

Thursday, 19 October 2023

1  
2 (10.00 am)  
3 **LADY HALLETT:** Ms Cecil.  
4 **MS CECIL:** Thank you, my Lady. Indeed. May I call  
5 Professor Catherine Noakes.  
6 **PROFESSOR CATHERINE NOAKES (affirmed)**  
7 **Questions from COUNSEL TO THE INQUIRY**  
8 **MS CECIL:** Thank you, Professor Noakes.  
9 As you will see, we've got a stenographer in the  
10 hearing room, and so if we can keep our answers at  
11 a reasonable pace, and if we're going too fast it will  
12 be my fault, and I'll ask you just to slow down, and if  
13 you can keep your voice up so that everybody can hear.  
14 Professor Noakes, you very helpfully prepared  
15 a witness statement for the Inquiry. That's dated  
16 20 July of 2023, and it's just been brought up at  
17 INQ000236261. It runs from page 1 through to page 89.  
18 It's a substantial piece of work, and it's accompanied  
19 by a declaration of truth. Is that right?  
20 **A.** That's correct.  
21 **Q.** You will appreciate that we have a limited amount of  
22 time, sadly, to go through some of your evidence. As we  
23 do with all witnesses, we simply won't be able to go  
24 through every aspect of your witness statement but what  
25 I do hope to do today is to pull out the most pertinent

1

1 So on 7 April of 2020, you were contacted by SAGE;  
2 is that right?  
3 **A.** That's correct, yes.  
4 **Q.** What were you asked to do?  
5 **A.** So I was asked initially to provide a paper that gave  
6 some information on the environmental routes of  
7 transmission and the current knowledge at that time, and  
8 then I was also -- it was indicated to me at that time  
9 that they were interested in setting up a subgroup and  
10 I might be asked to lead that subgroup.  
11 **Q.** Indeed. So you prepared that paper with the assistance  
12 of your colleagues at that point, because of the urgency  
13 and the proximity --  
14 **A.** Yes, that's correct.  
15 **Q.** -- of the next SAGE meeting, where it was to be  
16 presented, and indeed you attended that subsequent SAGE  
17 meeting on 14 April --  
18 **A.** Yes.  
19 **Q.** -- 2020? It was at that point that you were asked to  
20 set up what subsequently became the Environment  
21 Modelling Group; is that right?  
22 **A.** That's correct, yes.  
23 **Q.** That's typically known by an acronym, we have many  
24 acronyms here, but EMG?  
25 **A.** EMG, that's correct.

3

1 aspects as we see them within Module 2.  
2 So what I propose to do is to take you through your  
3 involvement in both SAGE, some of the working groups  
4 that were set up, and then specifically to deal with  
5 your expertise in the areas of transmission in terms of  
6 the virus.  
7 If I can just set the background for that, you are  
8 a professor of environmental engineering in the School  
9 of Civil Engineering at the University of Leeds?  
10 **A.** Yes, I'm actually environmental engineering for  
11 buildings.  
12 **Q.** For buildings, thank you.  
13 Your background is as a chartered mechanical  
14 engineer; is that right?  
15 **A.** That's correct.  
16 **Q.** In fluid dynamics --  
17 **A.** Yes.  
18 **Q.** -- as a specialism.  
19 You were a participant in SAGE, but your involvement  
20 went much further than that, and you were subsequently  
21 made the co-chair of a newly-formed group; is that  
22 right?  
23 **A.** Yes, that's correct.  
24 **Q.** I just want to go through how that came about, very  
25 briefly.

2

1 **Q.** With regard to SAGE, you continued to attend meetings,  
2 and I think you attended a total of 71 --  
3 **A.** Yes, I did.  
4 **Q.** -- meetings in the period that you were a member, and  
5 indeed, as we've already alluded to, you became  
6 the chair of EMG?  
7 **A.** Yes.  
8 **Q.** Now, just dealing with the remit of EMG, in a nutshell,  
9 how would you describe it?  
10 **A.** So I would describe it as we focused on how the virus  
11 transmits from person to person and the role that  
12 the environment plays in that, and then we also focused  
13 on the mitigations we could apply. But we focused more  
14 on the local mitigations, things like face masks,  
15 distancing, ventilation, hand hygiene, rather than  
16 the big ticket items like lockdowns or work from home.  
17 **Q.** Indeed. I'm going to come on and ask you about those,  
18 firstly about methods of transmission and then secondly  
19 about mitigations and how they interrelate, but before  
20 I do that, very briefly, EMG was a new group?  
21 **A.** Yes, it was.  
22 **Q.** So it didn't exist pre-pandemic and indeed it no longer  
23 exists; is that right?  
24 **A.** That's correct, yes. So we were asked to form this  
25 group and had to find a bunch of experts to create that

4

1 group in under a week.

2 **Q.** Indeed, and you set out in detail within your  
3 statement -- I'm not going to take you there or go  
4 through it now -- the challenges that you faced in  
5 setting up a group and the implications that had for  
6 diversity, and those mirror themes that we have already  
7 heard from other witnesses and that's why I won't go  
8 through those in detail now.

9 **A.** Yes.

10 **Q.** Dealing with the demand for your group's expertise, that  
11 was predominantly, it's fair to say, at the outset of  
12 the pandemic and through to the end of 2020; is that  
13 right?

14 **A.** That's correct, yes.

15 **Q.** What was the position in 2021? How did that differ?

16 **A.** So by 2021 I think we had a lot more of the baseline  
17 knowledge around transmission and it was therefore much  
18 more around application, and I think some of the work we  
19 did in 2021 sort of fed in to the ways in which we could  
20 release from the winter lockdown and to safely manage  
21 that. We did also consider, when new variants came  
22 along, what the implications of that might be for  
23 whether routes of transmission changed or became more  
24 prominent.

25 **Q.** Indeed, thank you. I think you describe it in your

5

1 focus on evidence on peer-reviewed scientific evidence,  
2 you know, the scientific evidence that was in preprints,  
3 and information from reputable laboratories, national  
4 laboratories, et cetera, rather than companies who were  
5 trying to sell products.

6 **Q.** The difficulty there was, of course, they had been  
7 copied in to the email chain, and so that took up some  
8 of your time, it's fair to say, in dealing with those  
9 requests and continued requests?

10 **A.** It did indeed, and it meant we had to put information  
11 into a paper that we wouldn't ordinarily have done so,  
12 and respond to those requests. And I think it's worth  
13 saying that triethylene glycol was never really going to  
14 be considered as a viable option, because the idea of  
15 putting something into the air to try to clean the air  
16 but you're putting a chemical into the air, you're just  
17 creating a new contaminant.

18 **Q.** Thank you.

19 Now, as the pandemic progressed, a number of  
20 subgroups were set up under the auspices of both EMG,  
21 and indeed you participated in a broader range of  
22 subgroups in relation to other SAGE mechanisms; is that  
23 right?

24 **A.** Yes, that's correct.

25 **Q.** I'll just run through those very quickly with you: the

7

1 statement, it's at paragraph 5.43 for those following,  
2 as a "limbo" period, in short, 2021, before then coming  
3 back in to looking at the roadmap out of lockdown?

4 **A.** Yes, I would agree with that. There was a period where  
5 we weren't -- we still had a few commissions but it was  
6 much slower and we were not quite sure how much longer  
7 we would remain as a group.

8 **Q.** Thank you. I want to just touch upon one challenge that  
9 you faced within the EMG in relation to commissioning,  
10 and a very specific point, if I may.

11 In the earlier stages of the pandemic, you received  
12 a question about the application of triethylene glycol,  
13 I hope I pronounced that correctly, as a method of  
14 mitigating airborne transmission. How did that come  
15 about?

16 **A.** Yeah, so that particular one came about not as  
17 a commission to EMG but actually as a question from  
18 an adviser in Number 10, I believe that's correct, and  
19 it therefore came as an email, and one of the challenges  
20 with that one was that that came with some external  
21 people tagged in to that email who then said, "Well, we  
22 have this technology, would you like to sign  
23 a non-disclosure agreement", to which I said no.

24 **Q.** Why was that in relation to a non-disclosure agreement?

25 **A.** Because I felt, as a co-chair of EMG, that we should

6

1 Hospital Onset Covid Working Group, Social Care Working  
2 Group, a number of task and finish groups, you were also  
3 spent at some SPI-B meetings, and indeed also GO-Science  
4 and co-ordination meetings; is that right?

5 **A.** Yes, that's correct, and I went to the majority of those  
6 because I had very specific expertise around  
7 transmission and the engineering knowledge that was  
8 perhaps not present in those other groups.

9 **Q.** We also see within EMG quite a broad range of other  
10 individuals from different SAGE groups and, indeed,  
11 non-SAGE groups such as NERVTAG, in attendance?

12 **A.** Yes, and when we set it up we deliberately co-opted  
13 people from those other subgroups so we could retain --  
14 make sure we kept those connections across the different  
15 subgroups.

16 **Q.** Indeed, thank you.

17 What I want to go to next, if I may, is the issue of  
18 transmission and how the scientific evidence and  
19 understanding evolved over the period of the pandemic.  
20 To do so, may I just firstly deal with the various  
21 routes of transmission. We see that there is fomite  
22 transmission, airborne transmission, sometimes known as  
23 aerosol transmission, and droplet transmission.

24 Now, for the assistance of all of us, if I can just  
25 run you through what each of those actually means. So

8

1 fomite?

2 **A.** Okay, so fomite transmission refers to -- a fomite is  
3 an object, so it refers to transmission that would  
4 happen if, say, a surface or an object was contaminated,  
5 somebody touched that object with their hand and then  
6 they subsequently touched their mucus membrane, so their  
7 eyes, nose or mouth.

8 **Q.** Okay. And airborne?

9 **A.** So airborne transmission, or, as you said, aerosol,  
10 refers to when there are very small particles containing  
11 the virus, these get emitted when we -- through our  
12 respiratory activities, and these are the particles that  
13 can remain in the air and travel over some distance.

14 Often "airborne" is used to describe longer-range  
15 transmission, so to the other side of a room, but  
16 actually it also happens when you're close to somebody,  
17 because those small aerosols are also present at close  
18 range, they don't just sort of magically get to the far  
19 distance.

20 **Q.** So effectively small droplets don't -- things don't get  
21 smaller as they go further away, necessarily --

22 **A.** They do a little bit but that -- they evaporate. But  
23 that evaporation happens really very quickly, happens in  
24 less than a second.

25 **Q.** Thank you.

9

1 make a difference if you're trying to combat droplet  
2 transmission?

3 **A.** So in some senses perhaps you don't, but actually where  
4 it becomes an issue is the sizes of these particles,  
5 because if you believe everything that happens when  
6 you're close to somebody is droplets, then, for example,  
7 you won't take precautions that require masks that will  
8 filter out the aerosols. So if people are just wearing  
9 a simple face mask or a face shield, which may deal with  
10 splashes and very large droplets, those won't filter out  
11 the small aerosols that are quite likely to also be  
12 present at close range.

13 **LADY HALLETT:** I follow, thank you.

14 **MS CECIL:** So the implications essentially for infection  
15 control therefore go to barriers or things that you can  
16 put in place to mitigate aerosols alongside droplets?

17 **A.** Yes, so you need to think about both of them, at both  
18 short distance and longer distances.

19 **Q.** Okay. In terms of understanding the transmission of  
20 Covid-19, what was the initial understanding at  
21 the outset of the pandemic in relation to the nature of  
22 the transmission?

23 **A.** So I think as a new disease it's quite hard to -- it was  
24 quite hard to have any good evidence. We were very much  
25 reliant on very early information coming out and papers

11

1 Then droplet?

2 **A.** So droplet transmission is -- this is a slightly more  
3 tricky one, because it tends -- most people think of it  
4 as it refers to large droplets, almost like the spit  
5 droplets, that then behave like a ball, ballistically,  
6 and deposit out on surfaces very close by. Now, in  
7 traditional sort of infection control in healthcare,  
8 droplets are defined as particles that are above  
9 5 microns in diameter, and that's not correct, because  
10 a 5-micron diameter -- well, a 10-micron diameter  
11 particle can stay in the air and go to the other side of  
12 the room. So there are actually some incorrect  
13 definitions used to define the difference between  
14 droplets and aerosols that are used very commonly in  
15 infection control literature.

16 **Q.** So it's not an easy distinction, necessarily, to make,  
17 owing to those differences in interpretation?

18 **A.** Correct, it's not an easy distinction to make, and  
19 there's no sort of single cut-off between a droplet and  
20 an aerosol, we actually all breathe out all of  
21 the different sizes of particles. It's not a sort of --  
22 there's no single -- not a cut-off you can put in there.

