**Witness Name: Neil Ferguson**

**Statement No. :3**

**Exhibits: NF3/01-NF3/02**

**Dated:28/8/2023**

# UK COVID-19 INQUIRY

# MODULE 2

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## THIRD WITNESS STATEMENT OF PROFESSOR NEIL FERGUSON

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1. I, Professor Neil Ferguson, Imperial College London, Exhibition Rd, South Kensington, London SW7 2BX, will say as follows:

2. This is my third statement to the Inquiry in relation to Module 2. The Inquiry have addressed a number of questions to me, building upon the evidence I provided in my first statement. Given the length and detail of my initial statement I will simply set out the questions and then provide my response. When considering these replies it will be important to note the wider background and details in my first statement.

3. The Inquiry asked me to provide details of discussions I had with Steven Riley regarding the likely impact of Chinese containment measures introduced on January 23rd 2020. Although I don't recall the precise wording of conversations on that topic, it was an issue that was discussed on a number of occasions in internal group meetings of the MRC Centre at Imperial which both Steven and I intended. I summarised how my assessment of the measures adopted by China evolved in para 173 of my first module 2 statement. To quote that paragraph: "*Given the relatively high estimates of R0 and the limited data available, I initially had some scepticism that the measures adopted in China from 23rd January would actually manage to reduce infectious contact rates sufficiently to drive R to below 1. However, by the third week of February, the trends in the Chinese case data (both nationally and at province level) were sufficiently clear that I was persuaded that intensive NPIs were*

*able to achieve suppression of COVID-19 transmission. I was convinced of the feasibility of implementing such measures in a UK context after they were adopted in Northern Italy in late February*."

4. From memory, I believe that Steven Riley was more rapidly persuaded that the measures in China were working to reduce R to below 1 than I was. Such a diversity of interpretations was not unusual among MRC Centre staff working on the pandemic, and I don't believe it led to major differences in approach in late January or early February. For example, I agreed with Steven (on 8th February) that we should undertake modelling of intervention options which made the assumption that Chinese policies would be successful in reducing R to below 1, even though I was not fully convinced from the data available then that we could be sure they would. I cannot precisely date when I became convinced Chinese policies were working, but I am on record in a SPI-M-O initiated email exchange of 24-25 February 2020 as stating that R was below 1 across China. That date was also when we first submitted our first modelling of NPIs to SPI-M-O (discussed at SAGE on 25th February), which included policy options with intensive enough non-pharmaceutical interventions (NPIs) to drive R to below 1 (what we would later term suppression policies).

5. I am asked by the Inquiry for elaboration of my views on the report by Steven Riley titled "*Benefits of managed acquisition of herd immunity for national COVID-19 epidemics rely on the absence of additional reactive social distancing when critical care facilities saturate*" which was considered at the SPI-M-O meeting of 11th March 2020 and the 16th March 2020 SAGE meeting. I would additionally refer the Inquiry to paragraphs 207-210 of my first module 2 statement for a discussion of that report.

6. Steven sent me the first version of his report, entitled, "*The potential benefits of ongoing containment as a UK policy objective for the 2020 COVID-19 outbreak*" on March 1st. This version presented three scenarios, namely: A. a "reasonable worst case" where no interventions were taken, resulting in 464,000 deaths in the UK; B. a "Reasonable non-directed response" scenario (effectively a mitigation option which assumed a 25% reduction in R due to a mixture of spontaneous behaviour change and some use of NPIs) which resulted in 339,000 deaths, and a "successful immediate ongoing containment option" which resulted in 148 deaths. The modelling assumed an $R_0$ value of 2.1 and a 1% infection fatality ratio (IFR).

7. Given Sunday 1st March was the day I and other Imperial and LSHTM staff met senior NHS staff and clinicians to finalise "reasonable worst case" hospitalisation estimates (see paragraphs 141-142 of my first module 2 statement), I only sent initial

