Witness Name: Peter Openshaw
Statement No. :1
Exhibits: 0
Dated: 06 March 2023

UK COVID-19 INQUIRY
MODULE 1

WITNESS STATEMENT OF PROFESSOR PETER OPENSHAW

I, Professor Peter Openshaw, Imperial College London, Exhibition Rd, South Kensington, London SW7 2BX, will say as follows:

1. I qualified in Medicine at Guy's Hospital (University of London) in 1979. After 5 years of training in respiratory and general medicine, I did a PhD at the National Institute for Medical Research at Mill Hill (1985-1988). I was then appointed at St Mary's Hospital Medical School (later merged with Imperial College) as a Wellcome Senior Clinical Fellow, becoming a full Professor at Imperial in 1996.

2. Having spent about 20 years working as a clinical respiratory physician and on the fundamental basis of lung inflammation induced by viruses, I ran a national consortium called 'Mechanisms of Severe Acute Influenza Consortium' (MOSAIC), recruiting and studying cases of severe influenza resulting in admission to one of 11 hospitals during the influenza pandemic of 2009-2010.

3. I now Co-Lead on ISARIC4C https://isaric4c.net/, a UK-wide consortium established to study the COVID-19 pandemic.

4. I also initiated and co-directed studies of human experimental infection of volunteers and am Director of the MRC-funded HIC-Vac consortium.

5. I served as President of the British Society for Immunology (2013-18) and am a member of the Academy of Medical Sciences–British Society for Immunology expert taskforce on the immunology of COVID-19.

6. I co-lead the NIHR-funded RSV Theme within the Health Protection Research Unit in respiratory infections between Imperial College London and Health Protection England.

7. I was Clinical Consul at Imperial for 3 years, then elected Senior Consul for 2 years and am now an Imperial Proconsul and now Chair the Imperial Together Task Group, promoting kind and ethical behaviour throughout the university.

8. I am an NIHR Senior Investigator.

9. I became a Commander of the British Empire in 2022 in recognition for Service to Medicine and to Immunology.

Professional Expertise:

10. I work on the pathogenesis of viral lung disease, aiming to understand protective vs. pathogenic immunity and to find ways to modulate virus-induced inflammation. My work has focused on the effects of age on immune responses, the infant origins chronic lung disease and immune responses of old age.

11. I have studied respiratory syncytial virus (RSV) and influenza since the mid-1980s; in the 1990s, I developed methods of intracellular cytokine staining of cytokines made by T cells *ex vivo* and *in vitro*.

12. I have been involved in vaccine testing and human volunteer challenge studies.

13. I have worked with many commercial vaccine developers as a member of advisory boards, speaker's panels and conference sessions.

14. I have been involved in many public engagement events, TV and radio broadcasts over more than 30 years, especially during threats or outbreaks of respiratory infection.

15. I have over 300 publications listed on PubMed https://pubmed.ncbi.nlm.nih.gov/?term=Openshaw-P* h-index of 91 on Google Scholar. Recent selected examples include:

- Ben Killingley, Alex J. Mann, … Ferguson, Peter J. Openshaw, Garth Rapeport, Wendy S. Barclay, Andrew P. Catchpole & Christopher Chiu **(2022)** Safety, tolerability and viral kinetics during SARS-CoV-2 human challenge in young adults *Nature Medicine* **28**:1031–1041.
- Kousathanas, A., Pairo-Castineira, E., Rawlik, K. et al. Whole-genome sequencing reveals host factors underlying critical COVID-19. Nature (2022). https://doi.org/10.1038/s41586-022-04576-6
- Evans RA, McAuley H, Harrison … Brightling CE; PHOSP-COVID Collaborative Group Physical, cognitive, and mental health impacts of COVID-19 after hospitalisation (PHOSP-COVID): a UK multicentre, prospective cohort study. *Lancet Respir Med*. **(2021)**; 9(11):1275-1287 PMID: 34627560
- Openshaw PJM. Using correlates to accelerate vaccinology. **(2022)**; *Science* 375(6576):22-23. doi: 10.1126/science.abn0007. Epub 2022 Jan 6. PMID: 34990231
- Muge Cevik, Nathan D. Grubaugh, Akiko Iwasaki, Peter Openshaw **(2021)** COVID-19 vaccines: Keeping pace with SARS-CoV-2 variants. *Cell* https://doi.org/10.1016/j.cell.2021.09.010
- Thwaites RS, Uruchurtu ASS, Siggins MK, Liew F, … Semple MG, Baillie JK, Openshaw PJM **(2021)** Inflammatory profiles across the spectrum of disease reveal a distinct role for GM-CSF in severe COVID-19 *Science Immunology* 6: 57, eabg9873 DOI: 10.1126/sciimmunol.abg9873
- Siggins MK, Thwaites RS, Openshaw PJM. **(2021)** Durability of Immunity to SARS-CoV-2 and Other Respiratory Viruses [Apr 8]. *Trends Microbiol*. doi:10.1016/j.tim.2021.03.016
- EC Thomson, LE Rosen, JG Shepherd, R Spreafico et al (2021) Circulating SARS-CoV-2 spike N439K variants maintain fitness while evading antibody-mediated immunity. *Cell* https://doi.org/10.1016/j.cell.2021.01.037
- Pairo-Castineira, E., Clohisey, S., Klaric, L. et al. **(2020)** Genetic mechanisms of critical illness in Covid-19. *Nature* https://doi.org/10.1038/s41586-020-03065-y

