Witness Name: Dr Chris Williams
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UK COVID-19 INQUIRY

WITNESS STATEMENT OF DR CHRIS WILLIAMS

I, Dr Chris Williams care of Public Health Wales, 2 Capital Quarter, Tyndall Street, Cardiff, CF10 4BZ will state:

1. This statement is provided by me in my capacity as a Consultant Epidemiologist at Public Health Wales in response to a request for evidence made by the Inquiry Team to me dated 6 June 2023.

Background

2. I have been involved in public health responses to communicable diseases mainly since I started Public Health training in 2001. Prior to this, I did have some experience through working in medical and infectious disease clinical teams in hospital as a junior doctor.

3. I was involved in public health responses as a registrar through working with the local health protection teams, regional epidemiology and national centre (HPA Colindale at the time), as well as being first on call for public health.

4. Following my registrar training in the East of England I trained in the European fellowship for intervention epidemiology in Germany, which involved surveillance, outbreak response, research and training. As part of this I helped investigate a case of cryptic malaria, a national outbreak of salmonella, and evaluated surveillance for the 2006 FIFA world cup.

5. My first consultant post in 2008 was as a consultant in communicable disease control, with responsibilities for outbreak control and surveillance. In this post (2008-2013) I managed many outbreaks and cases of communicable disease and was closely involved in the response to the 2009 H1N1 pandemic. I was not involved in responses to SARS-CoV-1 but one investigated outbreak was of coronavirus OC43 in a healthcare setting.

6. Since 2013 I have worked as a consultant epidemiologist in Public Health Wales Communicable Disease Surveillance Centre (CDSC). This involves surveillance and outbreak investigation, in addition to on call duties for control of individual cases.

7. As part of this role, I have been involved in communication and response to cases of MERS-CoV.

8. I have also worked for the World Health Organization (WHO) as an epidemiology consultant in Turkey (in a teaching capacity), Egypt (avian influenza), and Guinea (Ebola response 2015).

The Communicable Disease Surveillance Centre (CDSC)

9. The CDSC is a department within the Health Protection division of Public Health Wales and is responsible for surveillance and epidemiological investigation of communicable diseases. The CDSC is also involved in research, teaching and training on these subjects, working with Health protection teams and other partners.

10. The CDSC dates back to the time of the Public Health Laboratory Service. Following the creation of a national communicable disease surveillance centre in Colindale, regional centres were set up including CDSC Wales. It has existed within successive public health organisations in Wales.

11. When I joined CDSC in 2013 it was as one of three consultant epidemiologists. At that time there were also 5 senior scientists and additional epidemiological and analytic staff. I implemented a minor reorganisation in 2015, aligning scientists to specific subject groups with consultant oversight. Pre-pandemic there were increases in staffing in 2019 (including the addition of the healthcare epidemiology network and an additional consultant post) and in 2021, when there was an increase of around 25 posts.

12. Currently there are over 70 staff working within the CDSC structure, with some embedded in other teams (such as Health Protection and Local Health Boards) and some overlaps with programme structures such as those for vaccine preventable diseases and Healthcare associated infections.

13. CDSC consultants are either consultant epidemiologists or consultants in Public Health, with the majority having completed specialist training through the faculty of Public Health. The majority are medically trained but this is not now a requirement for specialist registration in Public Health. Senior scientists have a scientific background, experience in infectious disease surveillance, specialising in particular areas. Other staff include epidemiological scientists and data analysis and data scientists (recruited since 2019), most of which have a scientific background and often a Masters level qualifications in Public Health or epidemiology.

14. The CDSC worked on COVID-19 surveillance since the early part of the pandemic. Initially (between January/February 2020) we were identifying possible cases based on agreed UK definitions (**Exhibit CJW1 INQ000224029)**, led by Public Health England (PHE), to inform partners including PHE of case numbers and activity. Following development of a SARS-CoV-2 laboratory test in Wales, we used this data to inform surveillance. Later on, (from August 2020) data from other UK testing such as the lighthouse laboratories and from contact tracing, was added in to the picture.

15. From these sources, and others including hospital admissions, genomic analysis and vaccination status, CDSC produced a public facing dashboard with

surveillance information, alongside written reports and daily updates to stakeholders [**EXHIBITS CJW3 INQ000224054, CJW4 INQ000224067, CJW5 INQ000224078, CJW6 INQ000224087, CJW7 INQ000224088, CJW8 INQ000224097, CJW9 INQ000224098, CJW10 INQ000224030, CJW11 INQ000224031, CJW12 INQ000224032, CJW13 INQ000224033, CJW14 INQ000224034, CJW15 INQ000224035, CJW16 INQ000224036, CJW17 INQ000224037, CJW18 INQ000224038, CJW19 INQ000224039, CJW20 INQ000224041, CJW21 INQ000224042, CJW22 INQ000224044, CJW23 INQ000224045, CJW24 INQ000224047, CJW25 INQ000224048, CJW26 INQ000224050, CJW27 INQ000224051, CJW28 INQ000224052]**. CDSC also provided responses to requests for data from stakeholders (such as Welsh government and PHE dashboard staff), ad hoc analyses, and freedom of information requests. Surveillance and reporting evolved over the course of the pandemic. **(EXHIBT CJW29 INQ000224053, CJW30 INQ000224058)**

16. CDSC focused on surveillance data on Welsh residents. International data and reporting were provided initially by PHE, given their national role and resources used to produce an international overview of UK relevance. International descriptions were later added as part of our SARS-CoV-2 variant reporting.

17. There was consideration internally and within stakeholder groups (including the Technical Advisory Group (TAG)) of approaches to COVID-19 control used in other countries. This was particularly of interest early in the pandemic when Italy was introducing regional then national lockdowns, and later on when contact tracing was being developed, with reference to the stringent case and contact isolation used in some Asian countries.

18. CDSC surveillance work did feature in some of the TAG consensus statements, mainly in the form of supporting data and information from our extensive surveillance reports.

