the health service. Accordingly, pandemic preparation, and in particular the first workstream of the PFRB, focused on the

development of 'surge' measures aimed at increasing the capacity of the health service in the event of a pandemic.

6.26. Such measures envisaged the redeployment of staff, and if necessary, the postponement of other aspects of care which could reasonably be deferred. Further, it was foreseen that in the event of a severe pandemic there could be a need for triage systems. These would identify those most in need of medical attention, and if necessary, prioritise those most likely to benefit from the limited health service resources available, rather than providing services purely on the basis of need.

6.27. The importance of both surge planning and triage was recognised by Dame Sally when CMO and formed part of both the PIPP and PFRB's pandemic preparation activities. This ultimately culminated in the PFRB producing a discussion paper for the PIPP board in March 2016 which recognised that in the event of a severe influenza pandemic, hospital capacity, in particular critical care beds, was likely to be exhausted. The tension between caring for influenza patients whilst maintaining existing services was noted along with the attendant consequences for elective care, and in particular, surgical capacity. This work was trialled as a part of Operation Cygnus in October 2016 and revised in light of learning from that exercise.

6.28. Work on surge and triage systems was thereafter progressed by the PFRB throughout 2017. It culminated in a paper prepared by NHSE which was reviewed by Dame Sally in October 2017.

6.29. Thereafter, it was recognised that the remaining matters falling within the ambit of workstream one were predominantly operational and concerned the implementation of the surge and triage measures envisaged. Accordingly, NHSE was tasked with advancing the service facing document necessary to enable the health service to enact the required measures in the event of a pandemic. From this point on, DHSC and NHSE took the lead in further progressing surge planning.

Social care

6.30. The consequences of a severe pandemic on the social care system in England formed the basis of the second of the PFRB's workstreams. Even before the establishment of the PRFB in 2017, issues such as an increase in demand for social care services during a pandemic, staff absences, problems with communications between

Government and the sector, the distribution of PPE and vaccination of social care staff were under consideration, and social care was an issued that had been raised by the then CMO.

6.31. The OCMO was not directly involved in the work of the PFRB. Work on this second workstream was progressed by a steering group comprised of DHSC, NHSE, the Care Quality Commission ("CQC"), Civil Contingencies Secretariat, the Ministry of Housing, Communities and Local Government and representatives of the Devolved Administrations. That work produced a paper, which set out a detailed plan to maintain and augment the response of the adult social care and community health care sectors to an extreme influenza epidemic. It was presented to the CMO, DHSC CSA, the Chief Nursing Officer and the Chief Social Worker in July 2018. Thereafter the plan was agreed which was then taken forward by those responsible for the second workstream.

Cross-cutting Enablers

6.32. The PFRB's fifth core workstream related to "cross-cutting enablers", namely those parts of the pandemic response which engaged the interests of multiple areas of Government. Specifically, such activity included: i) consideration of the moral and ethical aspects of any pandemic response; ii) work on a draft pan-flu bill containing legislative provisions which may be necessary in a pandemic; and iii) communications strategies.

Moral and Ethical

6.33. Part of workstream five related to the moral and ethical aspects of any response to a pandemic. In 2018, following on from Exercise Cygnus (2016), the Cabinet Office and DHSC developed plans for a 'Moral and Ethical Advisory Group' ("MEAG"). Professor Van-Tam expressed his support for this initiative at the PIPP Board meeting of 1 October 2018. As DCMO, Professor Van-Tam had highlighted to the PIPP, the legitimate concerns that existed within the broader medical profession as to how decisions, especially those concerning triage and the prioritisation of patients in the event that demands on healthcare resources exceeded capacity, should be made.

6.34. The establishment of MEAG was approved by the Public Health Minister in January 2019. Shortly thereafter, activity on this aspect of the workstream was paused as resources were redeployed ahead of the UK's departure from the European Union.

6.35. Work resumed in August 2019, at which point the remit of MEAG was expanded to cover not just pandemic influenza preparedness, but also moral, ethical and faith considerations arising from healthcare related incidents more generally. The two main scenarios where it was anticipated advice would be sought from MEAG were:

1) in an emergency, to support incident response: i.e. where decisions may need to be taken at a clinical, operational or ministerial level which have moral, ethical or faith dimensions; and

2) as part of general emergency preparedness planning.

6.36. MEAG's first meeting was held on 25 October 2019 and the group was active during the COVID-19 pandemic.

Draft Pandemic Influenza (Emergency) Bill

6.37. Exercise Cygnus (2016) highlighted to Dame Sally the need for emergency Government powers to allow for a more effective response to a pandemic. This was reflected in the 'Key Learning' from Exercise Cygnus: *"the introduction of legislative easements and regulatory changes to assist with the implementation of the response to a worst case scenario pandemic should be considered"*. Work on the Bill was progressed as part of the PFRB's fifth workstream and led to the development of the Pandemic Influenza (Emergency) Bill. This, in turn, formed the basis of the Coronavirus Act 2020.