23 **LADY HALLETT:** Does it make a difference -- do you need to  
24 distinguish between them? Or if you're trying to combat  
25 them, supposing you have aerosol transmission, does it

10

1 that were starting to come out from -- initially from  
2 China and then from other countries as that data grew.  
3 It was fairly clear from early stages that there was --  
4 it was transmitted through a respiratory route, but  
5 an awful lot of the focus to start with was on droplets  
6 and washing your hands and surfaces, the fomites, rather  
7 than aerosols.

8 **Q.** Thank you.

9 Were you concerned that the airborne transmission  
10 routes in terms of aerosols were being overlooked to  
11 some extent?

12 **A.** Yes, I was.

13 **Q.** How did knowledge develop in the initial period of  
14 the pandemic, from April, in your involvement onwards?

15 **A.** So in the initial period of the pandemic, we drew on  
16 evidence from previous respiratory diseases, including  
17 influenza, and other coronaviruses, things like SARS.  
18 We drew on our understanding of the basic physics of how  
19 aerosols behave and our understanding of how viruses can  
20 be carried in those, so there is some science in there.

21 Then, as the evidence progressed, we -- we could see  
22 signals in epidemiological data that allowed sort of  
23 more understanding of transmission. So we started to  
24 see really quite early on that the vast majority of  
25 transmission happened indoors rather than outdoors,

12

1 which starts to give you an indication that  
2 the environment matters and that how people interact  
3 together matters.

4 You also, I think --

5 **LADY HALLETT:** You couldn't just slow down, could you?

6 **A.** Apologies.

7 **LADY HALLETT:** I'm conscious there is -- it's not me, I can  
8 keep up, but I'm not making a full note, unlike our  
9 stenographer.

10 **A.** Apologies. I think that --

11 **LADY HALLETT:** Sorry, I interrupted you.

12 **A.** It's also --

13 **LADY HALLETT:** Environment matters and how people interact  
14 together matters.

15 **A.** Yes. It was also apparent that a lot of transmission  
16 happened when people were in fairly close proximity.  
17 The other thing that we started to see in perhaps  
18 February and into March 2020 was there were what we  
19 might term "superspreading events", so where you have  
20 a large number of people infected in a short period of  
21 time, associated with a single event, and that perhaps  
22 is a bit of a red flag for airborne transmission.

23 **MS CECIL:** Thank you.

24 Just in terms of those superspreader events, can you  
25 give any examples of those?

13

1 prior to the pandemic.

2 **Q.** Indeed, you and those individuals signed a petition that  
3 was then sent to the World Health Organisation very  
4 quickly thereafter, on 2 April --

5 **A.** Yes.

6 **Q.** -- 2020. If you forgive me just for summarising, you  
7 followed that up with a letter when it was --  
8 effectively fell on deaf ears, initially; is that right?

9 **A.** Yes, that's correct.

10 **Q.** And, following on from that, articles. And as you  
11 explain at paragraph 10.8, that prompted both media  
12 attention and started to change the discussion that took  
13 place around airborne transmission; is that right?

14 **A.** Yes, that's correct.

15 **Q.** Why do you think there was a reluctance to acknowledge  
16 the potential for airborne transmission?

17 **A.** So it is hard to be sure, but my personal opinions are  
18 there may be a number of reasons. So I think it's --  
19 there's something about changing an accepted paradigm,  
20 if -- you know, traditionally respiratory diseases have  
21 often been categorised as droplet, and to change what  
22 people's accepted views are is -- can be difficult,  
23 especially if they feel that that challenge is coming  
24 from a different -- different field, a different area,  
25 aspect of it.

15

1 **A.** So there was -- there were a number that were reported  
2 in the -- early on, but there was a restaurant in  
3 Guangzhou in China where there were people who were  
4 infected who were more than 2 metres apart. There was  
5 a -- quite a famous one called the Skajit Chorale  
6 Society, which was a choir in America, and again it was  
7 a very high number of people, I think it was 87% of  
8 the people there were infected in a single two-hour  
9 activity.

10 **Q.** Thank you. And as you say, that causes a number of red  
11 flags to go up in terms of looking at transmission  
12 routes, but can I just ask you a little bit about  
13 the more global picture and the understanding by other  
14 organisations.

15 On 29 March of 2020 the World Health Organisation  
16 published a tweet stating that Covid-19 was not  
17 airborne. Did that cause concern?

18 **A.** I think it did. I was concerned by it, and I'm aware  
19 that other people were concerned by that as well.

20 **Q.** Indeed, in your statement, you explain that that  
21 prompted the formation of a group that came to be known  
22 as Group 36, and that's 36 experts in transmission,  
23 essentially?

24 **A.** Yes, so these were 36 scientists from all around  
25 the world who had expertise and had worked in this area

14

1 I think mitigating airborne transmission is more  
2 challenging, because it involves dealing with the  
3 environment, every environment's different, and it's not  
4 as easy to put a simple rule like washing your hands.

5 It also takes the responsibility from the individual  
6 to the organisation, because it's the organisation that  
7 tends to deal with the environment whereas it's the  
8 individual who perhaps washes their hands.

9 And I think I note in my statement as well that it's  
10 possible there may be a fear aspect to it, and you can  
11 see this in movies and things where it goes airborne, it  
12 promotes a fear. Now, I don't know whether that really  
13 was the case, did happen, but I think that may possibly  
14 play into it as well.

15 **Q.** You also touch upon implications for hospital infection  
16 control. What implications would those be?

17 **A.** Yes, so in hospital infection control, you know -- which  
18 is a very good field and there are a lot of really  
19 expert people who do hospital infection control, but  
20 conventionally if something is deemed droplet  
21 transmission, then you have relatively simple  
22 precautions: you perhaps put somebody in a side room,  
23 you maintain a distance, and you would wear relatively  
24 straightforward PPE, a simple surgical mask, maybe  
25 a visor.

16

1 If something is deemed airborne, then, providing  
2 you've got the capacity to do it, ideally you put that  
3 person into a negative pressure isolation room and you  
4 wear full respiratory protective equipment to manage  
5 that person.

6 **Q.** Certainly at the very outset of the pandemic, we'll all  
7 recall those images of people in --

8 **A.** Yeah.

9 **Q.** -- those sorts of mitigating outfits and so on.

10 In terms of EMG, it was obviously not established  
11 until April 2020, but in your view, was there  
12 an evidence base sufficient to operate on  
13 the precautionary principle through January through to  
14 March of 2020?

15 **A.** I think there was, and I believe that, prior to my  
16 involvement in SAGE, that NERVTAG had indicated the  
17 potential for airborne transmission.

18 **Q.** To your knowledge were there any reasons not to take  
19 steps to guard against airborne transmission?

20 **A.** I don't see that there were, no. I think there was --  
21 although the evidence at the outset was weak, in truth  
22 it was weak for all transmission routes. I think there  
23 was just a tendency to assume the other transmission  
24 routes, and then require the evidence for airborne  
25 transmission. So I think from a precautionary basis, it

17

1 I'm concerned that this information, that we --  
2 you know, the evidence base that we've been collecting  
3 and discussing and agreeing is not feeding in to this  
4 guidelines.

5 **Q.** Did you get a positive response?

6 **A.** So in one sense, yes: I believe Chris Whitty sent the  
7 emails on to Public Health England, they actually  
8 responded very quickly, they changed the information on  
9 their website, and indeed they -- in the process of  
10 doing that, they shared it with me, and we -- I helped  
11 them put some forms of words together to describe what  
12 we knew about transmission.

13 The NHS, on the other hand, nothing changed, and  
14 I believe I raised it in February, and then again at  
15 a SAGE meeting in June 2021, and finally, a few weeks  
16 after that, their webpages were changed.

17 **Q.** So quite some time later?

18 **A.** Quite some time later, yes.

19 **Q.** Now, you describe that period of autumn of 2020 as being  
20 the most frustrating period and -- for you, during the  
21 pandemic. Why was that?

22 **A.** I think it was because we could see cases were rising.  
23 We could see there was a desire to try to get back to  
24 normal, which is understandable, we can't stay in  
25 a lockdown forever, and that's totally inappropriate.

19

1 would have been appropriate to indicate that aspects  
2 like ventilation mattered, early on, and as that  
3 evidence base built, it was important that that -- those  
4 mitigations were more readily applied and people became  
5 more -- should have been made more aware of them.

6 **Q.** If I may move now through spring/summer of 2020, in  
7 short there were a number of papers that were published  
8 and you were still gathering the evidence; is that  
9 a fair summary?

10 **A.** That's a fair summary, and an awful lot of research  
11 happened during the pandemic which -- you know, we spent  
12 a lot of time sifting that information to put together.

13 **Q.** Now, come autumn 2020, did you still have concerns in  
14 terms of airborne transmission being taken seriously, or  
15 did you consider that enough was being done?

16 **A.** Yes, I did, and one of the concerns which I think you  
17 will have identified that I raised in my statement was  
18 that the publicly available information that's on  
19 the websites of the Public Health England, as it was  
20 then, and the NHS, for members of the public who maybe  
21 are trying to find information about how to manage  
22 the illness if, you know, they have a case in their  
23 home, that all still focused on droplets and surfaces  
24 and didn't mention airborne. So I emailed  
25 Patrick Vallance and Chris Whitty in September to say:

18

1 But I think it was that -- seeing cases rising and not  
2 very much being really done to try to mitigate them,  
3 even when people were interacting together.

4 **Q.** Now, your frustrations were such that you spoke to  
5 the press, is that right?

6 **A.** Yes. So I spoke to the press on many occasions through  
7 the pandemic, almost all of them were to talk about  
8 the science of transmission. On that one occasion  
9 I expressed a frustration with feeling that  
10 the mitigations that were being put in place, I think it  
11 was a curfew at 10 o'clock in a pub, that it was not  
12 going to make any difference.

13 **Q.** Indeed. And that was an article in the -- there was  
14 an article in The Financial Times in that respect --

15 **A.** That's correct, yes.

16 **Q.** -- 23 September. Then subsequently you posted a tweet  
17 in October of 2020. I'm just going to ask for that to  
18 be pulled up, if I may.

19 It's INQ000192075.

20 We see that here, it's dated 13 October 2020, it's  
21 1.56 pm, so the afternoon, it's a cartoon. If we just  
22 run through that. It's a cartoon. We see the first --  
23 it goes from left to right, obviously -- the first  
24 cartoon:

25 "Here's the situation ..."

20

1 We see a graph.  
 2 "This line is here."  
 3 "But it's going up towards here."  
 4 Effectively pointing towards bad, going from good to  
 5 bad.  
 6 And then a conversation between three individuals:  
 7 "So things will be bad?"  
 8 "Unless someone does something to stop it."  
 9 "Will anyone do that?"  
 10 "We don't know."  
 11 "That's why we're showing you this."  
 12 le the graph.  
 13 "So you don't know, and the graph says things are  
 14 not bad."  
 15 Response:  
 16 "But if no one acts, they'll become bad."  
 17 "Well, please let me know if that happens!"  
 18 And as we see:  
 19 "Based on this conversation, it already has."  
 20 So why did you send that tweet?  
 21 **A.** So I don't recall my exact feelings at the time but  
 22 I think it was very much that frustration that we could  
 23 see almost a repeat of what was -- what had happened the  
 24 previous winter, that cases were rising and it was  
 25 almost a case of we had to wait for something really bad

21

1 happens, so if it's more transmissible it doesn't make  
 2 that much more difference, but if before you'd not  
 3 crossed that threshold for airborne transmission to  
 4 happen but now perhaps you needed to breathe in slightly  
 5 less of it or perhaps more virus was being emitted, it  
 6 could become a more important route of transmission.  
 7 **Q.** Thank you.  
 8 I just want to deal now, if I may, with the  
 9 implications for physical distancing and the  
 10 1 to 2-metre rule specifically. With regard to that,  
 11 can you help us with the evidence behind what was the  
 12 1 to 2-metre rule?  
 13 **A.** So I don't know the evidence that was behind its  
 14 original design, that was before I'd been involved in  
 15 SAGE. It was one of the very first things EMG were  
 16 asked to look at, and we looked at where there might be  
 17 epidemiological evidence, there is very little of that,  
 18 and then we looked at where there are -- there was  
 19 evidence from the understanding of the physics of how  
 20 particles behave and different sizes of particles over  
 21 distances, and we drew together from what limited  
 22 evidence there was to indicate that actually, yes, this  
 23 sort of 1.5 to 2 metres is where things are -- I'm not  
 24 sure I'd even now go as far as to say safe, but where  
 25 the risk starts to drop off.