19. My role changed considerably from January 2020 to May 2022, in content, scope, workload and pace.

20. In January 2020 I was one of three consultants in CDSC. I was the only full-time CDSC consultant, with one colleague working part time for the liver plan out of a 0.8 Whole Time Equivalent (WTE) post, and another working 0.4 WTE for Cardiff University (and employed by them).

21. Early in the pandemic, I took on new roles in addition to my pre-pandemic CDSC role. I became one of three incident directors (to my recollection from March 2020) in Public Health Wales. After some initial work with Welsh Government, I was asked to join TAG in March 2020. I don't recall whether I was formally a member of the Technical Advisory Cell (TAC) before this, but I worked with the Chief Scientific Officer and colleagues on COVID-19. In April 2020 I started working with the Oxford Vaccine Group to become principal investigator for the Wales site of their COVID-19 vaccine trial.

22. The nature and delivery of my work changed repeatedly over the course of the pandemic. In common with many people, I started working primarily from home in March 2020 although I did come to the office, mainly for my usual Saturday incident director duties. The number and variety of meetings increased, from a morning daily update meeting with PHE to internal surveillance meetings, and multiple meetings communicating reports and findings to stakeholders, in particular Welsh Government. My role within CDSC became more managerial with less time for technical writing and analysis.

Technical Advisory Group (TAG)

23. I recall attending some meetings of the child and education subgroup of TAG, mainly in 2020. Several meetings with this label are in my diary from 2020 and 2021.

24. The TAG provided advice to the Welsh Government on the basis of consensus among its attendees, and that the Chief Scientific Adviser for Health (CSA(H)) and Chief Medical Officer for Wales were the interlocutors with policy-makers. The TAG group did contain diverse expertise which was helpful to balance views, and did commission individual pieces of analysis in an appropriate way. The

processes were less well developed earlier in the pandemic and then the group widened and was more formal when formulating questions and commissioning.

25. The diversity was sometimes challenging from a surveillance and epidemiology point of view, as experts in other areas could comment on the likely and actual spread of infection in ways that sometimes went beyond their area of expertise. However, as stated above, the availability of other viewpoints on the wider questions and particularly on societal controls, was very helpful in moving beyond a strictly infection-focused assessment of harms and benefits. I was not party to the organisation of the groups but it appeared to be well-coordinated and resourced, with much helpful technical work also ongoing within the Welsh Government.

26. The other difficulty with advising TAG and other colleagues in Welsh Government was that there were many groups and individuals requesting data, information and advice. These information requests came infrequently from TAG itself, more often being from Welsh Government members of TAG and other Welsh Government departments. This multiplicity of requests sometimes led to duplication and was difficult to manage.

27. I cannot comment on whether the TAG approach led to delays in communicating advice to the Welsh ministers nor can I comment on the relationships between TAG/its subgroups and the Welsh ministers as I wasn't involved in these elements.

28. I was initially the main CDSC contributor to TAG. My colleagues Daniel Thomas (initially a senior scientist and then consultant epidemiologist) and Simon Cottrell (Senior principal epidemiologist, acute respiratory /vaccine preventable disease) also provided input, the former on some ethnicity analysis in 2020 and the latter mainly on surveillance and vaccination coverage. I don't recall contributing to assessments of global COVID-19 transmission risk and control measures, other than possibly verbally as part of meeting discussions.

29. My recollection of the early months of the pandemic is that the TAG and the Welsh Government more generally took a lead from the UK government in the timing and nature of initial non-pharmaceutical measures. Although there was the potential to make different decisions, which was used later in the pandemic, the initial response was mainly guided by input from Scientific Advisory Group for Emergencies (SAGE) and Scientific Pandemic Influenza Group on Modelling (SPI-M), whose modelling papers set out the policy options and their likely consequences. **[EXHIBIT CJW31 INQ000224059]**

30. In February and early March 2020, I was becoming aware of the options for reducing transmission through non-pharmaceutical measures such as household isolation, school and university closure, and contact tracing. The key point for considering international perspectives was before the first lockdown on March 23 2020, where we had the example of Italy and China which had imposed lockdowns. I can't recall specific TAG discussions, but my recollection is that these were considered largely in the light of the modelling evidence rather than as empirical examples of transmission control.

31. At the time, I saw these decisions on these extreme measures as UK-wide with UK government, informed by SAGE/SPI-M, and my understanding was that this was the view shared by the Chief Medical Officers (CMO's) of each nation. With hindsight, the fact other countries had been imposing lockdowns as a response to the impacts of transmission, rather than independent modelling analysis of policy options, should have weighed more with all UK governments.

32. The Welsh Government did commission scientific advice along with data and other materials from Public Health Wales (PHW). CDSC and incident directors received multiple requests for information and responses to questions. Welsh government departments did appear to have input into these requests, and in some cases CDSC was involved in meetings with government departments- a specific example would be in the field of education. [**EXHIBIT CJW2 INQ000224040, CJW26 INQ000224050, CJW27 INQ000224051 as above]**

33. We received requests for information from various sources including the Welsh Government, Local Authorities, Local Health Boards and the public. These requests for information or to answer questions were not always coordinated, and mainly came via email from various sources. Where questions were asked, they were often requesting specific data or information rather than posing a scientific or policy question. There was often no formal commission in the sense of a clear question, timescales and scope. The volume, multiple sources and incomplete nature of requests made them difficult to prioritise and respond to, which might have reduced overall efficiency. For example, the majority of questions in early 2020 were queries about the data and reports, and some request for additional outputs or data streams.

34. Professor Robin Howe stated:

"*The process through which policy owners sought to commission advice from the group evolved over time towards a proforma-based process managed by the TAC secretariat that was introduced in the latter part of 2021. Prior to this it fell to the group itself to manage commissions. Individual commissions involved varying degrees of discussion and iteration towards a concise, clearly defined and agreed question. In many cases the initial question, while having some scientific element was not in and of itself a truly technical and/or scientific question. In such cases the technical and science issue had to be identified and separated from the policy ones.*"

I did not have the same experience as Professor Howe but recognise this description of the way that questions evolved. As above, from my experience a related but parallel challenge was being asked for specific data or tabulations which was intended to answer an underlying scientific or policy question, where this was not necessarily the best way of answering the question.