Communications

6.38. Following on from recommendations made in the Hine Review and directed to the then Department of Health, the devolved administrations and the Cabinet Office, the Flu Strategy committed to the development of a specific Pandemic Influenza Communications Strategy, published in December 2012. This UK wide strategy recognised that the CMOs in all four UK Governments have an "important professional leadership role in a pandemic" (page 6). It was superseded by an updated strategy in 2014 **(CJMW2/006 – INQ000183362)**, which was itself further developed and refined

in the aftermath of Exercise Cygnus. Ensuring that effective communications arrangements were in place in the event of an influenza pandemic became a component of the PFRB's fifth workstream.

National Pandemic Flu Service ("NPFS")

6.39. The NPFS was designed to supplement the response of primary care in the event that clinical pressures during an influenza pandemic meant it was no longer practical for all those with influenza symptoms to be individually assessed by a doctor or other prescriber. It comprised an online and telephone self-assessment service by which individuals were assessed not by a clinician but through answering a series of questions developed by clinicians in order to determine whether that patient was eligible to receive antiviral medications. If so, a friend or relative would collect the medicine from a designated Antiviral Collection Point. The idea was to ensure that patients could access antiviral medicines quickly, in a way that reduced the onward spread of infection and reduced demands on front-line health services.

6.40. The NPFS went live in England on 23 July 2009 during the H1N1 'swine flu' pandemic and operated until 11 February 2010. The Report of the Hine Review noted that over that period, 2.7m assessments were completed and 1.1m courses of antiviral treatment distributed via the NPFS. It also noted that the service *'succeeded in providing relief for primary care during the outbreak'*.

6.41. In light of this, the Hine Review recommended that the NPFS be independently evaluated, with triggers agreed for when it should be activated and stood down. The Royal College of General Practitioners ("RCGP") produced a quality assurance report of the NPFS for Dame Sally during her time as CMO which highlighted issues and lessons for the future. During her period as Chair of the PIPP Board, Dame Sally oversaw the re-procurement of infrastructure required for the NPFS, a process led by PHE. This work would ensure that the system could be quickly stood up in the event of an influenza pandemic.

Summary of OCMO's involvement in epidemic/pandemic simulation exercises and the response to them

6.42. The paragraphs that follow (from 6.43 to 6.74) reflect discussions with Professors Dame Sally Davies and Professor Sir Jonathan Van-Tam, and information received from Professor Sir Liam Donaldson. They also reflect part of the content of DHSC's Module 1 corporate statement which, as I have explained, was consistent with and reflected my own understanding.

6.43. Throughout the period June 2009 to January 2020, DHSC convened and coordinated a number of pandemic simulation exercises. A full list of these exercises is set out in the DHSC's Module 1 corporate statement. The design and scope of each exercise varied. Some were 'tabletop' exercises that involved bringing together key stakeholders from, for example, NHSE, PHE and DHSC, to work through the response to a hypothetical outbreak of an infectious disease.

6.44. The OCMO was not involved in every pandemic preparedness exercise undertaken by Government between 2010 and 2020. This was appropriate and unsurprising. Whilst some exercises tested those parts of the pandemic response in which the OCMO would be directly involved, or which require a high level of clinical or scientific technical support and guidance, others sought to test individual aspects of the operational response of stakeholders across Government and wider society. Accordingly, it was unnecessary for the OCMO to be involved in every pandemic simulation exercise.

6.45. The paragraphs below discuss those pandemic exercises in which the OCMO played a notable role between 2010 and 2020, as well as the nature of its involvement, insofar as we have been able to establish it.

Exercise Winter Willow (2007)

6.46. Winter Willow was the largest peacetime exercise undertaken in the UK and aimed at evaluating preparations for an influenza epidemic. UK-wide, it involved over 5,000 participants drawn from Government (including the devolved administrations), industry, and the voluntary sector.

6.47. The DHSC Module 1 corporate statement discusses Winter Willow (paragraphs 334 to 335) and exhibits a document (*Winter Willow Lessons Identified*) produced by DH (as it then was) setting out the lessons identified from this exercise. As that document

explains there were two stages to Winter Willow. The first stage, held on 30 January 2007, was a national tabletop exercise that simulated a scenario where the WHO had confirmed the onset of a pandemic and the first few cases had emerged in the UK. This stage informed the second stage held over several days in February 2007. This second stage took the form of a full national exercise and was designed to test the UK response at local, regional and national level to scenario where there were now widespread cases in the UK.