23

1 to happen before something did about it. I think it's  
 2 also fair to say maybe I felt this applied to other  
 3 things as well, such as climate change.  
 4 **Q.** When you refer to the previous winter, that's  
 5 the January to March period --  
 6 **A.** Yes.  
 7 **Q.** -- of 2020?  
 8 **A.** Yes.  
 9 **Q.** Thank you.  
 10 Then if I can just take you briefly through  
 11 winter 2020 to 2021, that was when we saw the emergence  
 12 of the Alpha variant --  
 13 **A.** Yes.  
 14 **Q.** -- and cases rising; is that right?  
 15 **A.** Yes, that's correct.  
 16 **Q.** Now, what implications did the Alpha variant have in  
 17 terms of transmissibility?  
 18 **A.** So the initial indications, which proved to be correct,  
 19 were that the Alpha variant was more transmissible,  
 20 so -- and when something is more transmissible, that  
 21 means that the risk from any of your transmission routes  
 22 increases. Our one concern there was that potentially  
 23 the airborne route could become more significant.  
 24 So if you imagine at close range you might have  
 25 already crossed a threshold whereby transmission

22

1 **Q.** Thank you.  
 2 Now, during spring of 2020, there was a lot of focus  
 3 on the 2-metre rule, and it caused a lot of controversy,  
 4 there was a lot of pressure to reduce that, and in terms  
 5 of your work, do you recall a situation where a line  
 6 from one of your reports was relied upon in furtherance  
 7 of promoting a reduction from that 2-metre rule?  
 8 **A.** Yes. So in May 2020 I was asked to give evidence to  
 9 a select committee --  
 10 **Q.** I'm not going to ask you about your evidence or anything  
 11 in relation to the select committee --  
 12 **A.** Okay.  
 13 **Q.** I'm not allowed to do that. What I am interested is  
 14 in --  
 15 **A.** Yes.  
 16 **Q.** -- that following on from that --  
 17 **A.** Following on, yes.  
 18 **Q.** -- a letter was sent by Greg Clark MP, the chair of that  
 19 committee, referencing your work and pulling out a line  
 20 from one of your reports.  
 21 Was that an appropriate use of that line from your  
 22 report?  
 23 **A.** No, it wasn't, because he had taken the line from  
 24 the report, it's actually the paper from 28 April, and  
 25 it's paragraph 44 in that paper, and he had taken one

24

1 line from it, the second sentence said "however", and  
2 described the fact that actually this model that we'd  
3 referred to had quite significant limitations. So  
4 essentially it was using one part of a paragraph but not  
5 the rest of that paragraph.

6 **LADY HALLETT:** Sounds like a West End review.

7 **MS CECIL:** So that was on 29 May 2020. In June and July  
8 of 2020, with regard to decision-making and the response  
9 in terms of mitigations, there was quite significant  
10 movement in relation to social distancing, the opening  
11 up of restaurants and so on and so forth. Was that in  
12 accordance with the scientific principles that you've  
13 considered and looked at and the evidence base in  
14 relation to distancing?

15 **A.** A lot of it was, because that 2-metre rule did remain.  
16 And I think it's worth saying the 2-metre rule doesn't  
17 just describe about your distance from somebody, it  
18 actually sets the principles of how many people can go  
19 into a different -- in a particular setting. So the  
20 more people there are in a setting, the higher those  
21 risks go.

22 **Q.** If I can just ask you specifically about the Eat Out to  
23 Help Out scheme. How does that fit with your  
24 understanding of transmission at that time?

25 **A.** So just to clarify, EMG were not asked to consider it.

25

1 contaminated, there's a potential risk there, so we're  
2 thinking around cleaning of those surfaces. But  
3 I think, although that was a key focus early on in  
4 the pandemic, really the evidence base to show that hand  
5 hygiene and cleaning surfaces reduces transmission for  
6 Covid-19 has not grown. I have yet to see evidence that  
7 suggests that it plays a major role. At the same time,  
8 I don't believe we can dismiss it, and I think we should  
9 have a certain amount of precaution there.

10 **Q.** Thank you.

11 Then the final topic, please, from me today, and  
12 that is the role of socioeconomic inequalities. If  
13 I can just touch upon some of the work that was  
14 undertaken by you and ask you just to expand on that  
15 a little bit.

16 You explained in one of your papers from the EMG  
17 that previous research from the swine flu pandemic, so  
18 really contextualising this for a moment, demonstrated  
19 that social distancing was effective in reducing  
20 infections, but it was most pronounced in households  
21 with greater socioeconomic advantage, and you explain  
22 that similar findings were emerging for Covid-19.

23 Why is that? What implications does socioeconomic  
24 situation have on the ability to practice social  
25 distancing?

27

1 Had we been asked, I think we would have had a concern  
2 that encouraging people to get together indoors, and  
3 only on perhaps three days of the week, which perhaps  
4 encourages crowding, was not necessarily a well designed  
5 approach.

6 **Q.** Just to round off the 2-metre rule, you've already  
7 explained why it's not a hard and fast rule, lots of  
8 variables apply to that, but it's still your view that  
9 that was not over-precautionary at the time?

10 **A.** That's correct, and indeed many other countries who did  
11 have shorter distances had implemented other measures to  
12 allow them to go shorter distances, particularly face  
13 coverings, which we didn't have at the time in the UK.

14 **Q.** Thank you.

15 Face masks have already been dealt with by  
16 Professor Horby, so I'm not going to ask you to deal  
17 with that today, but if I can just ask you very briefly  
18 to touch upon fomite transmission and the mitigations  
19 there. You've already referenced the hand washing  
20 campaigns that we're all so familiar with, with the  
21 happy birthday and various other things, in that  
22 respect.

23 But in terms of broader challenges in relation to  
24 surfaces, what were those?

25 **A.** So there was -- I mean, I guess any surfaces which are

26

1 **A.** So this was something that was increasingly discussed in  
2 the papers that we produced, because we became more and  
3 more aware of those inequalities, and in the example you  
4 gave there around housing, obviously those who perhaps  
5 are more wealthy are more likely to have larger houses,  
6 they're more likely to be able to have a spare bedroom  
7 for somebody to isolate in, and they tend to be slightly  
8 smaller households. If you have people who are living  
9 in multigenerational households, they are more crowded,  
10 it's very hard, if somebody's sick, to isolate, or,  
11 for example, if somebody is working in a higher risk  
12 occupation and doesn't want to put their household  
13 members at risk, it's much more challenging.

14 **Q.** Indeed. You also refer to other aspects such as  
15 occupation, transport to and from work --

16 **A.** Yes.

17 **MS CECIL:** -- those sorts of issues as well.

18 Thank you very much, Professor Noakes, but if you  
19 just pause there, there are some questions.

#### 20 Questions from THE CHAIR

21 **LADY HALLETT:** Just before we move to, I think it's

22 Ms Shepherd who is going to be asking questions, can  
23 I ask you about mass gatherings, Professor Noakes?

24 **A.** Yes.

25 **LADY HALLETT:** Given what you've said, where do you stand

28

1 on -- I think I have heard evidence that suggested mass  
2 gatherings don't of themselves create a greater risk  
3 because you're only going to infect the people around  
4 you. How does that fit with your --

5 **A.** Yes, so that's true, so actually a mass gathering --  
6 let's say you go to a football match, it's unlikely that  
7 you're going to have transmission from somebody who is  
8 sat at the other side of the pitch to you, it's more  
9 likely to happen very close to you. I think where mass  
10 gatherings perhaps do pose a risk is that people travel  
11 to them, so they will travel in coaches or all together,  
12 so there's risks in there. They will perhaps stay  
13 overnight in places. They will perhaps, as part of  
14 that, go and visit pubs and restaurants. So it's likely  
15 to be the activities alongside the mass gathering that  
16 pose more risk than the mass gathering.

17 Perhaps the only slightly differently one there is  
18 something like a wedding, which is a smaller gathering,  
19 but they were -- weddings and parties were associated  
20 with quite high transmission, and I think because there  
21 lots of people mingle with lots of other people.

22 **LADY HALLETT:** Thank you.

23 Yes, Ms Shepherd.

24 **Questions from MS SHEPHERD**

25 **MS SHEPHERD:** Good morning, Professor Noakes, I appear on  
29

1 terms of your responsibility to provide advice to  
2 the whole of the UK, and the responsibility of  
3 the scientific advisers to the devolved administrations  
4 to provide advice which concerned their nation  
5 specifically?

6 **A.** I think we ... most of the advice we gave was, I guess,  
7 agnostic to a particular nation, so we were giving  
8 advice around things like, you know, ventilation or  
9 distancing, and therefore really how that advice is  
10 acted on is the -- is up to the policymakers in those  
11 nations to take on and use.

12 **MS SHEPHERD:** Thank you, Professor Noakes, and thank you,  
13 my Lady.

14 **LADY HALLETT:** Thank you, Ms Shepherd.

15 That I think completes the questions for you,  
16 Professor Noakes. Thank you very much indeed. Until  
17 I started this Inquiry, I confess I didn't realise the  
18 extent to which your kind of expertise and skills were  
19 required and utilised during the pandemic response, and  
20 I should have known, and I'm really grateful to you,  
21 obviously unsung heroines and heroes. Thank you.

22 **THE WITNESS:** Thank you.

23 **(The witness withdrew)**

24 **MR KEITH:** My Lady, the next witness is

25 Professor John Edmunds.

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1 behalf of Covid-19 Bereaved Families for Justice Cymru,  
2 and my questions will focus on the devolved  
3 administration angle.

4 So firstly, did you and your colleagues on  
5 the Environmental Modelling Group feel that you had  
6 an understanding of how your advice would be used by  
7 the devolved administrations?

8 **A.** So we didn't have a full understanding because, as  
9 I say, we were producing advice papers for SAGE and  
10 therefore the routes for them to actually get to  
11 devolved nations were largely via SAGE. However,  
12 I think it's worth noting that on our group we had  
13 representation, active representation from NHS Scotland  
14 and Public Health Scotland on the group. We did also  
15 have observers, as did many of the subgroups, from  
16 the devolved nations, so they would hear the discussions  
17 that we were having.

18 **Q.** Did you receive any data from the devolved  
19 administrations?

20 **A.** I don't recall, but as a group, we didn't deal with  
21 significant amounts of data, it was many of the other  
22 subgroups who dealt with -- particularly SPI-M, who  
23 dealt with data more than us.

24 **Q.** Did you and your colleagues consider that you had  
25 a clear understanding of where the dividing line was in  
30

1 **PROFESSOR JOHN EDMUNDS (affirmed)**

2 **Questions from LEAD COUNSEL TO THE INQUIRY**

3 **MR KEITH:** Professor, could you commence your evidence,  
4 please, by giving the Inquiry your full name.

5 **A.** Professor John Edmunds.

6 **Q.** Professor Edmunds, you have kindly provided  
7 a substantial witness statement, INQ000273553, we have  
8 it there on the screen. We can see from the bottom of  
9 the first page that that page is page 1 of 115, in fact,  
10 and it's a statement that you signed, certified as being  
11 true on 30 August 2023; is that correct?

12 **A.** Yes.

13 **Q.** You are an expert in infectious disease modelling, in  
14 pandemic planning, by extension, and also, by virtue of  
15 your particular expertise, a de facto expert in  
16 epidemiology.

17 You are the chair in infectious disease modelling at  
18 the London School of Hygiene and Tropical Medicine?

19 **A.** I am.

20 **Q.** Have you been involved in pandemic planning at  
21 the United Kingdom level for many years?

22 **A.** Yes.

23 **Q.** Were you the head of the Modelling and Economics Unit at  
24 the Health Protection Agency? Is that the body now  
25 known as the UKHSA?

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- 1 **A.** Yes, and it is, yes.
- 2 **Q.** Were you therefore, in fact, one of the first members of  
3 SPI-M --
- 4 **A.** I was, yes.
- 5 **Q.** -- of which we've heard much? It's the Scientific  
6 Pandemic Infections Group on Modelling, of course.
- 7 You left the Health Protection Agency in June 2008  
8 when you took up your chair at the London School of  
9 Hygiene and Tropical Medicine, but did you carry on  
10 working on, in particular, pandemic influenza --
- 11 **A.** I did, yes.
- 12 **Q.** -- influenza pandemics, over the years, whilst you were  
13 still serving on SPI-M? And were you at the forefront  
14 of the expert field of modelling in epidemiology in  
15 relation to epidemics both in the United Kingdom and  
16 abroad?
- 17 **A.** Yes, I suppose you want me to say, but yes.
- 18 **Q.** All right. You were also a member of NERVTAG, and you  
19 I think joined NERVTAG in 2014, and you served on that  
20 committee from 2014 through to 2022. So when we  
21 confronted the pandemic in the United Kingdom, you  
22 continued to serve on all those committees. I think you  
23 attended 97 SAGE meetings, 99 SPI-M-O meetings, and  
24 91 other subgroup or related meetings?
- 25 **A.** As far as I could ascertain, yes.