35. By way of example, later in the pandemic, after introduction of vaccinations, there was a repeated push to report the vaccination status of hospital admissions compared to other cases, under the assumption that this would prove (or disprove) vaccine effectiveness. We (CDSC) eventually did include this in some

reports with stratification and with strong advice against interpreting as vaccination effectiveness, which requires separate and well-designed studies **[EXHIBIT CJW32 INQ000224060]**

36. I believe there was a formal way of requesting advice from TAG within the Welsh Government but I am not able to give an overview because I don't know what this process was. My colleagues and I received questions via email, verbal requests during TEAMS meeting and by direct phone conversations. These were sometimes direct from the original requester and sometimes came via other colleagues or partners via a chain. They were sometimes from TAG members, sometimes from discussion or actions requested in TAG. I can't reliably disentangle requests from their sources, only repeat that we had multiple requests from many different sources both within TAG, in TAG subgroups, and from more widely in Welsh Government.

37. I would recommend having a focal point (or points) for asking for information and advice, so that duplicate requests could be identified in advance and also allowing for planning of responses. TAG provided a forum in which we (PHW) were able to help shape and refine questions, and this ability to shape questions rather than deal with them raw would be helpful for other sources within the Welsh Government.

38. Feedback loops, particularly on the use of data or responses, would have helped but in most cases this did not occur. My recollection was that a cessation of further queries or requests on the same matter was the main indication that work on a question had completed. I'm not able to recollect the clarity of discussion of sub-groups' reports or recommendations within TAG, but given the breadth and depth of items discussed this is plausible.

39. I was an observer on SAGE from May 2021 and was able to listen to some meetings in early 2020. Regarding SPI-M, a subgroup of SAGE, I don't recall attending SPI-M as a member, but I was invited to join SPI-M in the later phase of the pandemic, attending my first meeting in May 2022. I did not contribute research evidence to SPI-M but have made some contributions based on my

surveillance experience (for example edits to a document on data requirements for a future pandemic).

40. My understanding of SAGE and SPI-M is that they involved addressing questions set by other groups, undertook analyses to answer these, then produced a consensus statement in response following discussion. Particularly in the early phases of the pandemic, we did not have sufficient scientific resources or data to contribute significantly, which (along with observer status) limited our involvement and ability to challenge.

41. I note Dr Christopher Johnson stated in his questionnaire provided to the Inquiry that: "*It sometimes felt like the ability of the groups to maximise effective operation was sometimes handicapped by unequal access to information or to influence the timing of actions which had impacts in all 4 nations*".

    I would agree with Dr Christopher Johnson's statement on unequal access to information. An example would be the sharing of NHS England models of bed demand based on the Ferguson model. These were already at an advanced stage when we saw documented versions, but as the underlying data was not shared with us, we had to improvise by copying from a pdf document and apply a population correction. We were later able to obtain the relevant data and models to run in Wales.

42. There was considerable discussion within TAG but it was not always possible to communicate some points of view effectively given the nature of discussions, size of the group and time available. Also, advice was sought directly from Public Health Wales as an organisation or from individuals by groups in Welsh Government other than TAG.

43. TAG tended to provide broader, scientific advice but this left a gap for more urgent or specific questions or data requests. Managing diversity of opinions in TAG or similar groups in the future could in theory be addressed by limiting comments based on role within the group, but this would go against its multi-

disciplinary nature. A combination of better individual awareness and appropriate chairing should be effective.

44. Pandemic planning and response, including direct experience of the H1N1 pandemic, infections such as SARS-CoV-1, MERS-CoV and Ebola, and seasonal influenza, could have been better represented on TAG. I am not an expert in behavioural science and therefore I'm not qualified to comment on whether there was sufficient diversity in representation of behavioural scientists within TAG and its subgroups.

45. In terms of the roles within TAG, I believe these could have been better defined, although these were inferred from the membership. There was collaborative working and sharing of resources although in general, TAG was not a resource-providing body for Public Health Wales.

46. One area that appeared to work well was in technical briefings to media. There were several of these sessions on specific topics and the media could ask questions to technical staff to receive more detailed answers which helped them to understand and interpret data.

47. The main area in which TAG and other advisory structures might have been better is in NHS capacity planning. In England, NHS England and NHS digital had existing structures for capacity planning, which then joined up with modelling outputs in the pandemic to produce models for likely capacity demands due to COVID-19. As Wales lacked this capability initially, Public Health Wales worked to fill this gap and in March 2020 the modelling of capacity was provided within Welsh Government, working with academic partners **[EXHIBIT CJW33 INQ000224061]**

48. The other area that could be improved is in duplication of surveillance and other statistical outputs. **[EXHIBITS CJW3 INQ000224054, CJW4 INQ000224067, CJW5 INQ000224078, CJW6 INQ000224087, CJW7 INQ000224088, CJW8 INQ000224097, CJW9 INQ000224098, CJW10 INQ000224030, CJW11 INQ000224031, CJW12 INQ000224032, CJW13 INQ000224033, CJW14**

INQ000224034, CJW15 INQ000224035, CJW16 INQ000224036, CJW17 INQ000224037, CJW18 INQ000224038, CJW19 INQ000224039, CJW20 INQ000224041, CJW21 INQ000224042, CJW22 INQ000224044, CJW23 INQ000224045, CJW24 INQ000224047, CJW25 INQ000224048, CJW26 INQ000224050, CJW27 INQ000224051, CJW28 INQ000224052 as above] Public Health Wales produced a wide range of statistical outputs which were made available to the Welsh Government. The latter also produced internal reports and a dashboard which presented an overlapping set of data (often the same data). Public Health Wales was required to provide regular data flows and reports (usually on a daily basis) to feed this separate set of reports. Demarcation as to which organisation should focus on which area, and avoidance of duplication, would have reduced workload and improved efficiency.