6.48. The lessons identified by the DH focused on coordination between structures at different levels including in relation to data reporting; communication; policy development (for example as regards travel advice and countermeasures to a surge in infections); and business continuity. It proposed next steps to be taken. The DHSC Module 1 corporate statement gives some detail as to how Winter Willow informed future planning.

6.49. The CMO at the time, Sir Liam Donaldson, and his team participated in Exercise Winter Willow. They were assisted by the recently appointed Director of Pandemic Planning and Preparedness. As the OCMO does not have access to the contemporary records from this time, it is unable to describe the precise extent of his or the Office's involvement in greater detail.

Exercise Alice (2016)

6.50. As the report of this exercise (exhibited to the DHSC Module 1 corporate statement) explains it was commissioned by Dame Sally, as CMO, to explore the challenges that a large-scale outbreak of MERS in England might present. Taking one day, the exercise involved PHE, DH and NHS England. Observers attended from the Cabinet Office, the devolved administration and GO-Science.

6.51. It is important to note that Exercise Alice simulated an outbreak of MERS in the UK due to an imported case, rather than the response to a wider respiratory pandemic event. Dame Sally opened the exercise on the day, providing background and context. After a detailed exercise briefing, the day was divided into two discussion sessions, each of which included a clinical advisory group meeting with Dame Sally. During these sessions, Dame Sally's role was to engage with the various participants and challenge them to consider different aspects of the scenario and their responses to it. The report on exercise Alice identified 12 lessons/actions which were to be progressed (usefully

brought together in the Annex to the report). As the DHSC Module 1 corporate statement explains (paragraph 353) – The "*learnings* [from Alice] *have been incorporated into ongoing planning work conducted by DHSC, UKHSA and NHSE to respond to HCID outbreaks in the UK.*" I took part in Exercise Alice in my capacity as DHSC CSA.

Exercise Cygnet (2016)

6.52. Exercise Cygnet was a discussion based exercise undertaken as part of the build up to Exercise Cygnus. It was delivered by PHE's Exercises Team with support from DCLG and DH on 2 August 2016. The scenario was based in week four of a hypothetical UK response to the same pandemic scenario which would be employed in Exercise Cygnus. The exercises' terms and outcomes were considered by the PIPP Board.

Exercise Cygnus (2016)

6.53. Exercise Cygnus was a DHSC commissioned cross-Government simulation exercise which followed on from the preparatory work undertaken earlier in 2016 during Exercise Cygnet.

6.54. Following delays caused by the outbreak of Ebola in West Africa, the actual simulated exercise was played out across three days in October 2016. The aim of Exercise Cygnus was to assess the UK's preparedness and response to a pandemic influenza that was close to the UK's worst case planning scenarios, starting in week 7 of the hypothetical outbreak. The scenario was designed to encourage participants to examine their response and capacity at the peak of a pandemic affecting up to 50% of the UK's population and which could cause between 200-400,000 excess deaths in the UK.

6.55. Exercise Cygnus was based around four simulated COBR meetings which were run by the CCS and which Dame Sally attended in her capacity as CMO. In advance of those meetings, Dame Sally and the Secretary of State were briefed by DH on the relevant data and then held pre-COBR meetings so that Dame Sally could advise the Secretary of State prior to their meeting with other Ministers. As part of the exercise,

DH also convened four nation CMO meetings at which the CMOs could discuss and coordinate their response.

6.56. As explained in the DHSC Module 1 corporate statement, Exercise Cygnus found that the UK's command, control and emergency response structures provided a sound basis for the response to an influenza pandemic. However, it also found that the UK's preparedness and response, in terms of its plans, policies and capability, were not sufficient to cope with the extreme demands of a severe pandemic that would have a UK-wide impact across all sectors. Exercise Cygnus identified 22 recommendations, all of which were accepted by the Government. The recommendations that arose from Exercise Cygnus were taken forward through the work of the PFRB and the PIPP.

Visit to United States Centers for Disease Control and Prevention (2018)

6.57. From 12 to 14 September 2018, Professor Van-Tam attended the US Centers for Disease Control's pandemic influenza simulation exercise as an international observer alongside a DHSC policy official. The exercise scenario considered a fictional novel influenza virus with high transmissibility and morbidity which originated in China and was antigenically different to stockpiled vaccines.

6.58. The exercise identified the challenges posed by such a scenario, including:

1) a shortage of respirators and face coverings;
2) inadequate pre-pandemic vaccine stocks;
3) needle shortages;
4) the time required to develop a pandemic specific vaccine;
5) the consequent need for school closures and other non-pharmaceutical interventions; and
6) the importance of clear and consistent public communications.

6.59. Policy officials at DHSC produced a paper including a summary of the above in order to feed back into UK preparedness planning.