- Gupta RK, Harrison EM, Ho A, Docherty AB, Knight SR, et al., **(2021)** Development and validation of the ISARIC 4C Deterioration model for adults hospitalised with COVID-19: a prospective cohort study. *The Lancet Resp Med* DOI: 10.1016/S2213-2600(20)30559-2

- Habibi MS, Thwaites RS, … Johansson C, Chiu C and Openshaw PJM **(2020)** Mucosal neutrophil activation during exposure to RSV enhances infection and opposes early inflammatory responses that prevent disease. *Science* 9;370(6513):eaba9301. doi: 10.1126/science.aba9301 PMID: 33033192

- Docherty AB, Harrison EM, Green CA, … Dunning J, Openshaw PJ, Baillie JK, Semple MG; ISARIC4C investigators. **(2020)**. Features of 20 133 UK patients in hospital with covid-19 using the ISARIC WHO Clinical Characterisation Protocol: prospective observational cohort study *Brit Med* J 369:m1985. doi: 10.1136/bmj.m1985.BMJ.

- Peng Y, Mentzer AJ, Liu G, Yao X, Yin Z, Dong D, Dejnirattisai W, Rostron T, Supasa P, Liu C, Openshaw PJM. et al. **(2020)** Broad and strong memory CD4(+) and CD8(+)T cells induced by SARS-CoV-2 in UK convalescent individuals following COVID-19. *Nat. Immunol.,* 04 Sep 2020 doi: https://www.nature.com/articles/s41590-020-0782-6

Previous involvement in governmental scientific advisory committees

16. I was involved in the following governmental scientific advisory committees
    - *NERVTAG: from October 2014 onwards (attended seven meetings)*
    - *SAGE Swine Flu Pandemic: May 2009 – January 2010 (attended 16 meetings)*
    - *PRE-SAGE Ebola: 2018 (attended two meetings)*

Overview, reflections and effectiveness of the above groups

17. I became a member of SAGE during the swine flu pandemic (2009-12). From memory, this was a process of co-option rather than election. As a Member I participated in 16 out of 22 meetings.

18. The involvement was intense throughout 2009 until it was realised that the general severity of H1N1 infections was mild, only a few of those infected becoming severely ill. Once we had better data the estimates of deaths became much more certain, and the upper bounds of impact came down to manageable levels. The frequency of meetings then reduced.

19. With respect to the advice I was able to give, I was one of the few clinically active and qualified members of SAGE and the only person certified as a pulmonary physician. My unique and in-depth knowledge of respiratory medicine, respiratory immunology and viral responses was valuable. When I gave a view, I felt confident that those views were considered. I did not perceive any political influence or interference with the proceedings.

20. As interim Chair and then vice-Chair or NERVTAG (10th October 2014-2022), I was initially invited to join NERVTAG and then became Interim Chair. I and Peter Horby were considered for the Chair and he was appointed. I was glad to become Vice-Co-Chair alongside Prof Wendy Barclay. As a Member I attended all the meetings I could; I was a committed member and saw it as my responsibility to attend whenever possible. Again, my experience and qualifications were (I think) useful on many occasions. There were subjects on which I could have provided more advice if asked, but generally feel happy with how the committee was conducted. There was, however, a sense of exhaustion that took a toll as time passed; I would say as a general observation that the requests for information or papers that came to NERVTAG sometimes seemed to distract us from autonomous decision-making about what we thought important or could best advise about.

21. As a member of the UK Vaccine Network, I provided advice on vaccine priorities for diseases of pandemic potential.

22. My view is that both SAGE and NERVTAG were generally effective for the purposes for which they were intended. The range of expertise was good; there was representation from the devolved nations and the relevant areas of expertise were generally well represented. Areas that might have been covered more thoroughly include primary care, social care and aerobiology. The utility of

improving air quality and of masks was not as clear as it might have been. However, these topics were little discussed during the time period suggested by Module 1.