33

- 1 of learning and reports and advice for  
2 the United Kingdom as well as a host of other low and  
3 medium-income countries around the world.
- 4 **A.** Yes. It was an amazing effort.
- 5 **Q.** I'll turn in a moment to asking you just to give us  
6 a flavour of the work that the CMMID did, but before  
7 I do, I want to ask you to put your mind back and give  
8 the Inquiry, please, a sense of what your understanding  
9 was in the middle of January 2020 as to the threat that  
10 was by then plainly emerging from China.
- 11 You say in your statement it was clear by early to  
12 mid-January 2020 that the novel coronavirus outbreak in  
13 China was a major public health threat. Did you mean --  
14 do you mean -- by that that it was a major public health  
15 threat to the world, to the countries around China, just  
16 to China, or to the United Kingdom?
- 17 **A.** At that very time, at the middle of January, it wasn't  
18 clear whether that was a threat just to China or whether  
19 it was a threat to everyone. I think all of us thought  
20 it might well be a threat to everyone across the world,  
21 but it wasn't clear at that time, because of -- it's  
22 a technical issue, but there was -- the way that  
23 the data were being reported from China, it looked at  
24 the time -- there was only 41 cases that had been  
25 reported, they'd all been -- they'd all attended

35

- 1 **Q.** And I think, in addition, 74 NERVTAG meetings?
- 2 **A.** It was busy.
- 3 **Q.** It was indeed busy.
- 4 You participated in a number of other groups, of  
5 which we've heard mention, for example EMG, the  
6 Environmental Modelling Group, the Children's Task and  
7 Finish Group, the Moonshot Scientific Advisory Group and  
8 a number of other bodies or committees set up by the  
9 public agencies in the United Kingdom --
- 10 **A.** Yes.
- 11 **Q.** -- including Public Health England and government  
12 departments such as the DHSC.
- 13 **A.** I did, yes.
- 14 **Q.** To add to your burdens, throughout the pandemic, because  
15 of course you are the chair in infectious disease  
16 modelling at the London School of Hygiene and Tropical  
17 Medicine, you were intimately concerned with the work  
18 that continued to be done by the Centre for Mathematical  
19 Modelling of Infectious Diseases, which is an integral  
20 part of the London School of Hygiene and Tropical  
21 Medicine?
- 22 **A.** Yes, correct.
- 23 **Q.** I think throughout the pandemic, the CMMID, which is  
24 what I'm going to call the Centre for Mathematical  
25 Modelling of Infectious Diseases, produced a vast amount

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- 1 the seafood wet market in Wuhan, and no other cases were  
2 being reported. So it could have been just some odd  
3 event, quite a large event, where people got exposed to  
4 something in that market. But it might not have been.
- 5 And when we started to see cases outside China, then it  
6 was -- it was very hard to believe that it was just  
7 a limited event.
- 8 **Q.** Whilst you give your evidence, Professor, could I invite  
9 you just to go a little bit slower as well.
- 10 **A.** Sorry. Yeah.
- 11 **Q.** Just to get our chronological bearings, the knowledge  
12 that there were cases outside China, of course, emerged  
13 at the end of January --
- 14 **A.** No, before then, the first case outside China I think  
15 was about the 13th, it may have been 11th or 13th  
16 January.
- 17 **Q.** But by the end of January, it was clear that it wasn't  
18 just one or two cases sporadically in a country outside  
19 China, there were multiple cases in multiple countries?
- 20 **A.** There were. And by then the Chinese had changed the way  
21 that they were reporting their cases, and there were  
22 thousands of cases in China.
- 23 **Q.** We'll come to this issue later of how it was that  
24 the early data grossly underestimated the spread of the  
25 outbreak in China.

36

1 But you've used the words major public "health  
2 threat".  
3 **A.** Yeah.  
4 **Q.** It was clear by mid-January that what China was  
5 grappling with was a viral outbreak, a viral pathogen,  
6 a disease outbreak based upon a virus?  
7 **A.** Yes, absolutely.  
8 **Q.** And viruses have a tendency, it's what they do, to  
9 spread exponentially --  
10 **A.** Not all of them.  
11 **Q.** Not all, but they may do so.  
12 It was clear in mid-January, although nobody knew  
13 the extent of the spread in China, that this virus had  
14 the capacity to kill, to seriously harm, to hospitalise,  
15 and that people weren't becoming infected just because  
16 they'd had contact zoonotically with an animal --  
17 **A.** Correct.  
18 **Q.** -- they were becoming infected from human-to-human  
19 transmission?  
20 **A.** That was then very clear by -- certainly by the end of,  
21 you know, the third, fourth week of January, that was  
22 very clear, yes.  
23 **Q.** So if human-to-human transmission was clear, and it was  
24 clear that it was spreading, although nobody knew to  
25 what extent, was that why you, as you say, appreciated

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1 not, a pandemic is a worldwide epidemic -- a sensible  
2 and wise approach is to apply a precautionary approach,  
3 that is to say get on top of the problem before it beats  
4 you?  
5 **A.** Correct.  
6 **Q.** And in your statement, you refer on multiple occasions  
7 to the need for the precautionary principles to be  
8 applied; it is at the very heart of epidemiology, is it  
9 not, it's how you deal with epidemics?  
10 **A.** Yes, when you're talking about response epidemiology,  
11 how to respond, then yes, you do -- it is wise to apply  
12 that precautionary principle, because we -- our  
13 surveillance systems are never likely to pick up every  
14 case, and they're always a bit delayed, and so  
15 the epidemic is likely to be more widely spread than you  
16 think it is.  
17 **Q.** Was that why you say in your statement that even in  
18 the early days or mid-days of January, it was essential  
19 for the United Kingdom, as with every other country, to  
20 assemble significant data in terms of  
21 the epidemiological nature of the virus that had by then  
22 already spread outside China, and the modelling data, in  
23 order to be able to work out precisely how the virus  
24 would spread and how to deal with it?  
25 **A.** That's right. So first of all you try to characterise

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1 there was a major public health threat?  
2 **A.** Yes.  
3 **Q.** Because if the virus continued to spread, and its  
4 reproduction number was more than 1, that is to say  
5 every single infected person would infect more than one  
6 other person in an unimmunised population, subject to  
7 control measures being applied, the virus would continue  
8 to spread forever, until herd immunity?  
9 **A.** Yes. Even after herd immunity of course you get spread,  
10 like we have now.  
11 **Q.** So the basic nature of the threat was clear: it was  
12 an issue, wasn't it, of seeing whether it would spread  
13 significantly beyond China and the countries around  
14 China, and therefore, by extension, whether there was  
15 a need to apply control measures to stop it?  
16 **A.** Yes, I would agree with that.  
17 **Q.** All right.  
18 If a virus spreads at a rate greater than R larger  
19 than 1, then it will spread, we've heard, exponentially,  
20 it will grow faster and faster and faster?  
21 **A.** If you don't take measures to stop that, yeah.  
22 **Q.** If you don't take measures. So is that why, in your  
23 field of expertise, there is this notion that when  
24 dealing with viral epidemics which may become a viral  
25 pandemic -- which is just a difference of scale, is it

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1 what you're dealing with, in terms of -- you mentioned  
2 the reproduction number, so what -- if you could try to  
3 estimate the reproduction number. And then other  
4 critical parameters related to the virus, for instance  
5 obviously how -- the infection fatality rate or case  
6 fatality rate, which is the fraction of those -- of  
7 the infections that might die, for instance. These are  
8 sort of absolutely critical numbers that you try to get  
9 an early estimate of, as best you can.  
10 Of course you don't stop there, throughout  
11 the epidemic you might refine those estimates and they  
12 might change a bit, but you spend a lot of your time  
13 trying to characterise -- especially with a new disease  
14 like this, trying to understand it, how fast it might  
15 spread, and then you can start to put together models to  
16 play -- you know, to look at different scenarios, as it  
17 were, to see whether -- to see how you could, you know,  
18 what measures might be effective or most effective  
19 against this new threat.  
20 **Q.** In relation to the coronavirus pandemic, that basic  
21 data, the reproduction rate, whether the virus killed,  
22 whether it hospitalised people, whether it was capable  
23 of being transmitted and was being transmitted human to  
24 human, and whether or not it was possible to become  
25 infected but not show symptoms, asymptomatic

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1 infection --

2 **A.** Yes.

3 **Q.** -- whether or not it was possible to become infected and

4 have a period of time during which you showed no

5 symptoms, pre-symptomatic; all that in general outline

6 was known fairly early on, was it not?

7 **A.** It was. Certainly by early February, or mid-February,

8 I'd have thought, then we had probably reasonable

9 estimates of most of these things. Some of them -- some

10 of these things take longer to estimate. For instance,

11 the infection fatality rate takes longer, because sadly

12 it takes time for people to die if they're infected, and

13 so you have to sort of wait for that. I know it's

14 a dreadful thing to talk about, but you have to wait for

15 that to happen, so you don't know how many people might

16 die until people are dying.

17 **Q.** Could you keep your voice up a bit more, please,

18 Professor.

19 **A.** Sorry, yes.

20 **Q.** So the infection fatality rate is vital, is it not --

21 **A.** Yeah.

22 **Q.** -- in terms of assessing what might happen to any

23 particular country's healthcare system? You need to

24 know what proportion of those infected in your

25 population will die in order to know whether you've got

41

1 infection fatality rate, the proportion of over

2 70-year olds who would die once they become infected was

3 much higher?

4 **A.** Yeah.

5 **Q.** Around 7% of them?

6 **A.** Correct.

7 **Q.** But the point, Professor, is this: plainly

8 epidemiologists and modellers, to use your words, like

9 to know the precise nature of the virus --

10 **A.** Yeah.

11 **Q.** -- the detail of how it will behave, how it transmits,

12 what the particular features are in terms of the impact

13 on segments of the population, how the population might

14 behave, how the virus might respond to self-imposed

15 behavioural changes.

16 And the models, to use your word, because you used

17 it, can be used to play at the figures, to demonstrate

18 these more nuanced conclusions.

19 But the basic information about the threat of this

20 virus and its potential fatal impact and the impact upon

21 the healthcare systems of this country were known, was

22 known, relatively early on?

23 **A.** Correct, yes.

24 **Q.** It was known, putting together the reproduction number,

25 the infection fatality rate, the knowledge of the size

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1 enough beds, whether you've got enough healthcare

2 facilities?

3 **A.** There's two aspects. So one is the reproduction number,

4 the basic reproduction number, and that gives you

5 an indication of how many people might become

6 infected -- if you do nothing. So if you allow the

7 epidemic just to sweep over the population -- and the

8 population does nothing. So they don't change their

9 behaviour. And that gives you -- so that tells you how

10 many people might become infected. And then, of course,

11 you would need to know, of those who become infected,

12 how many might die, how many might be hospitalised.

13 And it's not just those crude numbers, you'd like to

14 know it by different groups, like different age groups,

15 which, for Covid, that was -- there was enormous

16 differences in risk by age, for instance.

17 **Q.** But the reproduction rate was estimated to be between 2

18 and 3 at a relatively early stage, in fact in late

19 January. The infection fatality rate, in a very broad

20 sense, how many people will die in an unimmunised

21 population that takes no steps to protect itself, was

22 assessed in mid-February preliminarily --

23 **A.** Yeah.

24 **Q.** -- to be 1% overall. It subsequently transpired that if

25 you were over 70 -- or for the over 70-year olds the

42

1 of the population in this country, the knowledge of --

2 **A.** Demography, yes.

3 **Q.** -- how big the NHS is --

4 **A.** Yeah.

5 **Q.** -- that was all apparent to those in the know, to

6 the experts, certainly by the end of February?

7 **A.** Oh, yeah. I mean, earlier than that, really.

8 **Q.** When earlier than that, do you assess?

9 **A.** Sort of mid-February, I think, where we had probably

10 a pretty good -- pretty good idea. You get an initial

11 sketch even earlier than that, perhaps, but then --

12 which might give you, you know, an initial impression,

13 but of course then you improve on that and then you

14 understand some of the nuances, like the -- how risk

15 varies with age and how risk varies perhaps with

16 other -- with other sorts of variables, ethnicity --

17 obviously those sorts of things came later.