Summary of past UK and worldwide epidemics/pandemics and OCMO's role

2009-10 Swine Flu Pandemic

6.60. As explained in the DHSC Module 1 corporate statement and already discussed in this statement, in June 2009 there was an outbreak of H1N1 influenza ('swine flu'). This was first identified in Mexico but quickly spread globally. In the UK there were 795,000 cases.

6.61. Dame Sally took up the role of CMO as the 'swine flu' pandemic was coming to an end. Her predecessor as CMO, Sir Liam Donaldson, had been heavily involved in the response to the epidemic during the final 12 months of his time in post. Due to the passage of time and the unavailability of contemporaneous documents from the time, it is not possible to describe the precise nature of the OCMO or Sir Liam's involvement in detail. The best account of the response to the 2009 pandemic is contained in the Hine Review, which Sir Liam recommended to Ministers be commissioned and which I have discussed above.

2015 MERS outbreak

6.62. In May 2015 there was an outbreak of MERS in South Korea following an imported case. This was a limited outbreak which was contained locally, resulting in 186 laboratory confirmed cases and 38 fatalities. The UK domestic response was correspondingly limited. The OCMO was required to (1) issue an alert to the NHS to be vigilant to suspected cases; (2) write to PHE and NHSE asking them to confirm systems were in place to respond to a case of MERS-CoV; and (3) advise on the risk level to the UK and the need for on entry screening for passengers from either the Arabian Peninsula, or South Korea. In the circumstances, the advice was that latter was not necessary.

2014-2016 Western African Ebola virus epidemic

6.63. The Ebola virus was first recognised in 1976 in two separate outbreaks in South Sudan and the Democratic Republic of the Congo. Between then and 2014, there had been six outbreaks of the virus. The outbreak which occurred in West Africa between 2014 and 2016 was the seventh and largest outbreak of this virus, with substantially more cases and deaths than before. It began in Guinea and then moved across land borders to Sierra Leone and Liberia. In August 2014, WHO declared the outbreak a PHEIC.

6.64. Over the course of the epidemic, the disease was imported to seven additional countries: Italy, the Republic of Mali (Mali), the Federal Republic of Nigeria (Nigeria), the Republic of Senegal (Senegal), the Kingdom of Spain (Spain), the UK and the USA. Secondary infections (passed from the index case to another person) occurred in Italy, Mali, Nigeria and the USA. In June 2016, the outbreak was declared over by which time over 28,600 cases of infection had been recorded with 11,325 deaths. There were three cases in the UK, all where infection had occurred outside the UK with no onward spread.

6.65. SAGE was convened and co-chaired by the CMO and the GCSA three times in 2014 in response to the Ebola outbreak **(CJMW2/007 – INQ000183365, CJMW2/008 – INQ000183364, CJMW2/009 – INQ000183363)**. This co-chairing arrangement reflected changes to the organisation of SAGE in respect of health emergencies following the 2009 'swine flu' pandemic.

6.66. As CMO at the time, Dame Sally was heavily engaged in the response to the 2014-2016 Ebola outbreak. As CMO her role was to advise Ministers and the public about the risk of the disease.

6.67. I understand that the thrust of the work undertaken was to: 1) increase the vigilance of the NHS to suspected cases and to prepare for the possibility of their importation; 2) take similar measures in respect of public health through PHE; 3) in time, respond to the need to repatriate British Nationals from overseas; and 4) support international partners and other Government departments in their in-country response (predominantly, in respect of the UK, in Sierra Leone).

6.68. I was extensively involved in the UK response in support of Sierra Leone during the Ebola epidemic in West Africa but not as CMO or in OCMO - I was at that time CSA in the then Department for International Development, DFID, so concentrated on the international rather than the UK domestic aspects of the response. This is covered more fully in the Module 1 statement I have been asked to provide in a personal capacity.

6.69. One of the major learnings from Ebola was the importance of understanding behavioural and societal issues in the response to a pandemic or epidemic. As an example, the virus was being spread through funeral practices and devising safe and dignified burials which were acceptable to communities was essential. This relied on anthropological as well as epidemiological science and resulted in the development of targeted interventions aimed at reducing the risk of transmission in this setting.

6.70. A further area of difficulty which was identified during the Ebola pandemic related to the use of PPE in the NHS, and in particular the need for healthcare workers to have undergone prior training in the use of PPE in order for it to be effective. Steps to address these concerns were pursued by Dame Sally as part of the Ebola response. A distinction however should be drawn between the training in the use of PPE envisaged in order to respond to an outbreak of MERS or Ebola (i.e. relatively few, specifically trained staff using complex PPE requiring careful donning and doffing routines) and that which ultimately was required in response to a pandemic event such as COVID-19 (involving, to some extent, most hospital and care staff). The type of PPE required also varies depending on the pathogen concerned.