23. For the purposes of our mission, I do not think that inclusion of patient groups (for example) would necessarily have added greatly to the discussions. The views of patients are important, but I have found it hard to sustain an interest in acute respiratory infections in those who have been afflicted by past events; the most effective patient groups are those with a long-term interest in the condition being considered. At worst, patient representatives on scientific bodies lobby for a specific aspect that can detract from the focus of discussion; at best, they bring a fresh perspective to the table that enhance the scope of discussion.

24. With respect to the way in which groups were commissioned to address specific issues, I felt at times that we were distracted by requests to report on matters that were not in our areas of knowledge. There was not enough time (or bandwidth) to give a more complete response, or to decide ourselves on areas in which we could best contribute. The process by which selection of membership occurred seemed appropriate. My view is that selection must be based on scientific value to the committee and should not be influenced by government. There should be clear separation of political and scientific decision-making.

25. With respect to the ability of the groups to respond at short notice in emergency situations, it was important that we had been meeting sporadically and had got to know and trust one another before urgent situations arose. The ability to increase the frequency of meetings depended on our employers (mostly universities) being able to tolerate our secondment and absence from our day-jobs.

26. The committees were very well supported by professionals from the civil service. They were calm under great pressure, often working excessive hours to prepare for meetings but I cannot recollect any occasion on which they failed to provide appropriate support. However, the intensity of the work being undertaken in times of high demand would not be sustainable long-term, either for the officers or for the members. Again, this comment may be out of scope for Module 1.

27. The more recent offer to renumerate our employers for our time seems to me to be inappropriate. We are employed to use our knowledge for public good and are glad to give our time. If our employers are to be paid for our time, it should be at a realistic rate and not the derisory rate that was offered.

28. With respect to the general state of preparedness of UK's pandemic planning, preparedness and resilience, I would judge that we were well prepared compared to most other countries. The preparations need to be a joint effort by each of the devolved nations to be effective; to have done this separately would be wasteful and less effective.

29. The plans were largely based on an expected influenza outbreak, but many of the preparations would be similar regardless of the cause. There might have been greater learnings from exercises that were undertaken with different scenarios, but I do not think these were presented to NERVTAG.

30. Within the time scope of Module 1, we felt pleased that we had such well-developed plans. Many other countries did not have such plans and when they did, they were less complete. In retrospect we might have considered enhanced ventilation in buildings and better use of protective equipment (especially masks). We did discuss stockpiles of PPE but the costs and limited shelf life seemed prohibitive in terms of suggesting increasing rather than maintaining stocks. In hindsight we should have put in place not only adequate stocks of protective items, but also to have built our own factories to produce them. Reliance on imports and on supplies from elsewhere in times of emergency seems unwise- however, this is probably not a decision for NERVTAG (or possibly even for SAGE).

31. One thing that I think we did well was to keep the public on board in terms of support for the measures and for vaccination. This was not easy to do, and I am concerned that the politicization and public polarisation of views may make this harder in future. Our vaccination rates depended on public support and a vast effort by all those involved in the supply and deployment of vaccines.

Contributions to these groups

32. In the time-period of Module 1, the documents specified in the Rule 9 request are out of scope.

33. The following publications were made during the period of Module 1, excluding forty other publications which are on basic mechanisms and out of scope for pandemic preparedness:

- Risk factors for hospitalisation and poor outcome with pandemic A/H1N1 influenza: United Kingdom first wave (May–September 2009) J S Nguyen-Van-Tam, P J M Openshaw, A Hashim, E M Gadd, W S Lim, M G Semple, R C Read, B L Taylor, S J Brett, J McMenamin, J E Enstone, C Armstrong, K G Nicholson Thorax. 2010 Jul; 65(7): 645–651. Published online 2010 Jul 13. doi: 10.1136/thx.2010.135210 PMCID: PMC2921287 ArticlePubReaderPDF–174KCite

- Pre-Admission Statin Use and In-Hospital Severity of 2009 Pandemic Influenza A(H1N1) Disease Stephen J. Brett, Puja Myles, Wei Shen Lim, Joanne E. Enstone, Barbara Bannister, Malcolm G. Semple, Robert C. Read, Bruce L. Taylor, Jim McMenamin, Karl G. Nicholson, Jonathan S. Nguyen-Van-Tam, Peter J. M. Openshaw, the Influenza Clinical Information Network (FLU-CIN) PLoS One. 2011; 6(4): e18120. Published online 2011 Apr 25. doi: 10.1371/journal.pone.0018120 PMCID: PMC3081811 ArticlePubReaderPDF–88KCite