18 **Q.** So would it be fair to say that when that realisation

19 dawned, perhaps in mid-February, the absolute core

20 consideration then became: how do we control it? How do

21 we stop it? How do we suppress it? How do we mitigate

22 it? How do we do anything --

23 **A.** I think that had been a core consideration from before

24 then, certainly from January when the alarm first came

25 up: how do we stop this?

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1 Q. And unsurprisingly, experts, government officials,  
 2 scientists, epidemiologists, cast their minds back to  
 3 what sort of control measures we had utilised in the  
 4 past?  
 5 A. Yeah.  
 6 Q. And of course because of the flu pandemic of 2018,  
 7 because of swine flu, because of --  
 8 A. I think 1918.  
 9 Q. Sorry, what did I say?  
 10 A. 2018.  
 11 Q. Thank you very much, Professor.  
 12 A. Sorry. I didn't mean to put you off.  
 13 Q. No, no, no, it's quite all right. 1918.  
 14 Because of swine flu, because of SARS and MERS and  
 15 other -- those two particular coronavirus --  
 16 A. Yeah.  
 17 Q. -- epidemics, or pandemics perhaps, in the Middle East  
 18 and Far East, there was a basic understanding of what  
 19 sort of control measures might work?  
 20 A. Some, yeah. Almost as well a bit the other way around,  
 21 what kind of control measures are unlikely to work as  
 22 well. You know, there's two aspects to that.  
 23 Q. Thank you.  
 24 For flu, there had been quite a prolonged debate  
 25 about whether school closures, for example --

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1 to actually stop it, because there was, you know,  
 2 widespread recognition that it would be extremely  
 3 difficult and extremely resource-intensive to actually  
 4 try to stop a flu pandemic via contact tracing, because  
 5 it -- it moves so fast that the virus moves between one  
 6 generation of cases and the next so quickly that it's  
 7 really impossible to keep up with it with contact  
 8 tracing.  
 9 Q. And the contact tracing that was used for swine flu, and  
 10 is used actually for any new or emerging --  
 11 A. Oh, and things that have been around forever. You do it  
 12 for TB and -- well, HIV's not been around forever, but  
 13 yes, you do it.  
 14 Q. It's relatively limited. You pick up travellers, you  
 15 test them, you test and trace, contact, trace index  
 16 cases, and whether or not you're focusing on people  
 17 coming in with the infection or you focus on the  
 18 first few hundred cases or you focus on the first few  
 19 cases in the hospitals, it doesn't really matter,  
 20 the system was only designed to deal with the first  
 21 relatively few cases?  
 22 A. Yes. So for flu the system was always  
 23 a first few hundred system and the idea, as I said, is  
 24 really to understand and characterise the virus here in  
 25 the UK more than trying to stop it with the recognition

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1 A. Yeah.  
 2 Q. -- would work, and strategically the government and its  
 3 advisers thrashed this issue around for a very long time  
 4 indeed: is it a good idea to close schools in the face  
 5 of a flu pandemic?  
 6 There had been a long running debate, again resolved  
 7 in the context of flu, whether or not shutting borders  
 8 would help?  
 9 A. Yeah.  
 10 Q. And it was generally understood that it wouldn't?  
 11 A. There's a difference between absolutely shutting your  
 12 border, letting no one in --  
 13 Q. And restrictions?  
 14 A. And restrictions, yeah.  
 15 Q. But generally --  
 16 A. Restrictions were unlikely to buy much time.  
 17 Q. But we had never -- at least --  
 18 A. We had never shut our border.  
 19 Q. We had never shut our borders to deal with flu. And we  
 20 had never had a sophisticated or put into place  
 21 a sophisticated system for test, trace, contact, to  
 22 deal --  
 23 A. We had at the beginning of the swine flu pandemic, but  
 24 mostly to understand its transmission characteristics  
 25 here in the UK rather than as a concerted effort to try

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1 that it was very, very unlikely to stop a flu pandemic.  
 2 Q. So drawing those threads together, and I should say, can  
 3 you tell us whether or not there was in January 2020 any  
 4 system at all, whether by utilisation of past control  
 5 measures or anything drawn up on paper, any system of  
 6 quarantining whole segments of society or whole-society,  
 7 of self-isolation of the whole society or social  
 8 distancing the whole society?  
 9 A. In January/February, no, there was no consideration of  
 10 that. It was concentrating on contact tracing.  
 11 Q. And you knew that?  
 12 A. Knew?  
 13 Q. You knew that there was in place no system at all for  
 14 social distancing --  
 15 A. Yeah.  
 16 Q. -- quarantining --  
 17 A. Yeah.  
 18 Q. -- for whole-society response?  
 19 A. Yeah. I mean, of course at that time, if we're talking  
 20 about, say, February, there would have been very few  
 21 cases -- even, you know, looking back at it now, and  
 22 realising how many cases there were, there were still  
 23 very few, so you've got to sort of have some sort of  
 24 proportionate response. You know, do you put the entire  
 25 country under some sort of restrictions when there's,

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1 you know, perhaps a handful of cases? So the idea is to  
 2 really try to target it around those cases. I think  
 3 the issue was we always knew that it was likely that  
 4 cases would not -- some cases would not be picked up.  
 5 We were targeting our contact tracing around cases who  
 6 came in from high risk areas, China being the most  
 7 obvious, but other places where there was -- cases had  
 8 been picked up, which were mostly in the Far East. But  
 9 of course people could come indirectly into the UK via  
 10 other routes, and of course they did, and so that  
 11 contact tracing effort, it had -- you know, it had to go  
 12 really well everywhere in the world for it to be -- for  
 13 it to stop --

14 **Q.** For it to work?

15 **A.** Yeah, exactly.

16 **Q.** And you knew that?

17 **A.** Yeah.

18 **Q.** So you -- and I make it absolutely plain, you are but  
 19 one of a number of brilliant scientists and advisers who  
 20 assisted the government and the country in the  
 21 remarkable way that you did, but there must have been  
 22 a general awareness, therefore, by February this viral,  
 23 severe pandemic, this viral pathogenic outbreak is  
 24 coming, and it can't be stopped, and the measures which  
 25 could stop it once it reaches the United Kingdom have

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1 weren't generally used for flu, for which we'd been  
 2 preparing, although this coronavirus had a latency  
 3 period, a gap between when you become infected and when  
 4 you can pass on the infection to somebody else, in which  
 5 gap you can be tested and seen whether you are positive  
 6 for the disease, until such a system could be developed,  
 7 designed and put into place, it would be of little  
 8 practical assistance?

9 **A.** So by late January, early -- late January, let's say  
 10 early February, we knew something about  
 11 the characteristics, you quite rightly say, so there was  
 12 quite a long period between infection and you becoming  
 13 ill of sort of five or six days, which is very different  
 14 to flu, which is sort of one or two days, and so there  
 15 was a possibility that gave you a bit more time, if you  
 16 were trying to contact trace -- I mean, if you're trying  
 17 to contact trace, it gave you a bit more time to be able  
 18 to do it. In terms of are you infectious before you  
 19 become symptomatic, with SARS-1 that didn't look like  
 20 that was the case. So with SARS-1 that time period was  
 21 a bit longer, it was more like eight days, and it looked  
 22 like you became infectious when you became symptomatic.  
 23 And you were very ill with SARS-1 and so most people  
 24 were in hospital very quickly. And so it was easier to  
 25 contact trace with SARS-1 and that's how it was stamped

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1 either never been dreamt up or never been applied or  
 2 won't work?

3 **A.** I mean, you said can't be stopped, I mean, it was worth  
 4 trying to stop it in those ways. You know, there was  
 5 a hope but maybe not an expectation that it would be  
 6 stopped like that. But yes, we knew that there was  
 7 a very high likelihood -- I mean, you know, I'm  
 8 a scientist, I'm not going to say there's a -- you know,  
 9 there was an extremely high likelihood that we would --  
 10 that we would face a very, very major pandemic, yes, we  
 11 knew that.

12 **Q.** And when you say "we would face a very, very major  
 13 pandemic", you mean, so that we are clear?

14 **A.** Something like 1918. That was always -- you know, that  
 15 would have been -- and of course that's the great -- it  
 16 was the great influenza pandemic of more than 100 years  
 17 ago. You know, it's sort of etched in people's --  
 18 especially my field, of course, the sort of collective  
 19 memory has been a horrendous event, and this looked,  
 20 there was -- it was, you know, every time a new bit of  
 21 data came in they just sort of confirmed that this was  
 22 going to be something like that, you know, a once in  
 23 a hundred years event, horrific.

24 **Q.** And because there was no sophisticated test, trace,  
 25 contact, isolate system in place, because such things

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1 out globally. Flu you just wouldn't be able to do it  
 2 because of the speed. SARS-2, Covid, was somewhere in  
 3 between. It gave you a glimpse of maybe that might be  
 4 possible, but everything had to go really well for it to  
 5 work.

6 **Q.** But in practice, whether epidemiologically a test system  
 7 was possible, it didn't matter, did it, because in  
 8 January, February, March, beyond the first few hundred  
 9 cases, before the first few index cases, there was no  
 10 whole-society test, trace, contact system?

11 **A.** No. Strictly speaking you don't need to test people,  
 12 you can isolate them anyway, you know, on symptoms and  
 13 things like that, so -- obviously it's much better to  
 14 test them because then they know they have it or they  
 15 know they don't have it, but strictly speaking you don't  
 16 need to test people.

17 **Q.** So, to come back to your earlier answer, by mid-February  
 18 there was an understanding that there was a major  
 19 pandemic coming?

20 **A.** Yes.

21 **Q.** And so again so that we are clear, a major pandemic  
 22 means tens of thousands of hospitalisation cases?

23 **A.** And more.

24 **Q.** And more. Hundreds of thousands perhaps. It means tens  
 25 of thousands, perhaps more, of deaths?

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1 A. Oh, yes, and again more.  
 2 Q. It means the country being overwhelmed by disease?  
 3 A. Yes. It's more than that. You know, once -- the reason  
 4 why the flu pandemic was at the top of the National Risk  
 5 Register, it was always known that an event like that  
 6 would affect every aspect of society, every aspect of  
 7 government. So it wasn't just that it would overwhelm  
 8 the health service and cause, you know, a huge amount of  
 9 disease, but also it would affect people's lives in  
 10 other ways -- and society quite fundamentally in other  
 11 ways. That was always known for these major, major  
 12 events.  
 13 Q. As you've said, by mid-February there was only the hope,  
 14 not the expectation, that it might be stopped?  
 15 A. Yes.  
 16 Q. Why, then, as a country, did we not apply  
 17 the precautionary principle to which you have already  
 18 referred and do something about it then?  
 19 A. I think the risk then was still low to a person --  
 20 Q. Sorry, please speak more slowly. It's very important  
 21 that we record your answer.  
 22 A. I apologise.  
 23 So I think the risk for an individual in this  
 24 country in February was very, very low -- of Covid was  
 25 very, very low. So could you take national restrictive

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1 time. So I think maybe there are things that we could  
 2 have perhaps emphasised in February that might have  
 3 slowed things a little bit. They weren't going to stop  
 4 it, but they might have slowed things a little bit more  
 5 than they did.  
 6 Q. We're going to come, of course, to the detail of  
 7 the advice that you and SPI-M-O and SAGE gave to the  
 8 government, but the nature of the response was, you  
 9 accept, a matter for government.  
 10 What I'm asking you, though, is why was that  
 11 terrible conclusion, that dawning realisation that  
 12 the virus was coming, it was a fatal pathogenic disease,  
 13 and there was in practice, you understood, not much more  
 14 than a hope that it could be controlled, why was that  
 15 warning, why was that realisation not made more apparent  
 16 to government in the middle of February, to the  
 17 public --  
 18 A. Yeah.  
 19 Q. -- to the United Kingdom --  
 20 A. Yeah.  
 21 Q. -- that this pathogenic tsunami was coming?  
 22 A. So I distinctly remember my feeling at the time.  
 23 I assumed that the government did know all of this.  
 24 I mean, you know, I can't believe that they didn't,  
 25 quite honestly. I still can't believe that they didn't.