Responses to other epidemics or outbreaks

6.71. In the absence of contemporaneous records, it has not been possible to establish with certainty the extent of the OCMO's involvement in each and every infectious disease outbreak. The records which have been made available suggest the following involvement.

2015-2016 Zika virus epidemic

6.72. Five pre-SAGE meetings were held in response to the emergence of the Zika virus, however there was no representative of the then OCMO present (although I was as CSA, co-chaired and represented the CMO):

- 3 February 2016 **(CJMW2/010 – INQ000183370)**;
- 23 February 2016 **(CJMW2/011 – INQ000183369)**;
- 7 March 2016 **(CJMW2/012 – INQ000183368)**;
- 8 June 2016 **(CJMW2/013 – INQ000183367)**; and
- 2 August 2016 **(CJMW2/014 – INQ000183366)**.

6.73. Zika was not, for reasons I lay out in my personal statement for Module 1, considered an infection which posed a risk of major outbreaks in the UK.

2018 North-Western DRC Ebola virus outbreak

6.74. Three pre-SAGE meetings took place in response to the 2018 DRC Ebola outbreak, all of which were attended by Professor Van-Tam in his role as DCMO:

- 18 May 2018 **(CJMW2/015 – INQ000183371)**;

- 5 October 2018 **(CJMW2/016 – INQ000183372)**; and
- 16 May 2019 **(CJMW2/017 – INQ000183373)**.

OCMO's role in preparing the response to the COVID-19 pandemic

6.75. The OCMO played a significant role in the preparation for the response to the COVID-19 pandemic from its initial reporting to 21 January 2020 (the last date covered by this Module). The first instance of what became known as COVID-19 was notified to the WHO on 31 December 2019. Very little was known about the pathogen at that time.

6.76. Prior to 1 January 2020, no planning could be undertaken which was specifically tailored for COVID-19 because it was a novel pathogen. There was however planning for infectious diseases of various types, and for specific known pathogens considered to be those of greatest potential risk. It has always been assumed novel pathogens as well as known ones can cause pandemics and major epidemics.

6.77. On 2 January 2020, the OCMO was made aware of cases of "*pneumonia of unknown etiology*" detected in Wuhan, China. From that point, our team was involved in providing advice on clinical, scientific and public health issues to Government and continued to do so throughout the pandemic.

6.78. In the initial 3 weeks of 2020 running up to 21 January, the principal work being undertaken was to determine the risk that the outbreak in China could be a threat to the UK. At this point SAGE had not yet met, and the assessment and advice of PHE, the OCMO and the committees informing them, especially NERVTAG, was therefore central to Government activity. The OCMO Module 2 corporate statement sets out in some detail the role that OCMO played in this period. I have repeated that information below in order to assist those who do not have access to that statement as it is relevant to the timescale of Module 1[1].

Significant Activities – 1 January 2020 to 21 January 2020

[1] Exhibit references in paragraphs 6.79 to 6.112 are references to the exhibits to the OCMO Module 2 corporate statement

6.79. During this period there was a steady progression of activity, initially led by DCMO Professor Van-Tam and NERVTAG with some input from me, then increasingly by me as CMO with support from Professor Van-Tam as the probability of the threat becoming global increased.

6.80. PHE were also active in tracking the early outbreak, and any UKHSA witness statements may well cover the work undertaken by PHE.

6.81. This period predates the WHO providing the summary of its first delegation to Wuhan on 22 January 2020, declaring a Public Health Emergency of International Concern ("PHEIC") on 30 January 2020, and declaring a pandemic on 11 March 2020. SAGE (technically pre-SAGE) first met on 22 January 2020.

6.82. PHE and the OCMO and devolved equivalents, informed by NERVTAG and others, were therefore the principal interpreters to Government of the UK risk of this new outbreak in China in the first 21 days of January 2020. The OCMO was mainly involved in assessing the extent to which this new infection was a threat globally, and therefore to the UK.

6.83. There are multiple outbreaks globally every month, reported formally through WHO and/or informally through professional networks such as the website ProMed which alert physicians and public health specialists to assist with clinical management. Only a few of these become major epidemics (i.e. have a significant national or regional impact) and a fraction of those become a global threat. The initial assumption will almost always be that the probability of a major outbreak from any initial report is low, but the possibility is always there with an unknown pathogen. There are risks both to undercalling (missing the start of a major epidemic) and overcalling leading to multiple false alarms and unwarranted actions and concern.

6.84. WHO was notified of an outbreak in China on 31 December 2019. The pathogen was unknown.

6.85. On 2 January 2020, Professor Van-Tam as DCMO health protection emailed me, DHSC health protection policy and PHE colleagues and highlighted the outbreak **(CJMW/012 – INQ000183346)**.

