Witness Name:
Statement No.:
Exhibits:
Dated:

UK COVID-19 INQUIRY

WITNESS STATEMENT OF PROFESSOR TOM SOLOMON CBE FRCP FMEDSCI
DIRECTOR, THE PANDEMIC INSTITUTE, LIVERPOOL

I, Professor Tom Solomon, will say as follows: -

INTRODUCTION

1. My name is Professor Tom Solomon CBE. I am director of The Pandemic Institute and the National Institute for Health and Care Research (NIHR) Health Protection Research Unit in Emerging and Zoonotic Infections. My potential conflicts of interest are indicated in a footnote here.[a]

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[a] TS is Director of The Pandemic Institute, which has received funding from Innova, CSL Seqirus, Aviva and DAM Health; TS was an advisor to the GSK Ebola Vaccine programme and the Siemens Diagnostic Programme; TS was on the Data Safety Monitoring Committee of the GSK Study to Evaluate the Safety and Immunogenicity of a Candidate Ebola Vaccine in Children GSK3390107A (ChAd3 EBO-Z) vaccine; TS Chaired the Siemens Healthineers Clinical Advisory Board; TS Co-Chaired the WHO Neuro-COVID task force and sat on the UK Government's Advisory Committee on Dangerous Pathogens, and the Medicines and Healthcare Products Regulatory Agency (MHRA) Expert Working Group on Covid-19 vaccines; TS Advised to the UK COVID-19 Therapeutics Advisory Panel (UK-TAP); TS was a Member, COVID-19 Vaccines Benefit Risk Expert Working Group, for the Commission on Human Medicines (CHM) committee of the Medicines and Healthcare products Regulatory Agency (MHRA).

2. I confirm that the Inquiry can disclose this statement to Core Participants and publish the response on its website, without the need for any redaction to the content of the statement.

3. The Pandemic Institute was established in Liverpool in 2021 as a unique collaboration of academic, health service, civic and commercial institutions tackling emerging infections and future pandemic threats (TS/01 - INQ000190672). The Pandemic Institute's founding partners are The University of Liverpool, Liverpool School of Tropical Medicine, Liverpool John Moores University, Liverpool University Hospital Foundation Trust, Liverpool City Council, Liverpool City Region Combined Authority, and Knowledge Quarter Liverpool.

4. The Pandemic Institute's work extends across five research pillars:
    a. Predict which pathogens might emerge;
    b. Prevent those which do from spreading globally;
    c. Prepare for likely emerging threats, e.g., through developing diagnostics, therapeutics and vaccines to be ready within 100 days of a new emergence;
    d. Respond to emerging infection events through clinical and non-pharmaceutical interventions;
    e. Recover – helping society open and operate fully.

5. The Institute has more than 100 members, made up predominantly of academics, clinicians, and public health officials from the founding organisations. The Pandemic Institute is supported by £20M (to date) from philanthropic donors, commercial partners and UK government funding agencies. It has the agility to rapidly respond to emerging infection threats, e.g. Monkeypox, avian influenza, and Disease X (TS/02 - INQ000190673).

6. The Pandemic Institute builds on Liverpool's work leading the NIHR Health Protection Research Unit (HPRU) in Emerging and Zoonotic Infections. This was established in 2014, as a partnership between The University of Liverpool, Liverpool School of Tropical Medicine and Public health England (now the UK Health Security Agency), with the University of Oxford joining in 2020. The

Pandemic Institute and the NIHR Health Protection Research Unit in Emerging and Zoonotic Infections are both based in Liverpool, but both organisations have extensive national and international collaborations.

7. Although The Pandemic Institute was formed after the date range for Module 1 of the COVID-19 Public Inquiry (11 June 2009 - 21 January 2020), its members were working in relevant areas during the date range, and so can contribute useful evidence. The views presented here are mine, as Director of The Pandemic Institute, after discussions with leading scientists of the Institute. They do not represent the views of the founding partner organisations. In this statement, in considering the UK's emergency and pandemic planning, preparedness and resilience, I have focused especially on those which relate to research.

PARTNERSHIP BETWEEN ACADEMIA AND PUBLIC HEALTH AUTHORITIES IN HEALTH PROTECTION

8. Biomedical and health research provides some of the essential tools to support emergency and pandemic planning, preparedness and resilience. One of the critical and positive steps that the UK Government took was the establishment in 2014 of the NIHR Health Protection Research Units in Emerging and Zoonotic Infections, along with other Health Protection Research Units (TS/03 - INQ000190674). Previously Public Health England (the forerunner to the UK Health Security Agency - UKHSA) had held its own research budgets from the Department of Health and Social Care. Dame Sally Davies, the Chief Medical Advisor to NIHR, felt that health protection research would benefit from Public Health England and UK Universities forming joint research units, using this funding (TS/03 - INQ000190674).