- Comparison of CATs, CURB-65 and PMEWS as Triage Tools in Pandemic Influenza Admissions to UK Hospitals: Case Control Analysis Using Retrospective Data Puja R. Myles, Jonathan S. Nguyen-Van-Tam, Wei Shen Lim, Karl G. Nicholson, Stephen J. Brett, Joanne E. Enstone, James McMenamin, Peter J. M. Openshaw, Robert C. Read, Bruce L. Taylor, Barbara Bannister, Malcolm G. Semple PLoS One. 2012; 7(4): e34428. Published online 2012 Apr 3. doi: 10.1371/journal.pone.0034428 PMCID: PMC3317953 ArticlePubReaderPDF–323KCite

- Clinical and laboratory features distinguishing pandemic H1N1 influenza-related pneumonia from interpandemic community-acquired pneumonia in

adults Thomas Bewick, Puja Myles, Sonia Greenwood, Jonathan S Nguyen-Van-Tam, Stephen J Brett, Malcolm G Semple, Peter J Openshaw, Barbara Bannister, Robert C Read, Bruce L Taylor, Jim McMenamin, Joanne E Enstone, Karl G Nicholson, Wei Shen Lim, Influenza Clinical Information Network (FLU-CIN) Thorax. 2011 Mar; 66(3): 247–252. Published online 2011 Jan 20. doi: 10.1136/thx.2010.151522 PMCID: PMC3047189 ArticlePubReaderPDF–142KCite

- An Evaluation of Community Assessment Tools (CATs) in Predicting Use of Clinical Interventions and Severe Outcomes during the A(H1N1)pdm09 Pandemic Malcolm G. Semple, Puja R. Myles, Karl G. Nicholson, Wei Shen Lim, Robert C. Read, Bruce L. Taylor, Stephen J. Brett, Peter J. M. Openshaw, Joanne E. Enstone, James McMenamin, Barbara Bannister, Jonathan S. Nguyen-Van-Tam PLoS One. 2013; 8(9): e75384. Published online 2013 Sep 19. doi: 10.1371/journal.pone.0075384 PMCID: PMC3777884 ArticlePubReaderPDF–655KCite

- Antiviral B cell and T cell immunity in the lungs Christopher Chiu, Peter J Openshaw Nat Immunol. 2015; 16(1): 18–26. Published online 2014 Dec 18. doi: 10.1038/ni.3056 PMCID: PMC7097128 ArticlePubReaderPDF–1.4MCite

- Differences between asthmatics and nonasthmatics hospitalised with influenza A infection Puja Myles, Jonathan S. Nguyen-Van-Tam, Malcolm G. Semple, Stephen J. Brett, Barbara Bannister, Robert C. Read, Bruce L. Taylor, Jim McMenamin, Joanne E. Enstone, Karl G. Nicholson, Peter J. Openshaw, Wei Shen Lim Eur Respir J. 2013 Apr; 41(4): 824–831. Published online 2012 Aug 16. doi: 10.1183/09031936.00015512 PMCID: PMC3612580 ArticlePubReaderPDF–187KCite

- The Comparative Clinical Course of Pregnant and Non-Pregnant Women Hospitalised with Influenza A(H1N1)pdm09 Infection Gayle P. Dolan, Puja R. Myles, Stephen J. Brett, Joanne E. Enstone, Robert C. Read, Peter J. M. Openshaw, Malcolm G. Semple, Wei Shen Lim, Bruce L. Taylor, James

McMenamin, Karl G. Nicholson, Barbara Bannister, Jonathan S. Nguyen-Van-Tam, the Influenza Clinical Information Network (FLU-CIN) PLoS One. 2012; 7(8): e41638. Published online 2012 Aug 3. doi: 10.1371/journal.pone.0041638 PMCID: PMC3411676 ArticlePubReaderPDF–91KCite

- Predictors of clinical outcome in a national hospitalised cohort across both waves of the influenza A/H1N1 pandemic 2009–2010 in the UK Puja R Myles, Malcolm G Semple, Wei Shen Lim, Peter J M Openshaw, Elaine M Gadd, Robert C Read, Bruce L Taylor, Stephen J Brett, James McMenamin, Joanne E Enstone, Colin Armstrong, Barbara Bannister, Karl G Nicholson, Jonathan S Nguyen-Van-Tam, on behalf of the Influenza Clinical Information Network (FLU-CIN) Thorax. 2012 Aug; 67(8): 709–717. Published online 2012 Mar 10. doi: 10.1136/thoraxjnl-2011-200266 PMCID: PMC3402749 ArticlePubReaderPDF–300KCite

34. The links in the listings above allow the article summaries to be read.

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: 6 March 2023