6.86. On 2 January, Professor Van-Tam emailed international colleagues including WHO and the US Centers for Disease Control and Prevention ("CDC") asking for further information **(CJMW/013 – INQ000183347)**.

6.87. On 3 January, Professor Van-Tam emailed Professor Sir Peter Horby (an academic colleague) to ask him to use his contacts in China to provide any intelligence on the outbreak **(CJMW/014 – INQ000151286)**.

6.88. On 5 January, I laid out a series of triggers which, if met, would provide an indication that an epidemic of global importance was possible from the outbreak that had been described **(CJMW/015 – INQ000047484)**. These were:

1. *Healthcare workers dying. This is often the early warning that a new infection is both severe and transmissible (eg SARS, MERS, Ebola). This would be the most concerning.*
2. *Evidence of person-to-person spread e.g in families.*
3. *Geographical spread implying a zoonosis is spreading (in this case we would also want to liaise with DEFRA).*

Much of the next 2 weeks were spent trying to ascertain if the triggers were met.

6.89. On 5 January, the WHO reported that 44 people were reported as having been infected with what was then still described as "*pneumonia of unknown etiology*". There were 0 reported deaths **(CJMW/016 – INQ000183374)**.

6.90. On 6 January, Professor Van-Tam wrote to a colleague in the WHO to ask for further information on the outbreak and on the same day wrote to a colleague at CDC to ask for any information they could share **(CJMW/017 – INQ000151289, CJMW/018 – INQ000151291)**.

6.91. On 7 January, I met with Sir Patrick Vallance, the GCSA. While the outbreak was not the purpose of the meeting, we discussed it.

6.92. On 8 January, Professor Van-Tam shared informal information received from CDC colleagues with DHSC health protection policy colleagues that the outbreak in Wuhan might be a novel coronavirus **(CJMW/019 – INQ000151293)**.

6.93. On 8 January, Professor Van-Tam provided an update to CCS in the Cabinet Office **(CJMW/020 – INQ000151292)**.

6.94. On 9 January, Professor Van-Tam wrote to a colleague in Singapore to ask for further information **(CJMW/021 – INQ000183348)**.

6.95. On 9 January 2020, Professor Van-Tam wrote to PHE to set out a consolidated view based on the information available on the outbreak so far (**CJMW/022 – INQ000151296)**.

> *"My up to the minute take on things:*
>
> *1. Rumours are rarely incorrect in this space so as predicted we are heading towards a novel coronavirus; notably with zero reported case fatality so far, though 7 of 59 cases with severe disease is a significantly high 12% case-hospitalisation rate in my view such that established person to person transmission would cause serious hospital surge pressures on a par with a severe panflu virus.*
>
> *2. Our three triggers are not met at this point, implies no change to UK or global PH threat;*
>
> *3. The caveat is that in as much as two other novel coronaviruses have proven to be transmissible P2P predominantly in HC settings I do not rule out P2P transmission and case numbers in China have swelled from 27 when first reported to 59 now.*
>
> *4. My hunch is that likely the identification of the novel coronavirus has not been simple and that right now there will be no simple reliable diagnostic test available; it is possible that existing pan-coronavirus PCRs will pick it up OK and that MERS/SARS specific PCRs might cross react, but the latter is all a bit speculative.*
>
> *5. Essentially if we or any other countries get cases we won't be in a position to diagnose by lab test in the next few weeks; more likely it will be resp infection + travel to Wuhan within last 21 days (we don't know incubation period) + no obvious common RVI cause. The caveat will still be that +ve for flu (and lots in China at present) would not in my view assure no co-infection with something novel.*
>
> *6. Ben Cowling in HK tells me that they absolutely expect cases (even in the absence of P2P transmission) and the possible case in South Korea is a similar case in point.*
>
> *UK implications:*

1. Just because we may have a tentative novel organism identified (disclosed) by the end of the day simply gives us more info but does not materially change any global or UK PH risks

2. Cabinet Office and likely Ministers will be sensitive to imported cases because there is a direct flight to Wuhan once every 2-3 weeks. In reality most returnees will route via Seoul or Beijing methinks. But right now all we could do, if we do anything, is identify cases of ARI (possibly limited to hospital though we will miss a lot this way) with a recent 21d travel history to Wuhan. Take appropriate specimens for routine RVIs and stores samples and serum for when there is a decent test available. Maybe Maria [Zambon, PHE] *has a pan-corona test she can use now??*

6.96. On 9 January, Professor Van-Tam emailed PHE to ask about what category of Biosafety Level the pathogen would be treated as **(CJMW/023 – INQ000183349)**.

6.97. On 9 January, I requested NERVTAG meet the following Monday, 13 January, in particular to consider port of entry screening **(CJMW/024 – INQ000047488)**.