feedback to Steven at 8.11pm that evening. I stated that I felt policymakers were aware (from reports from China and Singapore and from modelling) that intensive use of NPIs might bring R below 1 (*i.e.* achieve suppression), but that I felt there was little appetite at that time for the social and economic upheaval that such policies would entail. The latter view was a subjective impression gained from interactions in and around SAGE up to that time (*i.e.* February 2020), but one which I feel was validated two days later with the publication of the Government's Coronavirus Action Plan (**NF3/01 - INQ000263373** – see paragraphs 166-7, 200, 265 and 437 of my first module 2 statement). However, I commented that I thought there was an increasing realisation that multiple NPIs would be needed. More generally, I expressed the view that I did not feel it was our role on SPI-M-O or SAGE to argue for one policy (it was clear from our group meetings that he wanted to do so, and I felt his paper reflected that view), so that him publishing his paper as an opinion piece might be a better option. I also noted that we had many other urgent priorities I'd appreciate his assistance with. I asked him to help coordinate the development of the real-time model staff of the MRC Centre were working on, which we both accepted we would need to track the epidemic in the coming months. I also commented that it was also a priority for us to finalise the severity analysis we were then working on (which had been a key topic in the meeting earlier that day) and to publish the modelling of intervention options we had already been undertaking for SPI-M-O/SAGE. In the latter context, I agreed that we would include longer-term containment/suppression options in that collective report. I note that Report 9 (on which Steven was an author) included three policy options similar to those in his March 1st paper, albeit with detailed modelling of healthcare demand, more granularity as to exactly what NPIs might achieve mitigation versus suppression, and discussion of how long-term suppression might be achieved through pulsing of policies.

8. Steven then sent me an updated version of his report on 7th March 2020, now with the new title "*Benefits of managed acquisition of herd immunity for national COVID-19 epidemics rely on the absence of additional reactive social distancing when critical care facilities saturate*". This now had a slightly different emphasis – arguing that mitigation policies would fail if the population spontaneously reduced contact rates once the health system exceeding capacity – and presented 4 scenarios: A. "Completed unmitigated", resulting in 531 thousand deaths in the UK over 18 months (though that draft quoted figures per 10 million people); B. "Successful optimal managed herd immunity", resulting in 347 thousand deaths; C.

"Attempted optimal herd immunity with behaviour change" which resulted in 82 thousand deaths (but very little population immunity at the end of 18 months); and D. "Ongoing control" (i.e. suppression) which resulted in 2.3 thousand deaths.

9. After consulting senior colleagues within the Imperial team, on 8th March I responded to Steven saying that I felt that scenarios C and D were highly speculative: C, for the reasons outlined in paragraph 209 of my first module 2 statement, and D because his report did not explain how R could be kept below 1 for 18 months in the UK context, except in saying "*… although a complete shutdown of activity is sufficient, it may not be necessary to achieve ongoing control of COVID-19, as indicated by recent data from China and reports of innovative public health processes*". I said that I worried that scenarios C and D were akin to the use of modelling as a rhetorical tool, with assumptions selected to favour a particular desired outcome, and commented that I could pick another set of assumptions for D in which containment gradually failed, at a huge health system cost. Indeed, in retrospect such a scenario might have looked a little like what happened in the UK in the autumn and winter of 2020 (see paragraph 17 below). However, since I knew Steve felt strongly that the UK should adopt a containment strategy and was therefore anxious to get his report out, I again said he should submit it as a personal opinion piece if he wished. I did not feel it met the criteria to be an MRC Centre report, given that Centre reports represented consensus descriptions of collaborative research by our team.

10. Suggesting Steven publish his paper as a commentary or opinion piece was not without precedent within the MRC Centre; on 9th March, the Lancet published a commentary by my senior colleague Sir Roy Anderson "How will country-based mitigation measures influence the course of the COVID-19 epidemic?" (**NF3/02 - INQ000252813**). I thought that this paper (which I was not involved in writing, but which Roy had shared with me a few days earlier) was an excellent and balanced summary of the scientific and policy challenges posed by the pandemic. It also included some scenario modelling of mitigation versus suppression policies. I would highlight one statement in that paper: *"A key issue for epidemiologists is helping policy makers decide the main objectives of mitigation—eg, minimising morbidity and associated mortality, avoiding an epidemic peak that overwhelms health-care services, keeping the effects on the economy within manageable levels, and flattening the epidemic curve to wait for vaccine development and manufacture on scale and antiviral drug therapies. Such mitigation objectives are difficult to achieve by the same interventions, so choices must be made about priorities.*".