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1 measures, would people come along with that? You know,  
 2 I think -- I think that would be difficult. I think it  
 3 would be a hard sell.  
 4 Q. But that, Professor, was surely a matter for our  
 5 politicians and our decision-makers? That was for them  
 6 to decide, was it not?  
 7 A. Yeah, it was, of course. I think there are other things  
 8 in between. You're going to -- you're kind of jumping  
 9 to the nuclear option, I think there are other things in  
 10 between that perhaps could have been done. I've thought  
 11 about it later, I thought, you know: what could we have  
 12 done? What would be more proportionate? I think things  
 13 like advice to work at home we could have perhaps done  
 14 that. Yes, it would have had an impact on the economy,  
 15 but -- and, you know, I regret that we didn't look at  
 16 that at that time.  
 17 And there are things -- there are other things like  
 18 we could have given -- we gave public health advice,  
 19 that was being given, to wash your hands and things like  
 20 that, which are sensible, but we could have perhaps made  
 21 it really clear that people should stay at home if they  
 22 had any sort of symptoms. Despite the fact that almost  
 23 all of them wouldn't have had Covid. Almost all of them  
 24 would have had flu or coughs and colds, whatever. You  
 25 know, because Covid was vanishingly rare even at that

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1 So I assumed that they did know all of this, and that  
 2 actions were being taken.  
 3 I -- the messaging at the time was very reassuring,  
 4 and I assumed that there was a plan: let's not concern  
 5 people and bother people now, because we'll have to --  
 6 we'll have to get people prepared, and do it in the  
 7 right way. That was my assumption at the time.  
 8 Afterwards, I look back on it and think: actually,  
 9 really, you know, was there a plan? I'm not sure. But  
 10 I'd assumed that there was. I assumed that  
 11 the messaging being quite reassuring was there for  
 12 a reason.  
 13 Q. I'm not asking you to speak for the government, and  
 14 we'll come later to how much the government responded to  
 15 the advice you actually did give. I'm asking you and,  
 16 through you, vicariously SAGE and SPI-M-O and SPI-B and  
 17 all the august, brilliant advisory committees,  
 18 the epidemiologists, the modellers, the virologists, why  
 19 was that warning not being shouted out from all of  
 20 you --  
 21 A. Yeah.  
 22 Q. -- from mid-February?  
 23 A. Yeah. So I didn't think we had to shout it. You know,  
 24 in terms of the government, I -- you know, something of  
 25 this magnitude you'd have thought the government should

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1 have all its attention paid to it, you'd think. So  
 2 there's that.  
 3 Secondly, yeah, I kind of just assumed that there  
 4 was some reason for not shouting it out. I remember  
 5 quite distinctly -- I remember Neil Ferguson gave a --  
 6 did say something on Radio 4 and I remember Chris Whitty  
 7 also saying something. There was this kind of funny  
 8 period where people would talk about, as you're talking  
 9 about, the -- you know, the reproduction number and the  
 10 implications that would mean for how many people might  
 11 get infected in an unmitigated wave, and there was talk  
 12 about the infection fatality rate, and so, you know, you  
 13 could easily just multiply those two numbers together  
 14 and get a very big number for deaths. But people  
 15 didn't. I was ... you know, people avoided multiplying,  
 16 you know, in public utterances.

17 And I felt that -- I honestly thought -- I mean, it  
 18 sounds really naive and silly, I think, but I honestly  
 19 thought there was a plan. I didn't want to be  
 20 the person who multiplied those two numbers together  
 21 and -- I thought that should come from someone central  
 22 in a kind of organised -- in an organised comms plan way  
 23 to prepare the country for what was going to happen.  
 24 And I didn't want to get -- I didn't want to mess that  
 25 up in any way.

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1 or mitigating, whether we should have an episodic  
 2 lockdown process.  
 3 But this vast learning nowhere says, at least until  
 4 March, there is a pathogenic tsunami coming and it can't  
 5 be stopped.  
 6 **A.** You know, I think that was clear to all of us. Yes, it  
 7 wasn't me who raised that alarm to the public.  
 8 I deliberately didn't. As I've explained to you,  
 9 I didn't want to. I didn't think -- I didn't think it  
 10 was for me to do that, I thought it was for someone with  
 11 more authority to do that, and to prepare people for  
 12 what was likely to come.

13 **MR KEITH:** Thank you.

14 My Lady.

15 **LADY HALLETT:** Thank you very much.

16 I hope you were warned, Professor, that we take  
 17 regular breaks, so I shall return at 1.40.

18 (11.25 am)

(A short break)

20 (11.40 am)

21 **LADY HALLETT:** Mr Keith.

22 **MR KEITH:** Continuing, Professor, with the theme of  
 23 the generic understanding in the scientific community,  
 24 the scientific advisory community in January, it is  
 25 absolutely vital, I make plain and put to you, that you

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1 **LADY HALLETT:** I appreciate you're mid-flow, Mr Keith.

2 **MR KEITH:** May I ask one more question and there will be  
 3 a very natural break?

4 **LADY HALLETT:** Very well.

5 **MR KEITH:** Your statement makes plain, Professor, how much  
 6 work was done by the CMMID working group at the London  
 7 School of Hygiene and Tropical Medicine, you describe it  
 8 as brilliantly led and organised by your colleagues, in  
 9 particular a doctor Rosalind Eggo.

10 You describe how over those three months, January,  
 11 February and March, you undertook -- or rather the  
 12 London School of Hygiene and Tropical Medicine undertook  
 13 a huge range of work, right from the early days --

14 **A.** Yes.

15 **Q.** -- assessing the nature of the initial outbreak,  
 16 accumulating data, analysing the spread of the virus,  
 17 looking at the reporting delays from China, how  
 18 difficult it was to get a handle on the nature of  
 19 the spread. You looked at airport screening, methods of  
 20 transmission, rates of testing, contact tracing,  
 21 isolation, the case fatality ratio, then latterly, in  
 22 March, the effect of non-pharmaceutical interventions  
 23 which, let's just speak it out, how to control  
 24 the virus, whether it would be a wave or a second wave,  
 25 what was herd immunity, whether we should be suppressing

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1 of course, Professor Edmunds, had absolutely no personal  
 2 responsibility for having to stand up and tell  
 3 the government what it should be doing, what was going  
 4 to happen, because you were part of SAGE, SPI-M-O, all  
 5 the many bodies, and it was those bodies which had been  
 6 constituted in order to give government advice; that's  
 7 a fair summary, is it not?

8 **A.** Yes, but it doesn't stop me feeling that I had some  
 9 responsibility.

10 **Q.** Well, if I may say so, that is very much to your credit.

11 And the way in which the structure worked was that  
 12 these many august and brilliant bodies were constituted  
 13 to assemble information, assemble data, give advice, and  
 14 then that advice -- and it was very clear how it could  
 15 be done and should be done -- was routed to government  
 16 through the CMO, the Chief Medical Officer, the  
 17 Government Chief Scientific Adviser --

18 **A.** Yeah.

19 **Q.** -- through the minutes, through the papers which were  
 20 given to the committees, through the documents that you  
 21 produced --

22 **A.** And can I say I'm absolutely sure that the CMO and  
 23 the Government Chief Scientific Adviser both raised  
 24 this. There is no way that they didn't.

25 **Q.** Yes. And we'll come to it, in a moment, your own

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1 emails, personal emails to Professor Ferguson,  
2 Professor Sir Chris Whitty, Sir Patrick Vallance, raise  
3 the issue of urgency and the need to act. We'll come to  
4 those in a moment.

5 But the point, we'll also look at SAGE, though is  
6 this, isn't it, that systemically or systematically,  
7 there was a structure in place to give the government  
8 advice, to warn it, to tell it what might happen and to  
9 give it the information to enable it to decide to  
10 respond rapidly, proportionately, effectively, but that  
11 system doesn't appear to have worked?

12 **A.** Clearly not. I mean, if you think about it, though,  
13 SAGE is -- only sits in an emergency, and it was called  
14 to sit in -- somewhere around the 20th, you'll know the  
15 date exactly, but, you know, the 20-something of  
16 January. So somewhere someone in government thought  
17 that it was sufficient -- you know, it was  
18 sufficiently -- there was a sufficient emergency to call  
19 SAGE. SAGE doesn't -- only sits very seldom in these  
20 kind of situations. So someone thought that it was  
21 worthy of calling SAGE together.

22 **Q.** Before we leave the subject entirely of the working  
23 group at the London School of Hygiene and Tropical  
24 Medicine, and the issue of the vast amounts of work that  
25 were done, can I ask you to look at one particular paper

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1 **A.** Yeah.

2 **Q.** -- reproduction number. What was it?

3 **A.** You know, it -- there was still -- estimates varied  
4 between about 2.5 and 3.5 at the time.

5 **Q.** So not as high as some other or some high-consequence  
6 infectious diseases, but --

7 **A.** Higher than most high-consequence infectious diseases.  
8 That -- 2.5 or 3 doesn't sound bad, but it's bad.

9 **Q.** Yes. Not as high as some, but higher than many.  
10 "30% transmission before symptoms makes control less  
11 likely in all scenarios."

12 By that were you saying, was your working group  
13 saying: if you've got a high number of people who are  
14 asymptomatic, who --

15 **A.** Pre-symptomatic, that's about pre-symptomatic --

16 **Q.** Okay.

17 **A.** So if you are infectious before you become symptomatic  
18 and we had different scenarios for that, so different  
19 assumptions -- because we didn't know that very well at  
20 that time, although that was becoming clearer --

21 **Q.** My mistake, the asymptomatic bullet point --

22 **A.** Is a bit lower down, yeah.

23 **Q.** Let's have a look at that.

24 "Presence of subclinical (asymptomatic) cases has  
25 an outsize and negative impact on probability to achieve

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1 dated from 7 February 2020, which is INQ000092645.

2 **A.** You can carry on, I know which paper it is, yeah. Yeah.

3 **Q.** Yes, we need to get it up on the screen, Professor, for  
4 everybody else.

5 So this is a paper dated 7 February. It's called  
6 "*Feasibility of controlling 2019-nCov outbreaks by*  
7 *isolation of cases and contacts*".

8 So at a relatively early stage, 7 February,  
9 the London School of Hygiene -- and this isn't a SAGE  
10 paper, it's a paper done by your research institute's  
11 working group, was on to the issue of how easy or  
12 difficult or effective controlling the virus by  
13 isolation of contacts and cases would be.

14 **A.** Yeah.

15 **Q.** Hence your evidence earlier about the very early  
16 understanding of how difficult it would be to control  
17 the virus by isolation and contact trace.

18 The summary of the findings in the bottom half of  
19 the page are these, or the summary is this:

20 "The percentage of contacts traced is critical to  
21 achieving control in all scenarios.

22 "Higher transmission (higher R0) makes outbreaks  
23 more difficult to control."

24 By this time you did have some basic understanding  
25 of the likely --

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1 control."

2 By that were you saying if a large proportion of  
3 infected people are asymptomatic, that is to say they  
4 don't show symptoms, then your ability to achieve  
5 control is hindered and the probability that you will be  
6 able to achieve control goes down?

7 **A.** Correct.

8 **Q.** You also say:

9 "60-80% of contacts must be traced (and transmission  
10 stopped) in order to achieve control in most scenarios,  
11 and more for some characteristics."

12 So you've got to, practically, be able to stop  
13 a very large number, a very large percentage of contacts  
14 for transmission chains to be broken?

15 **A.** Correct, so you have to -- you have to quickly  
16 isolate -- contact trace a large fraction of the  
17 contacts, and effectively quarantine them.

18 **Q.** Was it these findings in early February which led you to  
19 conclude that, as you began to appreciate,  
20 the asymptomatic, pre-symptomatic nature of the viral  
21 epidemic and the transmission rates, that effectively  
22 contact trace control was going to be extremely  
23 difficult?

24 **A.** I think it's a little bit more nuanced than that. This  
25 paper was a little bit of a -- one of those --

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1 the results here are a little bit of one of those -- is  
2 the glass half full or is a glass half empty? It said  
3 it was possible to do it, potentially, to -- but things  
4 had to go very well for that. Yeah, that's really  
5 a summary.

6 **Q.** All right.

7 I want to ask you now about SAGE and functionally  
8 how SAGE operated vis-à-vis the government. You had  
9 attended earlier forms, emanations of SAGE, because  
10 I think you'd been on SAGE during the Ebola crisis?

11 **A.** Correct.

12 **Q.** So you were very familiar with the workings of SAGE?

13 **A.** Familiar. I wouldn't say "very familiar", yeah.

14 **Q.** When the virus began to emerge from China, SPI-M -- of  
15 which we've heard a great deal -- alongside SAGE being  
16 brought together was also put into place, was brought  
17 together, and changed its focus to looking specifically  
18 at Covid-19?

19 **A.** Yeah.

20 **Q.** NERVTAG, we've heard, continued to operate, it was  
21 a standing statutory committee to the DHSC, it deals  
22 with new and emerging viral threats, but it also looked  
23 at Covid-19, of course.

24 When you were on SAGE, were you attending as  
25 a representative of the London School of Hygiene and

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1 a consensus document was a good thing, because it gave  
2 the government a clear understanding of a final  
3 position, or perhaps was undermined by or flawed by  
4 the tendency of such an approach to conceal nuance, to  
5 conceal the width of debate?