49. In general TAG worked well in the context of the pandemic, and the discussions provided an additional dimension to specialists in each area.

50. To my recollection I was not a member of any WhatsApp or similar messaging groups within the Welsh Government. WhatsApp and text messages were sometimes used between PHW colleagues, or between PHW and Welsh Government as a way of prompting phone calls, but not on a group basis or for advice and decisions.

The early stages of the pandemic

51. I first became aware of COVID-19 professionally on 7 January 2020 when I received an invitation by PHE to a briefing on pneumonia of unknown origin in China. I may have heard of the WHO report dated 31 December 2019 before this, but this briefing was my introduction to the issue.

52. Following this briefing, I had daily meetings with PHE and some internal meetings with PHW. I sent briefing notes to the Welsh Government and other stakeholders to inform them of the risk. **[EXHIBIT CJW30 INQ000224058 as above].** The 8 January 2020 briefing (the day after the initial call and sharing of a

briefing note from PHE) reports on cases of pneumonia of unknown origin in Wuhan, China, and alerts to the risk of imported cases in travellers from China. **[EXHIBIT CJW 34 - INQ000089574]**

53. The update on 23 January 2020 adds that due to the enlarging geographic area affected and evidence of human-to-human transmission, it is likely that suspected cases will be identified in the UK including Wales and advises the importance of minimising the time between onset of infection and isolation. **[EXHIBIT CJW30 INQ000224058 as above]**

54. UK counterparts were attending these briefings which became a daily situation update. I did not liaise directly with WHO or other international organisations, or other governments at the time to my recollection. There was a devolved administrations update led by PHE on 15 January 2020.

55. I sent a written summary of the daily situation reports to PHW and Welsh Government colleagues and passed on information through other meetings, including a daily incident management meeting within PHW and a daily Welsh government meeting from January 26th 2020. I was involved in preparations for the response to possible cases, confirmed cases, and flowcharts for management.

56. In the early stages of the pandemic CDSC was mainly concerned with surveillance and reporting of initial, possible and then confirmed cases. We did not undertake any specific reports on transmission, lacking sufficient data to do this (and with case numbers lagging behind other areas overall).

57. I don't recall what I knew or advised about asymptomatic transmission between January and March 2020. In general, I tend to keep an open mind about transmission possibilities for any infection. In this context I have found two relevant emails. Firstly, I responded to a query from Dr Rob Orford (Chief Scientific Adviser for Health) on healthcare worker testing on 1 April 2020, regarding asymptomatic transmission thus, referencing a paper that alluded to asymptomatic transmission in care homes. **[EXHIBIT CJW35 INQ000224062]**

I also wrote a short paper with Dr Giri Shankar responding to a letter on contact tracing (sent on 1 April 2020) which also references asymptomatic transmission. **[EXHIBIT CJW36 INQ000224063]**

58. The above examples demonstrate that I was aware of the possibility of asymptomatic infection at this time, but I can't recall the first date on which I became aware.

59. I produced an 'analysis on expected hospitality and mortality impacts of Covid-19 adapted from models from NHS England based on existing models of likely new infections' **[EXHIBIT CJW33 INQ000224061 as above].** I don't recall this analysis being formally commissioned but the work came out of discussions with Welsh Government colleagues who had seen the NHS England projections and I believe I offered to translate this to the Welsh context.

60. An early version (not using the model but scaling England estimates to Wales population by age and Local Health Board) had the following summary points (date 5/3/2020). These were for a scenario unmitigated by control measures. **[EXHIBIT CJW33 INQ000224061 as above]**

a) New cases are expected to peak 11 weeks from start of epidemic

b) Demand for services is likely to peak around weeks 12-14

c) There will be considerable variation by health board based on the local timing of the outbreak, size of the resident (and non resident) population, and proportion of vulnerable people (older, co-morbidities, social deprivation)

d) Adjusting the model assumptions by simple scaling down gives lower demand – but even with a 25% scaling, demand will exceed supply (>12000 prevalent cases requiring hospitalisation)

e) CDSC is well placed to prospectively monitor health service demands as part of its surveillance function

61. This early presentation predicted (at 25% of the reasonable worst case model, for a single wave) peak daily admissions for the first wave of 1622, total overall deaths of 6,338, and total overall hospitalisations of 51,125. Outputs were made as spreadsheets and presentations rather than formal reports or advisory notes to Welsh government.

62. This compares to 5520 cumulative deaths reported via the PHW rapid mortality surveillance up to 1 April 2021, over two waves (1545 deaths after the first wave). Peak hospitalisations per week were 984 (140 per day) on 8 April 2020 (earliest data from UK COVID-19 dashboard). By June 2021 there were nearly 30,000 cumulative hospitalisations (9495 after the first wave). Thus the model overestimated the actual peak new hospitalisations by over 10-fold, but over two waves the cumulative hospitalisations and deaths were of the same order of magnitude as the model predications[1].

63. The initial adaptation was simply a scaling of England estimates by 5% (the proportion of England population represented by Wales i.e. 5% of 60 million = 3 million) but within a short period of time the estimates were scaled using Wales national and Local Health Board age-specific population figures from StatsWales.

64. Regarding the paper cited *"Covid-Technical Advisory Cell: Briefing on Behavioural and Social Interventions*", I cannot find reference to this in my files or emails. It's likely that I may have contributed to this paper but I cannot comment without having sight of this document.

65. Insofar as I was able to comment on behavioural and social interventions early in the pandemic, it would have been on the basis of having seen papers presented to SAGE or SPI-M, some of which were shared by Welsh Government colleagues via a file-sharing system. After an initial period without routine access this improved. It might have been a disadvantage early on but given that decisions were generally made on a UK consensus, it is unlikely to have made a difference.