11. In the context of that quote, a challenge for SPI-M-O and SAGE throughout 2020, though particularly between January and March, was that government objectives were unclear. If minimising the duration of the epidemic and the period NPIs were in force was the top priority, mitigation ("flattening the curve") was the preferred option, if technically, economically and politically feasible and providing the resulting immunity would provide a high level of protection until vaccines were available. If minimising mortality was the top priority, then Steven Riley's preferred option of early long-term suppression was the policy option most likely to achieve that objective, again if technically, economically and politically feasible. If the priority objective was to prevent the NHS from being overwhelmed while minimising the duration and economic impact of interventions, our estimates of the IFR and likely hospital demand again pointed to some form of (perhaps pulsed) suppression policy being necessary. However, preventing the NHS from being overwhelmed only became apparent (to me at least) as a clear government red line from 13th March onwards. I would also note that while that red line remained throughout the pandemic, government policy for the autumn of 2020 was far from optimal for minimising either the eventual duration of NPIs, economic impact or mortality, being more akin to a policy of acting as incrementally and as late as possible while preventing NHS capacity being exceeded. More generally, in the absence of clearly defined policy objectives, it was perhaps inevitable that scientific advisors sometimes implicitly imposed (consciously or unconsciously) their own view of what objectives should be prioritised in their discussions of policy options.

12. Steven Riley submitted the final version of his paper (which I did not see in advance) to SPI-M-O on March 10th, in an email to the secretariat and a large number of SPI-M-O members, including me, John Edmunds and Graham Medley. Following standard procedure, the paper was discussed within SPI-M-O and then included in documents for the March 16th SAGE meeting. The 10th March paper retained the title of the 7th March version, but expanded the number of scenarios and gave much higher projections of deaths. Six scenarios were presented: UE "Completely unmitigated epidemic", resulting in 2.65 million deaths (3.9% of the population) in the UK; SM "Successful mitigation", resulting in 1.74 million deaths (2.6% of the population); SC "Successful ongoing control" (i.e. suppression) resulting in 2,670 deaths; UM "Baseline unsuccessful mitigation", resulting in 446 thousand deaths (0.67% of the population); UMs1 "Sensitivity 1 unsuccessful mitigation", resulting in 807 thousand deaths (1.2% of the population); and UMs2 "Sensitivity 2 unsuccessful mitigation", resulting in 834 thousand deaths (1.3% of the population). The reason

that the numbers of deaths increased so much compared with his previous draft was that Steven assumed that the IFR would increase from 1% to 5% if demand for hospital beds exceeded supply. In addition, the UM scenarios differed importantly from the previous draft in terms of the mechanism proposed for failure of mitigation (though not in how they were modelled, I believe). In the 7th March draft, spontaneous behaviour change was suggested as the mechanism, while in the final report, enforced geographical quarantine in areas where critical care capacity was exceeded was proposed, though behaviour change was still mentioned. I felt this latter change was a more plausible mechanism, as I also had significant concerns at that time that policymakers had not truly accepted or grasped the consequences of implementing a mitigation policy (see paragraphs 202 and 206 of my first module 2 statement) for NHS demand.

13. However, I continued to have concerns about the speculative nature of some of the modelling assumptions made in Steven's report. As I comment in paragraphs 208 and 209 of my first module 2 statement, while retrospective data now shows evidence from multiple countries of IFR increasing in periods of high case incidence (including instances where healthcare capacity was completely overwhelmed), this was not at the level assumed by Steven's final report; the country with the highest excess mortality in the first two years of the pandemic was Bulgaria, at approximately 1% of the population (over several waves caused by multiple variants). In addition, while there is now (again in retrospect) some evidence of spontaneous behaviour change reducing transmission at times of high incidence in some populations, I'm not aware of any country which saw a pattern of incidence akin to Steven's scenario C of the 7th March draft, at least prior to the roll-out of vaccination.

14. The Inquiry asked me to comment on an email exchange between SPI-M-O members on 10th March in which I stated:

*"I think the key issues right now are (a) ensuring policy makers really understand what even successful mitigation would look like (in terms of mortality and health system impact), and (b) giving a fairly hard-nosed evaluation of the feasibility of achieving containment for 12+ months without completely locking down society (with the social and economic (and likely health) impacts that would entail.*

*I do feel strongly that we should focus on providing an evidence based assessment of what the policy choices are and their likely impacts, rather than advocate for a particular policy. At least in our role on SPI-M.*

*That is said from a perspective that I personally don't see any easy decisions here. Whatever policy choices are made, the next few months will see profound impacts on the UK.*"

15. Steven initially disagreed that it was necessarily our role as scientific advisors to say how containment could be made to work, on the basis that government could be expected to devote huge resources to innovating to make such a policy work. My argument was that for government to accept suppression as a viable long-term policy option, we had to propose policy measures which looked plausible in at least the medium term (something I think both Imperial and LSHTM did in the next few days). Speaking frankly, both Steven and I were exhausted at the time of that exchange (many of the team, including me, were working 18+ hour 7-day weeks), and so there were misunderstandings on both sides. By 12th March, my memory is that we were much more aligned, albeit not completely so; Steven still felt strongly we should more actively advocate for containment/suppression than I felt comfortable doing as a participant on SAGE (though see paragraph 18 below).