6 **A.** I think that -- you know, I think you could probably  
7 have done both, have a consensus statement and then have  
8 maybe fuller minutes or something, so if you were  
9 interested you could see the -- how the debate went.

10 But as it was, it was just this very terse, short  
11 document with a consensus.

12 **Q.** Was the information flow with government one-way or  
13 two-ways?

14 **A.** No, it was one-way. It came from us, through Patrick  
15 and Chris -- sorry, Patrick --

16 **Q.** Sir Chris Whitty and Sir Patrick Vallance.

17 **A.** Yeah, Sir Chris Whitty and Sir Patrick Vallance to -- to  
18 central government. We didn't have any -- we didn't  
19 play any role in that.

20 **Q.** So that there is absolutely no question about it  
21 whatsoever, there is nothing to suggest that they  
22 conveyed the information from SAGE to the government  
23 other than properly, faithfully, and --

24 **A.** Oh, I'm absolutely sure they would have done. And it  
25 didn't come back. I mean, they're consummate

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1 Tropical Medicine, or do you and all your colleagues  
2 attend in a personal capacity?

3 **A.** I was just there in a personal capacity.

4 **Q.** It's self-evident, there were a very great number of  
5 experts on SAGE. You describe the level of advice and  
6 the level of understanding on the part of the attendees  
7 at SAGE, as being very high. SAGE was very, very well  
8 informed, was it not?

9 **A.** Absolutely.

10 **Q.** All of you were experts in your own fields, but you were  
11 obviously capable of opining on related subjects, and  
12 the evidence is that a great deal of information was  
13 culled by members of SAGE from their contacts and their  
14 professional colleagues abroad?

15 **A.** Correct.

16 **Q.** So in summary, do you agree that SAGE, in terms of its  
17 ability to locate, consider and report on data and on  
18 information and on this field of expertise, was very  
19 high indeed?

20 **A.** Yes, absolutely.

21 **Q.** The papers produced by SAGE, in particular the minutes,  
22 weren't really minutes, though, were they, they were  
23 more of a consensus document bringing together a final  
24 concluded position?

25 Do you think that worked? Do you think having

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1 professionals, of course, and so they -- we didn't know  
2 what the government was discussing -- you know, they  
3 didn't report on that, of course they didn't. So it  
4 went one way. That's how it was.

5 **Q.** Did you understand on SAGE that they were conveying  
6 the consensus position which SAGE had reached or that  
7 they were conveying the whole range of debate,  
8 the issues which had been explored, and perhaps  
9 the divergence of views which had been apparent in  
10 argument?

11 **A.** I don't know, of course, because I wasn't there. But we  
12 did used to try to include a statement about certainty  
13 or uncertainty in everything -- I say everything;  
14 I would hope just about everything -- so when there was  
15 a statement made then it was -- there would be a very  
16 broad indication of how certain that statement was.

17 **Q.** You, or rather SAGE, is a scientific advisory committee.  
18 Did you see the role of SAGE as properly extending to  
19 giving the government policy advice or making specific  
20 recommendations as to what it should do?

21 **A.** I didn't. I viewed the process in sort of three steps.  
22 I thought that there was the sort of evidence synthesis  
23 step, which was SAGE -- and obviously there could have  
24 been evidence syntheses in other aspects, economic  
25 aspects, social aspects, that we weren't covering, but

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1 I felt that we were involved in evidence synthesis,  
2 trying to summarise the evidence, and then that went  
3 forward to central government somehow, to the  
4 policymakers, who I -- in my view are the senior civil  
5 servants who weigh up those -- put that aspect of the  
6 evidence together along with the other, because  
7 of course any policy would have huge implications for  
8 society, you know, beyond the epidemiology or the health  
9 implications and so --

10 **Q.** Could you just slow down a little bit, Professor.

11 **A.** Apologies.

12 **Q.** You're running away from us.

13 **A.** So I felt that then that second step was being done by  
14 the policymakers, the senior -- the civil service. And  
15 then the final step, you know, they would come up  
16 with -- this is my mental model, I don't know whether  
17 it's accurate, but -- and then the final sign-off on  
18 which of the preferred options would of course be made  
19 by our elected representatives.

20 **Q.** Was it the role, do you think, of individual members of  
21 SAGE to publicly advocate for particular measures to be  
22 taken or for policy, to go to the press and say,  
23 "I think this should be done, why isn't the government  
24 doing that?" or "We, SAGE, aren't doing enough"?

25 **A.** I think it was difficult. So my -- I think the answer  
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1 do, in any of those interviews. Sometimes it's --  
2 they're very eloquent, they're very clever at their art  
3 and they get things out of you that perhaps you didn't  
4 want to divulge. So I tried not to.

5 What I tried to do, because I did think it was --  
6 well, I always thought that it's important, that we  
7 should explain to the public -- you know, science  
8 generally I think -- you know, outside of a pandemic  
9 I think we should explain our work to the public, who  
10 are ultimately funding it in most instances. And in  
11 this particular case, of course, they were being  
12 directly affected by the measures that were being put in  
13 place or not being put in place, and I felt that it  
14 was -- there was a responsibility on us to try to  
15 explain the science. And also I tried to explain --  
16 I mean, if you saw my interviews on wherever, I tried to  
17 explain that this was not easy, that there was never  
18 an easy solution to any of this, and this was difficult,  
19 and the government were having to make really difficult  
20 decisions, having to trade off different aspects of,  
21 you know, health and wealth and whatever. I tried to  
22 explain that this was a very, very difficult thing.  
23 Because it was. They were dreadful decisions that they  
24 were having to make.

25 **Q.** Indeed.

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1 to that is -- should we have that sort of thing --  
2 probably no, because that didn't necessarily help  
3 the government make its -- I thought that -- and we  
4 were -- you know, Chris and Patrick both made this clear  
5 to us, that it didn't necessarily help the government  
6 consider the evidence in a cool and calm way, if they  
7 were getting pressure from senior -- from senior  
8 advisers, I have to say, so I tried to stick to that in  
9 the early part of the epidemic. Later in the epidemic,  
10 at times I struggled with trying to stick to that, and  
11 I don't think I always did. I -- I did -- yeah.

12 **Q.** Professor, it's fair to say that you gave a number of  
13 interviews to the press, you spoke to Reuters in April,  
14 on 8 April, I think, The Sunday Times in May,  
15 the Andrew Marr programme in May, you went on  
16 the Robert Peston programme I think at a later stage,  
17 perhaps Andrew Marr as well?

18 **A.** Yeah.

19 **Q.** Was the tendency of some members of SAGE to speak to  
20 the press and to talk about the guts of what had to be  
21 done and what was being done or not being done, do you  
22 think that helped this process of giving scientific  
23 advice to the government?

24 **A.** So possibly not. I tried not to give -- to make  
25 statements about what the government should or shouldn't  
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1 More on SAGE. The Inquiry has heard evidence from  
2 a number of attendees on SAGE that because  
3 the government never told SAGE what its strategies were,  
4 what its overall objectives might be or, in essence,  
5 what it wanted to achieve, when providing advice SAGE  
6 was to some extent shooting in the dark, would you  
7 agree?

8 **A.** Yes, I think -- I think I said in my statement it's  
9 very -- it's very difficult to plot a course when you  
10 don't know what the destination is.

11 **Q.** In terms of the membership of SAGE, the membership of  
12 SAGE grew enormously, not least because it was able to  
13 go online and did go online --

14 **A.** Yes.

15 **Q.** -- at the onset of the pandemic. It was obviously  
16 a scientific committee, and it had a number of august  
17 biomedics, epidemiologists, modellers, public health  
18 experts. It was attended also, wasn't it, by  
19 representatives of NHS England, Public Health England,  
20 and of course the CMO and the Government Chief  
21 Scientific Adviser, who are well renowned experts in  
22 their own right?

23 **A.** Yeah.

24 **Q.** Would it have benefited from a greater input from  
25 frontline organisations?

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1 **A.** I thought -- I personally felt that that would have  
2 helped at times. I thought that there were times,  
3 particularly at the beginning, when our data were  
4 terrible, that our situational awareness of what was  
5 really happening wasn't as good as it could have been.  
6 And so I would have -- I would have preferred to have --  
7 yes, I thought -- I would have liked to hear a little  
8 bit more from the frontline.

9 In fact, with NERVTAG, I knew that PHE, for  
10 instance, used -- had started to do somewhat they called  
11 a sitrep, and this was a large number of slides,  
12 you know, there was -- it was huge, it was like 50, 60  
13 slides, that they were putting together every week which  
14 gave a summary, of -- well, a situation report.  
15 I sort of -- I asked on NERVTAG whether we could see  
16 that at the start of NERVTAG meetings, so that we could  
17 get a little bit better, a bit more holistic  
18 understanding of what was really happening. And that  
19 did happen, so that was accepted, and PHE used to start  
20 NERVTAG with a brief sitrep.

21 **Q.** What did SAGE make of the government's mantra that it  
22 was, at crucial times, "following the science"?

23 **A.** Well, you know, the government couldn't and shouldn't  
24 ever have just followed the science. That was only one  
25 aspect of the -- it's only one aspect of the epidemic.

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1 received enormous assistance from something called the  
2 Department of Health and Social Care Health Protection  
3 Analytical Team?

4 **A.** Yeah, they were amazing. The secretariat for -- it's  
5 hard to describe the -- how much work was being done.  
6 And to bring that together, you know, and to make sense  
7 in -- say if we think of the SPI-M work, enormous amount  
8 of work that was being done every week, technical,  
9 difficult, not something that lay people would  
10 necessarily be able to get a grasp of, and  
11 the secretariat, importantly, with SPI-M, included  
12 modellers. There's a Health Protection Analytical Team  
13 within -- it's a small team, but within the Department  
14 of Health and Social Care. And they formed part of  
15 the secretariat for SPI-M, and -- so then the  
16 discussions that we were having, they were following  
17 them, they were understanding them, so they could --  
18 because these discussions were technical, far ranging,  
19 difficult. And to summarise that in these consensus  
20 statements that they did was an amazing piece of work.  
21 And similar work was being done by civil servants,  
22 GO-Science and others.

23 The secretariat support was spectacular.

24 **Q.** To be clear, SAGE and SPI-M and NERVTAG weren't just  
25 responding to particular commissioned requests from

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1 And so they had to weigh advice or -- you know, on  
2 various aspects, whether it was economic or social or,  
3 of course, operational, as well as the scientific  
4 aspect.

5 So I thought that that was always, I could see why  
6 they were doing it, they were doing it so they could  
7 hide behind us, I think, so when difficult decisions had  
8 to be made, they could hide behind us.

9 **Q.** Is science ever certain?

10 **A.** No.

11 **Q.** Can it ever be?

12 **A.** No.

13 **Q.** Is there ever one piece of science which can be  
14 followed?

15 **A.** No. That's the -- so that was -- exactly -- so that's  
16 why we tried to represent the level of uncertainty in  
17 the statements we were making at these sorts of  
18 meetings. Because, of course, especially at the  
19 beginning of a pandemic, of a completely novel disease,  
20 I mean, uncertainty is huge.

21 **Q.** Why did SAGE, or perhaps you, feel the government was  
22 trying to hide behind you?

23 **A.** It's what they do. It's convenient, isn't it?

24 **Q.** Was SAGE enormously assisted by, well, a great deal many  
25 other unsung heroes? I think a secretariat, you

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1 government, every week or perhaps every meeting these  
2 committees would have presented before them, because  
3 they had been prepared since the last meeting, round-up  
4 of information, updated projections, rolling charts,  
5 voluminous papers on what the position was --

6 **A.** Correct.

7 **Q.** -- that you could consider as part of your -- then your  
8 analysis?

9 **A.** Yeah, correct. So it's probably worth -- I don't know  
10 whether you want to get into the details, but there was  
11 different ways of working on the different committees.  
12 SPI-M -- or SPI-M-O more correctly at the time was  
13 a little different from the others, in that it had some  
14 routine tasks it did every week, which was short-term  
15 projections, medium-term projections, estimation of  
16 the reproduction number, and so on, and they were done  
17 by many groups contributing to that every week. So  
18 there was a kind of routine piece of work. There were  
19 the commissions that came to us from central government,  
20 asking us to do some work on a particular aspect. And  
21 they came most weeks, from recollection.

22 Then on top of that there was work that we did off  
23 our own bat, because we felt that it was important.

24 Like, for instance, the work that you just highlighted  
25 earlier, nobody asked us to do that, we got on with that

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1 in January and then brought it to SPI-M, you know, at  
 2 the appropriate time.