[1] Public Health Wales COVID-19 dashboard

66. The above paper (referred to at paragraph 65 above) states: "Modelling evidence suggests that some interventions such as the restriction of mass gatherings (which includes closure of sporting fixtures, bars, restaurants, cinemas) whilst assumed to be effective, are not supported by evidence". I can't comment on this quote because I don't know what evidence is being referred to or who provided the evidence. Furthermore, I can't comment on any use of the Ferguson model in informing it, or on the consideration of pre- and asymptomatic transmission because I wasn't involved directly in drafting that sentence.

67. CDSC did not contribute to the monitoring of transmission internationally, as these summaries and evidence presented to SAGE/SPI-M was led by PHE. We did not have separate international scanning, mainly due to a lack of capacity and also a limited rationale to explore different approaches. To my recollection by March 2020 the advisory groups had reviewed reports and evidence of approaches in other countries and these were considered as possible responses, sometimes involving modelling. It was not until later in the pandemic that estimates of the actual effect of individual measures were made.

68. In addition to the analyses described above on projecting hospital demand, Public Health Wales also produced short-term estimates of the growth rate of COVID-19 infections (from 16/3/2020). We did not calculate the incubation period or mortality rate but did report on actual mortality and cases over time. **[EXHIBIT CJW37 INQ000224064]**

69. Given the incomplete and changing case finding, calculating case fatality proportions would not have feasible.

70. In January 2020, I analysed case data from PHE briefings and internet sources to estimate the reproductive number and growth rate of cases in China, and communicated these findings within PHW and to PHE and WG colleagues. As I lacked complete international data and finer modelling capacity I felt that these estimates were likely inferior to consensus estimates from larger academic

groups, but they did give a useful background idea of growth and the challenges of estimating this. **[EXHIBIT CJW38 INQ000224065]**

71. Divergence of opinion was addressed through discussion and chair interventions, to my recollection, within TAG and its work.

72. I don't recall my input to any discussion on the Stereophonics concerts and the Scotland vs Wales Six Nations rugby match. It is possible that this occurred verbally in meetings.

73. My recollection of my views expressed in a briefing report to TAC [exhibit] was that the modelling evidence did not show a major impact of mass events on overall transmission. **[EXHIBIT CJW39 INQ000224066, CJW40 INQ000224068]** My previous experience of mass event surveillance (for example during the 2006 FIFA World Cup, and 2012 Olympics) was that these had a minimal effect on overall disease transmission, albeit in a pre-pandemic situation. This, along with my experience as a consultant in communicable disease, informed my views on gatherings and transmissions. I was aware of the associated travel and social interactions around such sporting events, and of restrictions on events in Italy. I can't recall my understanding of asymptomatic transmission at the time but it's likely that I thought this would be possible.

74. With hindsight I would say that I probably underestimated the role of international gatherings in seeding infections through travel (as opposed to through transmission at the event). I still think that overall these events do not play a major role in overall transmission. The context at the time was around banning such events whilst still allowing normal commuting, social interactions and international travel – so that banning these events alone would not have slowed transmission. My understanding is that subsequent analysis has still found that their additive effect was minimal. Genomic evidence showed seeding from multiple countries at the time that, for example, travel from Italy was considered a risk [**EXHIBIT CJW41 INQ000224069].**

<u>Infectious Disease Modelling</u>

75. My understanding of infectious disease modelling is that it uses a set of methods (including statistical methods) to examine scenarios, test hypotheses and make projections on the spread of infections. I'm aware of basic compartment methods whereby a theoretical population is allocated into groups, for example susceptible, infected and recovered.

76. The model calculates flows between each compartment based on parameters such as R0 (basic reproductive- number- number of secondary cases produced by an index case under initial conditions), incubation and infectious periods, and then iterates to produce estimated new cases over time. More complex models involve subdivision of the population by age group, and also add the differential interaction between each age (or other category) group based on contact matrices derived from real-world studies of contacts. I'm also aware that there are agent-based models that start with individuals and simulate contact interactions and transmissions, and then aggregate these to produce population level incidence estimates.

77. I don't recognise a distinction between infectious disease modelling and statistical modelling, but I'm not a statistician or modeller.

78. As above my understanding is that infectious disease modelling uses statistical methods and computer tools to produce outputs.

79. The main use I've seen for models pre- and during the pandemic was for scenario planning, and short to medium term forecasting or nowcasting (to compensate for reporting delays). Modellers tend to advise that models are not predictive, which I think is a fair assessment.

80. Increasing complexity of models through additional input parameters and methods steps can produce outputs that better describe the real world, but this also increases the number of elements that need to be provided and that also might change in the real world (for example contact patterns).

81. Scenario models were used early in the pandemic to estimate possible outcomes based on infection parameters and also on possible interventions. Later on, this type of modelling was less prominent and models were used to estimate the current situation of transmission and likely near-term impact.

82. Sensitivity analyses involve re-running models using a range of input parameters, to test how much outputs vary depending on these parameters. In some instances these can change the outputs greatly and in others less so. Models can be verified or validated by comparing with real-world data over the same time range predicted (where scenario modelling has been done).

83. Beyond the above, I'm not able to add on the mechanism and use of models as this is not a main specialty of mine. As a specialist in epidemiology, surveillance and field investigation I tend to consider current and past surveillance data and findings, and consider model outputs with caution.

84. I am able to understand the broad methods behind some of the models and also the importance of real-world data inputs which are required for both model parameters and model testing. I and colleagues were routine suppliers of COVID-19 data to modelling groups for these purposes.

85. Modelling to obtain disease parameters, for example early in the pandemic, is not a specialism of mine but I am aware of methods used to take incomplete and small early datasets and from these make estimates of parameters such as incubation period or serial interval. For example, knowing the likely distribution of a parameter, statistical methods can estimate how likely a set of real-world observations (with limitations) would be to occur.