16. I also note that there was considerable email discussion between SPI-M-O members (including SPI-M-O and SAGE secretariats) between 10th and 13th March on the topic of mitigation versus suppression strategies, which included the drafting of a one-page summary statement "Mitigation vs Prevention" which I felt gave a balanced view of the benefits and risks of both approaches. I'm not sure what happened to that document, but the points it made were discussed at the SAGE meeting on 13th March 2020.

17. A key factor accelerating discussion of policy options from the week beginning 9th March was the increasing realisation that UK surveillance had been detecting an even smaller fraction of cases in the country than had been anticipated. I refer the Inquiry to section H of my first module 2 statement, paragraphs 236-265 in particular.

18. This realisation, together with the broader discussion of mitigation vs suppression among SPI-M-O members, including Steven, occurring between September 10th and 12th substantially shaped the SAGE meeting of 13th March. In addition, that SAGE meeting was the first where there was a frank admission by senior NHSE staff present that the NHS would be overwhelmed many times over under any of the mitigation options previously discussed. I refer the Inquiry to paragraphs 210-212 of my first module 2 statement for further details on that SAGE meeting.

**19.** In retrospect, I feel aspects of both Steven and my concerns around the challenges of successfully implementing mitigation or long-term suppression unfortunately

proved to be somewhat prescient. The move to a what was effectively a suppression policy after 13th March onwards in large part appeared to be driven by final acceptance within government that mitigation would lead to healthcare demand far in excess of NHS capacity and an apparent decision within government that the NHS being overwhelmed was an unacceptable outcome. Thankfully this occurred a little before the NHS was actually overwhelmed – the "Unsuccessful Mitigation" scenario Steven's 10th March report warned of. However, from August 2020 onwards, even with government innovation of the type Steven anticipated (*e.g.* test and trace, tiers), it proved impossible to maintain continued suppression without resorting to another imposition of lockdown level NPIs. This, combined with delays in then reintroducing sufficiently effective NPIs to drive R to below 1, meant that by October, England was entering a situation I would describe as a hybrid between failed suppression (my concern when I talked about a "hard nosed evaluation") and Steven's "Unsuccessful Mitigation" scenario (*i.e.* only acting when healthcare demand was already very high). Indeed, the UK experience in the autumn and winter of 2020 to an extent reflected Chris Whitty's very early concern (see paragraph 182 of my first module 2 statement) around suppression measures pushing infections in the autumn. As I stated in my first module 2 statement (paragraph 306) over two thirds of UK COVID-19 deaths prior to April 2021 occurred *after* 1st September 2020 (and 75% of all deaths in the first two years). Indeed, this fact is why I strongly feel that the Inquiry should examine the events in the summer and autumn of 2020 in at least as much detail as those in January-March 2020.

**20.** Partial or complete failure of suppression policies in the autumn of 2020 was by no means unique to the UK; only a handful of European countries (*e.g.* Denmark, Finland and Norway) achieved what I would characterise as successful containment/suppression – *i.e.* consistently maintaining low infection levels across the first 18 months of the pandemic. Conversely, a number of European countries experienced second and third waves of transmission between October 2020 and April 2021 which resulted in substantially higher excess per-capita mortality than seen in the UK. Outside Europe, suppression/containment proved hard to sustain in much of the Americas (Canada being a notable exception) and in Africa. The picture in Asia was more mixed, with China, Japan, South Korea, Vietnam, Thailand, Malaysia and Singapore standing out as countries which maintained low infection levels and mortality through to at least September 2021, while others (*e.g.* India, Pakistan and Bangladesh) found maintaining suppression more difficult after about

August 2020. I note this in the context of my belief in March 2020 (see paragraph 12) that there were no easy decisions to be made at that time.

**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**: 28th August 2023