9. The NIHR Health Protection Research Units are generally held to have been a success, including making vital contributions to the UK pandemic response (TS/04 - INQ000190675). They have allowed high quality research, produced jointly by universities and UKHSA, to help UKHSA protect the health of the public. (TS/04 - INQ000190675).

10. Twelve Health Protection Research Units were supported initially, focusing on different areas of public health. The Health Protection Research Unit in Emerging and Zoonotic Infections has made an especially important contribution to emergency and pandemic planning, preparedness and resilience. For example, the Unit in EZI played a critical part in the UK response to the Ebola crisis in West Africa (2014-16; TS/05 - INQ000190676), and the Zika epidemic in Latin America (2016-17)). It was supported with £10 million from NIHR, has leveraged a further £160 million in external funding, and has had significant impacts protecting UK public health (TS/06 - INQ000190677).

11. The Health Protection Research Unit in Emerging and Zoonotic Infections has also played a major role in developing the next cadre of health protection researchers, which is an essential part of preparedness and resilience. We have placed great emphasis on training and capacity building. For example, from 2014 to the start of the pandemic, we trained 20 PhD students and 11 Post-Doctoral Researchers, the vast majority of whom have continued with careers in emerging infections research or public health. We also offered training in broader aspects of health protection to 58 PhD students from all twelve Health Protection Research Units across the UK. We gave specific training to work in the Containment level 3 Laboratories with dangerous pathogens to all Health Protection Research Unit students and post-doctoral research staff, as well as others beyond the Unit. This proved prescient at the start of the COVID-19 pandemic, meaning a good number of staff and students were trained in the techniques needed. We ramped this training activity up as the pandemic became established.

12. **LESSONS LEARNED FOR THE FUTURE: Given the clear benefits of this partnership between academia and public health bodies, the inquiry might like to consider whether there is sufficient provision for interaction between public health trainees, and those involved in clinical and research training. It is my belief that in the future more UKHSA staff should have the opportunity to undertake higher research training through universities, and more clinical infection trainees, and university PhD students and post-doctoral research staff should have opportunities for placements within**

public health departments outside of periods when there is an ongoing emergency health crisis. Enhanced research training for UKHSA staff would strengthen the UK's preparedness for emerging infection threats, and more extensive interactions between the partners in "peacetime" would lead to a greater understanding, and smoother operational working, during times of emergency response "wartime".

PROVISION OF EXPERT ADVICE TO GOVERNMENT

13. The quality of the advice to Government during public health emergencies and other crises is absolutely critical to ensuring an appropriate government response and maintain public confidence. The Government needs to hear the opinion of experts; it also needs to be able to commission research to address unanswered questions. During emergencies, scientific advice to the Government is provided through the Scientific Advisory Group for Emergencies (SAGE) and other advisory committees. SAGE is convened by the Government's Chief Scientific Adviser and/or the Chief Medical Adviser.

14. During the Ebola emergency in West Africa (2014-16) it seemed to me that parts of the Government machinery were unaware that they were funding, through the NIHR Health Protection Research Units such as ours on Emerging and Zoonotic Infections, which could address many of the critical questions they were raising. I made these point publicly with the hope that in future emergencies, better use could be made of the NIHR Health Protection Research Units.

15. It seems that these points were noted, because the SAGE for the Zika public health emergency (2016-17) did have broader membership, including representation from NIHR Health Protections Research Units.

16. However it does raise issues about the composition of SAGE and how it is formed. The membership of SAGE for the COVID-19 pandemic has come under some scrutiny, and questions were raised about whether the initial meeting on 22

January 2020 had appropriate members, lacking for example anyone with extensive expertise on coronaviruses (TS/07 - INQ000190678). The fact that first SAGE had 18 members but by March 2022 more than 150 experts had been listed as members might raise questions about the process (TS/07 - INQ000190678).

17. **LESSONS LEARNED FOR THE FUTURE: The Inquiry might like to consider the process by which SAGE is formed, and the extent to which it is based on informal knowledge and contacts versus an established procedure. The first SAGE for COVID-19 met within the time window being considered in module 1, and considerations of the expertise required for different emergencies is something that is part of emergency and pandemic planning, preparedness and resilience**.