86. Applying UK models to Wales could have increased uncertainty in the early part of the pandemic. In the H1N1 pandemic, the first wave came later in Wales than the rest of the UK. However, in COVID-19 the extent of transmission and impact on health was not greatly dissimilar to that in other parts of the UK. This would not really have had an effect on decision making around non-pharmaceutical

interventions or other major response, as absent measures in one area would contribute to cross border transmission to the adjacent area.

87. The effective reproductive number (Rt), is the number of secondary cases arising from a single primary case following influences of immunity, contacts and behaviour.

88. An Rt below 1 implies that case numbers will fall over time and Rt above 1 implies exponential increases in case numbers over time. On a simple level, Rt can be estimated from daily counts of new infections and estimates of the serial interval and its distribution, using functions in statistical packages such as R. This was the basis for the short-term Rt estimates produced by Public Health Wales. More sophisticated models could estimate Rt based on observed case numbers by checking predictions based on a particular Rt value over time against actual case numbers.

89. The uncertainty in Rt estimates was higher in Wales than England due to the lower case numbers. Larger sample sizes generally lead to lower statistical variance in an estimate. The variance would have reduced with increased testing over time. I don't recollect specific steps taken to reduce variance in Rt estimates within Public Health Wales, beyond simply maximising the data available, but I can't comment on estimates produced elsewhere.

90. I agree that models should not be relied upon to provide accurate forecasts or predictions. They are however useful to get an idea of what might occur in the future, and particularly in the near future, and to plan scenarios where there is uncertainty.

91. I note that Professor John Watkins said: "TAG policy decisions were driven by modelling scenarios, as if they were predictions, rather than rational evaluation, based on broader views, around infectious disease epidemiology, immunology, viral genetic drift etc." I would agree to some extent with Professor Watkins' statement about TAG decisions and modelling. To simplify greatly, there could be a division between those responding to modelling papers from very eminent

academic groups, with predictions about future behaviour, and others with less modelling experience but more in infectious disease surveillance and virology who took a more pragmatic approach to likely future developments and modelling predictions.

92. I note Professor Gravenors stated that the modelling results from SPI-M-O and other SAGE groups were being shared and used in Wales however, "it soon became apparent that due to natural factors such as geography and socioeconomics, and also due to different timing of responses across the devolved administrations (Das), the results obtained from 'scaling' of UK modelling output for Wales were not ideal". I agree that scaling England model results to Wales was not ideal.

The first national lockdown

93. I thought and still think that a national lockdown was necessary in March 2020. I think the national lockdown should have been implemented earlier than it was.

94. I have reflected on the likely reasons for the delay and I think the main factors are to do with a kind of UK exceptionalism; evolution of assumptions within the SAGE/SPI-M modelling group; and political reasons for resisting collective actions implemented by the government.

95. Lockdowns were being implemented in other countries including in northern Italy, in response to a severe wave of infections with deaths and hospitalisations. Even without any modelling, a pragmatic response might have been to recommend a lockdown at a similar point of the epidemic to other countries. However there seemed to be a reluctance to accept that the UK would be similarly affected to all other industrialised countries. I think I shared this view early in the pandemic when infections were increasing in China, but it was harder to believe that outcomes would be different once multiple countries had been affected, particularly in Europe.

96. My recollection (which is very much mine and based on only partial exposure to the discussion and methods involved) is that the earlier models (such as from Ferguson's group) predicted an overwhelming wave with a large number of deaths and hospitalisations and intensive care needs far beyond the UK capacity. These models also predicted that the burden would overwhelm the health service such that case fatality outcomes would be worse than in a managed situation, due to lack of oxygen, ventilators and other medical care; and also that an uncontrolled wave "overshoots" beyond the point at which transmission should stop. However, the same model implied that control measures for the first wave (such as lockdown) would reduce this impact, albeit only if very stringently applied, but that further and larger waves would follow.

97. My recollection was that there was debate as to whether lockdown measures could be applied repeatedly, and if they were, how often would they be needed and what would be the triggers. There was also a view, I believe from Scientific Pandemic Insights Group on Behaviours (SPI-B), that lockdowns would not be acceptable or adhered to, particularly if repeated.

98. This debate then moved on with the introduction of models for scenarios with repeated triggered lockdowns, that involved a series of (roughly) managed waves. These would provide population immunity for some duration, and also give time for other measures such as vaccination which was still only a theoretical possibility at that time. Riley et al **[EXHIBIT CJW42 INQ000224070]** modelled mitigation and concluded that even a successful mitigation would result in a worse result than containment, due to changes in population behaviour in response to saturation of critical care services. In my recollection, this paper contributed to moving the debate towards considering repeated attempts at suppression (getting Rt<1) using NPIs. Ferguson's group (16 March 2020) **[EXHIBIT CJW43 INQ000224071]** modelled repeated lockdowns, triggered by intensive care indicators, and concluded that this approach (repeated suppression) would be preferable to mitigation as the latter would result in an unacceptable level of deaths, hospitalisations and health service pressures.

99. My recollection is that there were scientific meetings (SPI-M/SAGE) between 10 and 13 March 2020 and that the consensus strongly shifted in favour of the need for an immediate lockdown to reduce the impact of the first wave.

100. The Government announcement on 13 March 2020 was a partial intervention but short of a full and mandated lockdown, and I recall being surprised that the scientific consensus had not resulted in a mandated lockdown.

101. I do not know what the internal discussions were within the government, but assumed that there were libertarian and economic arguments that resulted in a slower and less firm response.

102. I think it was necessary to take a 4 nations approach to the lockdown, partly because a lockdown in one area but not another would lessen the impact where measures were taken, and partly because these measures were unprecedented and needed strong political support.

103. Regarding the TAC report of 20 March 2020, I don't recall the point about the risk of exceeding NHS capacity having increased. The model predictions without or even with significant interventions were for over-topping of NHS capacity.