6.98. On 10 January, Professor Van-Tam wrote to the Civil Contingency Secretariat ("CCS") in the Cabinet Office **(CJMW/025 – INQ000151308)**.

"1. This is a coronavirus

2. Colindale [PHE] *has a pan-coronavirus assay it can use now (I do not know how cumbersome, rapid or automated this is – but there may well be very finite capacity limits). The other test-performance limitations are that: a) this should essentially give a yes/no answer for any coronavirus. The test will be positive for 'normal' coronaviruses of the type that can be the cause of the common cold. Equally should be positive for SARS and MERS. Should in theory also be positive for the novel coronavirus but we will simply not know the performance of that test against the novel virus (if it is reliable or not in the new application) until we have specimens or sequences against which the test can be validated. Thus right now a positive test might mean something (but might indicate a common cold); a negative test would not be entirely reassuring only somewhat reassuring.*

3. The specific assays for MERS and SARS that UK has we can assume do not work for the novel coronavirus or cross-react. The reason is the Chinese

were able to conclusively exclude MERS and SARS on the basis of having access to specific MERS and SARS tests.

4. Work on perfecting an assay specific to the novel virus will take weeks not days, but maybe not very many weeks. No-one can begin this assay development work to any great extent anywhere in the world until there is access to specimens and/or genetic sequencing data. There is an ongoing WHO call as we speak but I have not heard yet that any specimens have been shared by China.

5. My opposite number in Singapore (DCMO equiv) confirms that they are in exactly the same place as the UK in terms of current diagnostics"

6.99. On 11 January, there were news reports of the first reported death globally **(CJMW/026 – INQ000183350)**.

6.100. On 13 January, the first case outside China was reported. This first confirmed case was in Thailand. Professor Van-Tam wrote to CCS (Civil Contingencies Secretariat of the Cabinet Office) to make them aware **(CJMW/027 – INQ000151313)**.

6.101. On 13 January, Professor Van-Tam attended that first meeting of NERVTAG. He subsequently wrote to CCS **(CJMW/028 – INQ000151311)**.

"My observations below come with all the requisite 'health warnings' about the dangers of interpreting officials' views of meetings in advance of the formally approved minutes.

But hope helpful to clarify:

1. NERVTAG briefed and watching closely; remain cautious that it is too early to rule out all person to person Tmx [transmission] *but it so far looks very low or absent*

*2. NERVTAG endorses extant advice to HMG that port of entry screening is not likely to be effective nor a good use of resources.**

3. NERVTAG supports PHE risk assessment and approaches to date.

4. During the call, case in Thailand confirmed by sequencing (sequences have now been released at least in part) – this is a Chines [sic] *national visiting Thailand (who's symptomatic but not poorly). No contact with implicated market in Wuhan raising unresolved questions. Rather a long interval from date of onset of first case (06DEC19) and latest Thai case (05JAN2020).*

It remains very much a watch (closely) and wait situation.

**To note, NERVTAG aware that the Thai case was picked up by airport thermal screening but this does not change its view that screening will be highly inefficient and is not advised."*

6.102. On 13 January, Professor Van-Tam suggested the pathogen should be seen as an airborne HCID (High Consequence Infectious Disease) **(CJMW/029 – INQ000151309)**.

6.103. On 15 January, Professor Van-Tam wrote to colleagues at the WHO requesting further information if possible **(CJMW/030 – INQ000183351)**:

"Our modellers and UK Gov advisory experts are desperate for the demographics and epi curves from Wuhan.

Anything you can share please?"

6.104. On 15 January, 43 people were reported as infected, 2 outside China. There was 1 reported death. The numbers for China had been revised down from 44 to 41. There was then 1 case in Thailand and 1 case in Japan **(CJMW/031 – INQ000183375, CJMW/032 – INQ000183385, CJMW/033 – INQ000183376)**.

6.105. On 16 January, Professor Neil Ferguson (an expert academic infectious disease modeller) wrote to me and Professor Van-Tam estimating that based on two exported cases in Japan and Thailand the 40-50 cases reported to date were unlikely to be accurate and that his central estimate was 1149 cases by 6 January **(CJMW/034 – INQ000183353, CJMW/035 – INQ000183386)**.

6.106. On 17 January, Professor Van-Tam attended a WHO meeting on COVID-19 **(CJMW/036 – INQ000183354, CJMW/037 – INQ000183352)**.

6.107. On 17 January, Professor Van-Tam set out advice on port health recommendations to DHSC health protection and PHE colleagues **(CJMW/038 – INQ000151331)** (Professor Van-Tam's text is shown in red and underlined below, policy colleagues' text is shown in black):

"Thank you very much for sharing IMT and SRG recommendations on port health. The CMO and DCMO have now considered these and their feedback follows in red:

Rec 1 - For direct flights between Wuhan and Heathrow, implement an announcement during the flight asking passengers to report symptoms to cabin

crew combined with the requirement for a General Aviation Declaration (radioed by the pilot to the airport prior to landing) that there is nobody unwell on the aircraft. If an individual is declared unwell, the flight will be dealt with according to existing operational plans.