18. **It is my belief that advisory group membership will be stronger if there has been some consideration in advance. It would not be appropriate for the offices of the CSA and CMA to know about every potential expert for every potential threat; but there should be a procedure in place to rapidly identify expertise appropriate to any new threats, for example by reviewing major research infrastructure funded by the Government (NIHR Health Protection Research Units, UKRI funded Units and Centres) asking the major funders to provide information on who has received major grants in a particular area, etc.**

19. **The risk, if there is no established and transparent procedure, is that advisory committees appear to be formed based on personal knowledge of the CSA and CMA and their offices. This can mean critical expertise is overlooked and can lead to inequalities and disparities. The Inquiry might find it instructive to look at the gender, ethnicity and geographical location of the initial membership of SAGE for COVID-19. There is also the risk that those who feel their expertise is being ignored give opinions through other means (e.g., "Alternative SAGE", or critical newspaper articles), which then undermines public confidence.**

CLINICAL RESEARCH INFRASTRUCTURE

20. The strength of the UK's research response to the pandemic and its widespread impact has been recognised nationally and internationally. For example, in the UK we ran the largest prospective study of hospitalised COVID-19 patients (ISARIC-4C Study) which gave critical early information on risk factors for severe disease and death, to improve patient care (this study was run from Liverpool); we developed and assessed one of the key COVID-19 vaccines (The Oxford-Astra Zeneca vaccine – Liverpool was the largest recruiting site for the clinical studies of the vaccine); we ran the large clinical study (The Recovery Trial) which showed that dexamethasone reduces deaths by about 30%, as well as showing the benefits of other treatments; we ran the AGILE Clinical trial platform (from Liverpool) to test completely new COVID-19 drugs; we led (from Liverpool) the COVID-CNS (central nervous system) study and provided some of the key descriptions of the virus's impact on the brain. None of this would have been possible without the UK's strong clinical research infrastructure. This has been developed over many years, including the critical development in 2006 of the National Institute for Health and Care Research (NIHR), which funds the Health Protection Research Units, as well as other key research infrastructure and programmes, such as the NIHR Clinical Research Network.

21. The value of maintaining critical research infrastructure as a part of resilience cannot be over-emphasised. However, some of the infrastructure is currently weakened, partly because of the pandemic itself, and partly because of other factors. The NIHR Clinical Research Network, in particular, has struggled since the initial phase of the pandemic to recruit patients to non-COVID studies because of a lack of research nurses, and general fatigue in the NHS. To address this the NIHR announced in 2022 a "reset" of the Clinical Research Network requiring studies that were failing to recruit adequately to be closed, so the focus could be on studies which were more likely to succeed (TS/08 - INQ000190679). The industrial unrest in the health care sector, with doctors and nurses strikes, is making things worse. The general state of the NHS, with its reduced workforce, low morale, and increased waiting lists are compounding the challenges faced (TS/09 - INQ000190680).

22. **LESSONS LEARNED FOR THE FUTURE The Inquiry might like to consider the extent to which our clinical research infrastructure and thus our resilience for future emerging infection events is weakened by the current state of the National Health Service, and the urgency with which the Government is addressing this issue. It is my belief that the current position of the National Health Service, and in particular the NIHR Clinical Research Networks is impacting negatively on the UK's preparedness and resilience for emerging infections and future pandemics.**

CLINICAL RESEARCH WITH OVERSEAS PARTNERS

23. Responding to emerging infection events overseas plays an essential role in UK health protection for several reasons: firstly it can help contain outbreaks at source so that they do not spread internationally; secondly it can provide UK public health authorities with timely and direct information about the nature of an emerging disease problem, and assist with sharing of other assets such as samples; thirdly it provides opportunities for training of UK researchers and public health staff. The earliest warnings of a disease emerging are often clusters of patients presenting with unusual disease patterns in tropical locations. Thus, clinical surveillance in overseas settings where these clusters first arise is a crucial part of pandemic preparedness and resilience. The UK has a long and proud record of working with overseas collaborators to strengthen such surveillance, through research and training programmes. For example, Liverpool investigators played a critical role in strengthening surveillance for the emerging infection Japanese encephalitis across Asia, in partnership with WHO and local governments (TS/10 - INQ000190681), and we are currently leading an NIHR Global Health Research Group, with collaborators in Africa, India and Latin America, to strengthen the recognition and early management of patients with acute brain infections. Many investigators at The Pandemic Institute, and across the UK, have similar strong links with institutions around the world.

24. The Medical Research Council, now part of UK Research and Innovation, has supported international health research since its inception in 1913. Since 2016

NIHR has also been able to support a significant portfolio of applied global health research in low- and middle-income countries, principally using Official Development Assistance (ODA) funding.