104. The SAGE/SPI-M discussions mentioned above included an awareness that the later the application of interventions in a wave, the lesser their effect and the larger the impact of infection, so it was likely simply a case that things would be worse the longer we waited to lock down. As above, this was an unprecedented intervention but over the previous 1-2 weeks there was increasing acceptance of the need to lock down to reduce the impact of the first wave. Also as above, the use of these measures in other countries did suggest that it might be a sensible idea.

105. I don't recall exactly what I advised during this period in early March 2020, which was extremely busy and during which I had multiple roles and duties. I do recollect an impression, as above, that a lockdown should have been

imposed on 13 March 2020 or earlier rather than the less firm announcement made by the Prime Minister, and it's likely that I shared this view with others working in PHW and Welsh government. At the time, TAC was not the only place in which these discussions occurred, and it's likely that I would have had conversations with the chief scientific officer and others during this period.

106. I do not recall perceiving any desire on the part of Welsh government to avoid a lockdown.

107. To my recollection there was no modelling in Wales during March 2020 of the effects of a lockdown, either in my department or in Welsh Government. The advice to lockdown came from SAGE/SPI-M and my recollection was that I and TAG colleagues agreed with the interpretation of the models and their implications.

108. I don't recall a recommendation for a gradualist approach to non-pharmaceutical interventions (NPIs). I can't really comment on whether there was "groupthink" within Welsh Government and advisers. At the time I felt that I had a very minor role in advising, given that there seemed to be a strong steer for all 4 nations to work in lockstep, and because I had a partial access and ability to absorb the scientific modelling papers and be involved in discussions as to the position taken.

109. As above, my recollection was that by 13 March 2020 there was a clear consensus across the scientific advisory groups to have a strict and immediate lockdown, and that this did not occur. Had the lockdown occurred sooner I think there would have been fewer hospitalisations and deaths in the first wave, due to reductions in transmission.

110. It would require further modelling (I believe there has been work on this) to estimate the overall effect over the waves up until vaccine availability. Again as above, this would have been far less effective if implemented in Wales but not England. To that extent I agree with Vaughan Gething's statement that if Wales had entered a national lockdown a week or two earlier in March 2020, "we'd have

saved more lives". My recollection even of the early COVID-19 SAGE/SPI-M papers is that they include analyses of the impacts of delaying interventions, and tended to predict a larger initial wave with more severe impacts where NPIs were delayed. [**EXHIBIT CJW31 INQ000224059 as above**]

April 2020 onwards

111. I don't recall the aims of the Welsh Government in managing the spread of COVID-19. There were strategic aims agreed in the Public Health Wales response, broadly to minimise death, disability, and serious illness by controlling transmission.

112. Regarding behavioural fatigue, as mentioned above my recollection is that there was a view (in the advisory groups) that repeated lockdowns would not be accepted by the population and this assumption influenced the types of interventions modelled, particularly in early March 2020.

113. I don't recall any advice I gave on discharging patients from hospitals to care homes in February and March 2020, nor on testing. I have subsequently worked with colleagues to address the question of transmission to care homes from these discharges, and this work has largely confirmed that transmission to care home residents is driven by their exposure to the community through staff, rather than from hospital discharges. **[EXHIBITS CJW44 INQ000224072, CJW45 INQ000224073, CJW46 INQ000224074, CJW47 INQ000224075]**

114. I don't recall being consulted in any way on the "eat out to help out" scheme.

115. I've reviewed the TAC report on "circuit breaker" indicators **[EXHIBIT CJW48 INQ000224076].** I would have been involved in supplying some of these indicators given my surveillance role, but don't recall having much input into the list of indicators. Some are likely to provide an early warning, such as some Rt estimates, community case indicators and hospital admissions. Others are likely to be lagging such as ICU admissions and deaths, and some such as occupancy are indicators of healthcare system capacity rather than early warning.

116. Regarding advice on the imposition of various NPIs, my role was mainly in providing information to make decisions rather than advising what particular interventions should be imposed.

117. I was an advocate for lockdowns when rates were rising, given my experience from March 2020. In autumn 2020 surveillance data was used to guide local and regional levels of restriction, and I was involved in explaining these data to groups advising on these. **[EXHIBIT CJW49 INQ000224077].** On the firebreak, I recall verbally advocating for a long enough period to be significant, but I was aware that there were constraints in feasibility and also that an intervention not mirrored across the border would have more limited effects.

118. Regarding schools, I thought it was important to set the risks here in context, given the relatively low severity and burden in children and the negative effects of school closures. Therefore, I and colleagues set up a school's report to monitor trends in students and staff and also to compare the risks of staff with comparable individuals in their local area. **(EXHIBITS CJW2 INQ000224040, CJW26 INQ000224050, CJW27 INQ000224051 as above)**

119. On face coverings I can recall arguing verbally (in TAG)in favour of their use, even in the absence of evidence, as I knew that there was evidence from SARS-CoV-1 that surgical face coverings had a protective effect in hospitals and also that they were likely empirically to be effective; and that a measure with low effectiveness deployed very widely can have a significant effect.

120. On border controls, my role in variant surveillance meant that I was involved in some of the reporting on travel-linked infections and it's likely that I would have presented these data with a view to showing the risks of importation.

121. On the questions about R in September 2020, I may have been asked about the effects of university student return and on modelling a firebreak. My recollection is that modelling was done between the Welsh Government and

academic team. I don't recall debate on the exact level of R – the infection data itself indicates where cases are rising and this in turn implies an R greater than 1.

122. On the Welsh Government response to TAG reports in September on the evolution of the wave at that time, I can't comment on how seriously they were taken. As above, given the experience in March 2020 my view was that earlier lockdown would reduce the impact of the wave, and that earlier and longer intervention might overall result in a shorter period of lockdown.

123. My current views on the lockdowns remains that, where necessary to reduce the impact of a wave, they should be implemented early on and be maintained until transmission has been suppressed to below one. From reviewing the case number trends against the timing of local measures, I'm confirmed in my view (likely from the 2nd half of 2020) that sub-national measures are unlikely to be effective.