This is NOT supported. NERVTAG has not recommended entry screening and this recommendation would, in effect, be self-reported entry screening for symptoms that might identify some NCoV19 cases but also lots of other things. Also, some passengers might hide symptoms for fear of consequences. If the aircrew detect a clearly unwell passenger its BAU for them to issue a GAD.

Rec 2 - For terminals receiving direct flights (i.e. at London Heathrow), ensure isolation capability is available for the immediate management of suspected cases

This is appropriate for interception and safe management of people who self-report having seen arrival notices (see below i.e. if used) and/or who are picked out by aircrew or customs as looking very ill in some way which would be BAU.

Rec 3 - For all ports in England, prioritising those known to receive higher volumes of travellers from Wuhan via indirect routes:

Accelerate the roll out of the RING card (an aide memoire which highlights key symptoms of infectious diseases) to frontline Border Force staff in conjunction with supporting training. This is to support early recognition of compatible illness in passengers entering the UK.

This is a potential option but NOT YET as it will be hard to recognise anything that distinguishes NCoV19 from ARI in general and support BF staff.

Add WN-CoV-specific information to the existing operational support information used by all airport ground staff. This is to support early recognition of compatible illness in passengers.

Agreed but NOT YET

Public information posters displayed in English and Chinese. It is suggested that includes information about NHS 111 should they be unwell after leaving the airport, but discussion with NHSE is underway to agree this. Posters can either be targeted to those airports known to receive direct flights and higher volumes of indirect travellers, or across all airports. This is to ensure that

arriving passengers know about the symptoms to be aware of should they develop, and actions to take. Potentially OK but NOT YET

CMO is content for preparation work for options 2 and 3 to be done 'quietly' so they could be implemented quickly if deemed necessary in the future.

In summary, CMO/DCMO advise that it would be TOO SOON to do any additional measures on the basis of one case in Japan and one in Thailand (places with high Wuhan traffic and China generally). If by Monday we have two cases who have been in the UK (one fleetingly) and maybe a couple more 'pop-up' cases elsewhere in the world e.g. HK or Australia for example, then it might be the time to consider acting.

CMO is also conscious that there have been no new case declarations in China itself since 06JAN20 which could mean the outbreak is over and we are picking up tail ends or there will be a second round of reporting."

6.108. On 19 January, 65 people were reported as infected, 3 outside of China with 2 deaths **(CJMW/039 – INQ000183356, CJMW/040 – INQ000183377)**.

6.109. On 19 January, I had an email discussion with Sir Jeremy Farrar (Director of Wellcome), and subsequently Professor Van-Tam based on informal information Sir Jeremy had seen from an unpublished manuscript. This provided evidence, albeit in early form, of person-to-person spread (but not of sustained community transmission). We discussed whether there was asymptomatic transmission as that had practical implications, including for screening **(CJMW/041 – INQ000183355)**.

6.110. On 20 January, the first DHSC Permanent Secretary-led meeting on COVID-19 was held on the basis of our increased perception of risk.

6.111. On 20 January, OCMO alerted GO-Science that it was my view that we should hold a pre-SAGE (a SAGE meeting in advance of a formal request from Cabinet Office to activate SAGE) **(CJMW/042 – INQ000047510)**.

6.112. On 21 January, 282 people were reported as infected, 4 outside China. There were 6 reported deaths **(CJMW/043 – INQ000183384)**.

Section 7: Future risks, reviews, reports and lessons learned exercises

7.1 The UK CMOS, DCMOs, GCSA and National Medical Director of the NHS along with many other distinguished scientists involved in the response produced a joint Technical Report to our successors on lessons learned in COVID-19 (381 pages). This is publicly available and is our main contribution to the technical lessons to be learned from the COVID-19 pandemic in the UK at this stage. It contains significant technical information that I consider likely to be of assistance to the Inquiry and informative to the wider public.

7.2 The OCMO, through the CMO and DCMO Health Protection are involved in planning for future pandemics and epidemics. Each pandemic and epidemic is different, and often radically different, from its predecessors. As previously noted, a plan designed for our last major pandemic involving substantial loss of life, HIV, would have been largely useless against COVID-19, and vice versa. Even the last major coronavirus outbreaks via the respiratory route (MERS and SARS) were very different in mortality and spread to COVID-19, requiring very different responses. It is therefore less useful to have specific plans than to have significant and flexible capability and capacity.

Statement of Truth

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

Signed **Personal Data**

Dated 05/05/2023