25. However, the work in Liverpool, and that of many UK universities, was severely impacted by the Government's decision to reduce ODA funding from 0.7% to 0.5% of Gross National Income (TS/11 - INQ000190682). The knock-on effects of this were not only that some future programmes were not funded, but in March 2021 others were halted in mid-progress at short notice (TS/12 - INQ000190683). The whole episode had a regrettable negative impact on the reputation of the UK overseas. In addition, the 'Indo-Pacific tilt' of UK government policy as set out in the Integrated Review (March 2021; TS/13 - INQ000190684) has not led to new grant funding opportunities on a scale comparable to the now defunct Global Challenges Research Fund and Newton Fund. This, together with the inability of UK academics to engage with the European Union's Horizon programme is also severely impacting on our global positioning, and ability to do research internationally (TS/14 - INQ000190685), including on emerging infection threats. For example, Liverpool played a leading role in understating and mitigating the threat of Zika virus, through the Horizon 2020 ZikaPLAN programme (TS/15 - INQ000190686). Such a role would not currently be possible.

26. **LESSONS LEARNED FOR THE FUTURE: The Inquiry may wish to consider the impact of the Government's decisions on research funding with overseas collaborators including in tropical countries and in Europe. It is my belief that the reduced ODA funding, and failure to engage with the European Union's Horizon programme is inhibiting our ability to plan, prepare for and respond to emerging infections and pandemic threats in collaboration with our international partners.**

HIGH CONTAINMENT RESEARCH FACILITIES, INCLUDING CONTAINMENT LEVEL 4 LABORATORIES

27. The laboratory facilities for dealing with dangerous pathogens are a crucial element of UK preparedness and resilience for emerging infections. However, one area where we remain vulnerable is in the provision of high containment research facilities, especially those at Containment Level 4 (CL4), for dealing with the most dangerous pathogens.

28. In the UK there are currently four facilities, all in Government institutions, that are licensed to work on human pathogens at CL4 (as determined by the Advisory Committee on Dangerous Pathogens, e.g., Ebola and Crimean-Congo Haemorrhagic Fever viruses). These are:
    a. the UK Health Security Agency (UKHSA) laboratory at Porton Down;
    b. the Defence Science and Technology Laboratory at Porton Down;
    c. the UKHSA laboratory at Colindale; and
    d. the National Institute for Biological Standards and Control (NIBSC) at Potters Bar.

    However, only the first is regularly functioning.

29. In addition, there are three laboratories (two in Government institutions) licensed to work on animal pathogens at CL4 (as determined by the Specified Animal Pathogens Order, e.g. Highly Pathogenic Avian Influenzas virus):
    a. UKHSA at Porton Down;
    b. The Pirbright Institute; and
    c. The Francis Crick Institute.

    None of these is regularly functioning.

30. This situation in the UK contrasts with mainland Europe and the USA where there are many CL4 laboratories in universities as well as government institutions. Consequently, in the UK we are limited in our ability to research and respond to the most dangerous pathogens.

31. In 2015 the Government announced that a new CL4 facility will be built in Harlow, after which UKHSA's Colindale and Porton Down sites will close (both are coming to the end of their useful life); However, there is some uncertainty over the future of Harlow and even if approved this facility will not open before 2034 (TS/16 -

INQ000190687). There is thus a clear and urgent need to develop further CL4 laboratories in the UK.

32. The initial work on the virus causing COVID-19 (SARS-CoV-2) was all done in the CL3 laboratories of Public Health England (forerunner of UKHSA). However, it soon became clear that additional support was needed, and this was provided by the academic sector. Several universities across the UK have CL3 laboratories but there are none with CL4 facilities. The UK universities' Pandemic Sciences Network (which includes The Pandemic Institute in Liverpool, and eight other academic organisations working in this area) is developing a plan for such provision, which is currently being discussed with the UK Government Office for Science, the NIHR and the UKHSA, as well as the devolved governments.

33. **LESSONS LEARNED FOR THE FUTURE: The Inquiry might wish to consider whether it feels that the UK is vulnerable with such limited capabilities for researching the most dangerous pathogens, and whether the proposal from the UK Pandemic Sciences Network to create a CL4 facility within academia should be supported by the Government. My belief, shared with much of the academic and public health community, is that we are currently vulnerable; the proposal for new high containment facilities, led by academia in collaboration with public health and commercial partners, will provide a critical part of our national infrastructure and resilience to protect against emerging infections and pandemic threats.**

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.

Personal Data

Signed: _____

15th May 2023

Dated: _____