Monitoring of variants

124. The variant technical group (VTG) aimed to assess the characteristics and impacts of new variants or signals identified in another group, the horizon scanning group. Broadly the discussion involved description of current epidemiology of COVID-19, then studies on the immunology, virology, and real-world epidemiology of variants with respect to immunity/vaccine effectiveness, severity and transmissibility/growth. The group also considered reports from outside the UK where similar work was done, although only a few countries had sufficiently high sequencing coverage to do these studies. The aim was to provide a risk assessment on the variants considered, which was circulated to members for comment.

a) Welsh Government members attended the VTG and will have communicated its findings. I took notes from each meeting and generally summarised the discussion, and communicated this to both Public Health Wales and Welsh Government colleagues, mainly via the chief scientific officer. On occasion I would present these notes to TAG or other groups, along with analyses from

Public Health Wales where available. **[EXHIBITS CJW50 INQ000224079, CJW51 INQ000224080, CJW52 INQ000224081]**

125. This was one area where data from Wales, at least on the presence and emergence of variants, was used at a UK level, due to the high level of sequencing coverage from Wales PCR tests, expertise and joint working with surveillance and epidemiology colleagues in Wales. In addition, Wales sequences were shared via UK and international collaborations.

126. I have set out below an overview of each of the following variants including their, assessment of severity, transmissibility, challenges and advice given to TAG and/or the Welsh Government regarding the management of each:

b) Alpha- First discussed in VTG in December 2020. Early analyses suggested that transmissibility and severity were greater than the previous virus, and that it had emerged in Kent. The pattern of PCR test results termed "S gene target failure" enabled identification of cases before sequencing was available, and I and the team ran analyses to estimate the spread of alpha in Wales during December and January 2020. This work led to me setting up the variant surveillance team, working with Tom Connor's genomics team, involving genomics, bioinformaticians and epidemiologists working to report on variants. I advised TAG and the Welsh Government using outputs from VTG and these analyses. Given my involvement I was invited to a meeting with Welsh Government to brief them on this variant in December 2020. **[as above EXHIBITS CJW50 INQ000224079, CJW51 INQ000224080, CJW52 INQ000224081)**

a) Delta- VTG analyses, and international reports, also indicated higher transmissibility and severity for this variant. There was a strong travel component, with the variant emerging in various countries outside the UK and particularly in India, and with concomitant attempts to both restrict travel and to identify imported case through testing and isolation. A particular challenge was the apparent gaps in the travel restriction system, as there were exceptions to restrictions and testing and sequencing (and communication) did not always

occur in a timely way. One example would be cases in new entrants from high prevalence countries who had travelled to the UK to study. Again, I advised TAG and the Welsh Government using VTG material and analyses done by the variant team. The team involved in international travel also had helpful reports on this and other travel-related variants. **[EXHIBITS CJW53 INQ000224082, CJW54 IN1000224083]**

c) The Omicron variant emerged in December 2021. Initial reports were from South Africa and there was uncertainty over the relative severity, with early data being insufficient to analyse this. It was clear early on that the variant was highly transmissible, and these analyses were repeated in the UK. Again I gave advice from VTG and internal reports to TAG and Welsh Government colleagues, and was also invited to a meeting involving the CMO and regarding the overall risk. My recollection at the time is that I urged caution and to strongly consider a further lockdown, given the likely very high transmissibility but uncertainty in severity. A lockdown did not occur and the resulting peak was higher than at any time previously in the pandemic, but fortunately the severity was lower than previous viruses, and this combined with a highly vaccinated population meant that the overall impact was less severe than expected. **[EXHIBITS CJW55 INQ000224084, CJW56 INQ000224085, CJW57 INQ000224086]**

127. In the main I felt that the management of variants provided some good examples of UK-wide collaboration and mobilisation of scientific expertise. The VTG was a particularly good forum, well-chaired and with a clear focus on its aims and the use of relevant scientific evidence, generated by groups attending the meeting.

128. Areas that could have been improved were in sharing of information across the UK. Sequences, particularly from travel-related cases, and information on travellers, were not always communicated in a timely or complete way. Travel data from the home office could be incomplete and of poor quality. The response to variants (operation Eagle) was very much led by PHE policy and seemed to aim to contain new variants. Given the gaps in border controls and high

transmissibility of infection, I was not convinced that this was a feasible aim and the approach in Wales was more pragmatic.

Communication of Scientific advice

129. I presume that TAG only started publishing advice in May 2020 because of the sheer volume of work and pressure on the Welsh Government team prior to this, but I don't know for certain the reasons. I think that TAG made good efforts to be transparent. The input from subgroups into TAG, and the translation of discussions in TAG to TAG advice notes was less transparent, but I recognise that advice was being interpreted in a government context.

130. In terms of technical briefings to the media, I don't recall written briefings associated with these but they were a means of explaining developments to the media. On review, I found four examples from my diary:

a) A briefing in June 2020 on the R number;
b) One on the variant situation in May 2021,
c) Another explaining the rationale behind not combining PCR and lateral flow testing reporting in January 2022.

131. Usually, the chief scientific officer attended these briefings, along with other TAG members. These were not correcting incorrect information previously given by PHW/WG, nor directly addressing misinformation, but more to explain subjects and methods in detail following a number of media queries on a specific topic.

132. Regarding boundaries between scientific advice and decision making, I would say that the analyses that I and colleagues undertook and communicated were provided to policy makers as data or evidence. In the many discussions I'm sure that I and others may have given opinions on policy recommendations following on from these analyses – for example, I think it's likely that I would have said that strict testing and contact tracing for imported variants was unlikely to succeed given the exceptions to travel restrictions. However it was clear that we

were providing data and analysis, and policy-makers had to consider this when decision making.

133. I can't comment on the overall impact of the "following the science" message. It seemed plausible at the time but in hindsight it could have had the effect described, of tying scientific analysis to specific policy decisions.

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: 17 August 2023