3 **Q.** Now can I turn, please, to modelling, which is,  
 4 of course, your speciality.

5       Shortly, can you explain the difference, please,  
 6 between scenario modelling and forecasts?

7 **A.** So forecasts are what we think will happen, and  
 8 scenarios are what might happen under certain  
 9 circumstances, and they're usually run, those scenarios,  
 10 over a longer period of time, so you could see  
 11 the impact of those different circumstances.

12       So if I could give an analogy --

13 **Q.** Please.

14 **A.** -- from the ... so we have a weather forecast, and that  
 15 tells us -- that tells us -- it gives a probabilistic  
 16 statement about what the weather might be tomorrow or  
 17 the day after or whatever. So it might say there's  
 18 a 80% chance of rain tomorrow.

19       There's nothing you can do about that. It's going  
 20 to rain probably, there's an 80% chance, or not. The  
 21 only thing you can do is take an umbrella or a mac or  
 22 something. Yeah?

23       So a scenario is something quite different and it  
 24 runs over a much longer period. So the scenario models  
 25 for looking at climate change, for instance, so looking

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1 really be exactly like this in two or three months"  
 2 is -- the chances of that are very low, of course.

3 **Q.** Right.

4 **A.** They sketch out possibilities, just like the climate  
 5 change modelling --

6 **Q.** Versus --

7 **A.** -- sketching out possibilities.

8 **Q.** All right.

9       In the context of Covid, the forecasts therefore  
 10 focused, did they not, on fairly -- it's no less  
 11 important, but fairly basic information like how many  
 12 people will die if you do nothing, how many beds will  
 13 need to be occupied, how many hospital cases are there  
 14 likely to be, and so on. Those are examples, fairly  
 15 basic --

16 **A.** Yeah, and they were very short term, so it's sort of  
 17 looking ahead just one or two weeks.

18 **Q.** In order to be able to forecast in that way, as you've  
 19 explained, a modeller needs to have an understanding of  
 20 the reproduction number, the infection fatality rate,  
 21 the hospitalisation rate, that sort of basic data?

22 **A.** Strictly speaking -- yes, you certainly need the data,  
 23 of course you need the data. But strictly speaking, you  
 24 don't necessarily need to know the reproduction number  
 25 to forecast how many hospital beds you might need the

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1 at what might happen over the long term, over, you know,  
 2 10, 20, 30 years if we do something: if we take certain  
 3 action to, say, reduce our CO2 emissions, for instance,  
 4 this might happen to the climate.

5       Now, those are obviously very certain, they're run  
 6 over a very long time period, but you have  
 7 the decision-makers, and in this case it's sort of  
 8 the -- all of us, I guess, have some ability to change  
 9 the future. So on the basis of these scenarios you  
 10 could say, well, really we ought to be doing this to,  
 11 say, reduce our carbon dioxide output, for instance,  
 12 which then might change the future, we might have less  
 13 of an increase in global temperatures.

14       It's the same sort of thing for epidemiological  
 15 forecasts, which are very short term and just say things  
 16 like how many beds might there be required next week or  
 17 perhaps the week after. They're very short term, just  
 18 like the weather forecast is very short term. Versus  
 19 these longer-term scenarios: okay, if we put this policy  
 20 in place, what might happen? If we put that policy in  
 21 place, what might happen?

22       Now, they're, of course, played out over a much  
 23 longer period. They're much more -- because they're  
 24 going over a much longer period they're not going to be  
 25 right. The actual -- the actual -- "The epidemic will

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1 next week. You need to look at the trends and you could  
 2 just -- so there are simple ways you could do it just  
 3 looking at trends and projecting forward.

4 **Q.** All right.

5 **A.** And what happened was that there were a large range of  
 6 different methods that were used by the different groups  
 7 around the country, and brought together in a -- and  
 8 then combined in a statistical way to come up with a --  
 9 what's called an ensemble forecast.

10 **Q.** Even a forecast of a fairly basic type, perhaps based on  
 11 fairly basic information like taking a percentage of how  
 12 many people in the population might die or how many  
 13 might be hospitalised, requires the modeller to have  
 14 a good understanding of the underlying data. So if  
 15 there is a delay in people being tested, or there's  
 16 a delay in getting the results of those tests to the  
 17 modeller, or if there is an unwillingness on people who  
 18 are infected to be tested at all, or if there aren't any  
 19 sophisticated surveys or blood tests which have been  
 20 carried out in order to see how many people are infected  
 21 if they're not prepared to be tested, a lack of data of  
 22 that type makes the modellers' life very difficult  
 23 indeed?

24 **A.** Of course. In fact, actually one of the things that we  
 25 are -- one of the roles in the -- is to understand those

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1 delays. And so it's not just -- it's not just a matter  
2 of forecasting into the future, but there's this  
3 dreadful term "nowcasting", which is how many cases  
4 there actually are now, because that's not -- because  
5 the reported cases won't be reflecting the actual  
6 infections occurring on that day, they're reflecting  
7 something that happened perhaps weeks earlier. So we  
8 can take -- with understanding of these delays, then we  
9 can actually get a better idea about what's actually  
10 happening now. It's a dreadful term, but it's quite  
11 explanatory, "nowcasting".

12 So that was one of the roles that we were of course  
13 doing.

14 **Q.** So for SAGE and the modelling experts on it, there was  
15 a very real problem in February and early March, was  
16 there not, because you couldn't be sufficiently precise  
17 in even these basic forecasts until you had the right  
18 data and you were receiving the data in good time?

19 **A.** We weren't doing forecasts in February, there wasn't  
20 really sufficient data to do it. We started doing it in  
21 March.

22 **Q.** Right. In terms of the scenario modelling, that is to  
23 say "what might happen if we do this", do you think that  
24 that distinction between forecasting and the contingent  
25 possibility, "what might happen if we do or don't do

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1 mentioned one of them indirectly already.

2 The Report 9, so-called, by Imperial College on  
3 16 March I think --

4 **A.** Yeah.

5 **Q.** -- was actually part of a wider body of material. You  
6 had drawn up, I think on 3 March, learning from  
7 a meeting on 1 March that also looked at how many deaths  
8 might occur or would occur if there was a failure to  
9 take control measures and what the impact would be on  
10 the NHS. And Professor Steven Riley, from whom my Lady  
11 heard, also gave evidence about his own work, a series  
12 of papers between 3 and 10 March.

13 Professor Ferguson's work, or rather the work of  
14 Imperial College London, that Report 9, was met with  
15 a storm, really, of reaction and, in some places,  
16 criticism, and he was accused of being outrageously  
17 alarmist.

18 Were these scenario modellings, particularly of  
19 March, which set out what would happen if steps weren't  
20 taken, in fact unduly alarmist?

21 **A.** I don't think so. You know, we were, as you -- we said  
22 before, from early on you could see that this had the --  
23 this was the -- you know, this had all  
24 the characteristics of being a nightmare.

25 In terms of epidemiologically, it was a respiratory

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1 this", do you think that distinction was properly  
2 understood by the government and the public?

3 **A.** No. I think sometimes at times it may have been  
4 deliberately misunderstood. So we were -- so very  
5 frequently our scenarios about what might happen were  
6 afterwards treated as a forecast, when we'd changed  
7 the -- the government had taken action to avoid that  
8 scenario. A classic example would be, I mean, the work  
9 on looking at the first wave and how many deaths there  
10 might happen in a first wave and a scenario that --  
11 that -- you know, we were working on and Neil Ferguson's  
12 group at Imperial was working on, would be -- you know,  
13 there were many scenarios but one of which would be:  
14 what happens if we take no action and nobody changes  
15 their behaviour? That would be the kind of absolute  
16 worst-case scenario. And of course we took action,  
17 you know. And both my group and Neil's group, the work  
18 suggested that that scenario would be devastating, there  
19 would be hundreds of thousands of deaths,  
20 hospitalisations way above what the NHS could cope --

21 **Q.** All right.

22 **A.** But we took action to avoid that, so the government took  
23 action to avoid that. So to compare then what happened  
24 with that scenario is actually meaningless really.

25 **Q.** I want to ask you about two particular examples. You've

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1 infection, so very easy to spread. Clearly very  
2 transmissible in the community. And although  
3 an infection fatality ratio of 1% doesn't sound like  
4 a lot, when of course you match that with, if no action  
5 is taken, a large fraction of the potential will become  
6 infected very rapidly, that then -- that then leads to  
7 a huge number of deaths.

8 **Q.** A second example, so moving forward, in fact, to the  
9 autumn, the government gave a press conference where  
10 some particular documents were used to -- not directly  
11 used, I think, to justify the lockdown but they were  
12 certainly put into play, and they were documents which  
13 had been produced some weeks before by a number of  
14 modelling groups, so your own London School of Hygiene,  
15 I think Imperial, Warwick --

16 **A.** PHE in Cambridge.

17 **Q.** PHE, Cambridge, thank you. And they were work done at  
18 the request of the Cabinet Office to point out what  
19 the very worst or one of the worst or maybe even  
20 the worst, the reasonably worst-case scenario might be.

21 **A.** Yeah, there were -- it was an early step to try to work  
22 up a new reasonable worst-case scenario. These  
23 reasonable worst-case scenarios were used for government  
24 planning. And it was an early step, actually at the  
25 request of SPI-M-O secretariat initially --

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1 Q. All right.

2 A. -- to come up with some ... so to come up with some  
3 scenarios what might happen over the next few months.

4 Q. All right.

5 Weeks later --

6 A. Yes.

7 Q. -- they were relied upon.

8 A. They were.

9 Q. The extent to which they were relied upon needn't detain  
10 us, but there was a massive reaction in the press, was  
11 there not, because the press were saying: well, look,  
12 these documents appeared to show X number of deaths but  
13 they haven't happened, or they won't happen.

14 A. Yeah.

15 Q. The short answer was they were only scenario models, and  
16 they were reasonable worst-case scenario models to boot,  
17 and they were draft documents --

18 A. Correct.

19 Q. -- and they were being prepared for a different purpose?

20 A. Correct. And it was worse than that, in fact, because  
21 every week we were doing medium-term projections, so,  
22 again, the various groups contributing to SPI-M-O were  
23 doing medium-term projections over a period of  
24 six weeks, I think is -- four to six weeks is what we  
25 were doing, and every -- and each of those groups were

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1 called doom --

2 Q. That you were being alarmist?

3 A. Yeah.

4 Q. All right. We'll just have a quick look at some of the  
5 reaction, INQ000212171.

6 A. Yeah, yeah.

7 Q. "Apocalyptic forecast of 4,000 coronavirus deaths a day  
8 could be FIVE TIMES too high and had already been proved  
9 wrong when government revealed it at the weekend."

10 A. Yeah, well, we would have said the same thing.

11 And the -- of course the whole point of getting this  
12 ensemble estimate together is that it would downplay,  
13 downweight the more extreme estimates. Just the same  
14 way with sort of climate change, you know, some models  
15 might give a higher estimate of what the impact might be  
16 and some lower, and it's the same thing here. And then  
17 by bringing many, many different models together, you'd  
18 get a consensus. And so what was done here was pick  
19 the worst -- the worst -- the most alarmist bit of  
20 the -- of that -- so of those four reasonable worst-case  
21 scenarios, the Daily Mail here is picking the worst one,  
22 and we would never have presented -- we would never have  
23 presented it like that. We were presenting these  
24 consensus estimates, which of course would downplay  
25 the extremes and focus on the most -- you know, where

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1 contributing to an ensemble estimate of what we thought  
2 would happen if nothing changed, and then every week we  
3 would look at how well we did last week and learn from  
4 it. So we would look at each individual model, how well  
5 that had projected what had happened in the coming week,  
6 and also the ensemble estimate, how well that had done,  
7 how well that had performed in the coming week, and the  
8 whole process would move on.

9 So since the date when those reasonable worst-case  
10 scenarios were generated at the beginning of October,  
11 there were three weeks or more of these more -- what we  
12 think are more likely to happen, you know, and that  
13 had -- those estimates had been validated by looking at  
14 what actually did happen. And they were doing -- and  
15 they were actually capturing the trends really rather  
16 well.

17 So the government could have used that much more  
18 accurate -- those much more accurate scenarios,  
19 medium-term projections, to -- it didn't matter, in  
20 a way. They were all still saying: unless action is  
21 taken, the NHS will come under severe -- will come under  
22 severe stress very shortly.

23 But the way it was done and the way it was -- to use  
24 the reasonable worst-case scenario, it reflected very  
25 badly on us, it made us look like we were, well, we were

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1 there's most support from the different statistical --  
2 the different models.

3 Q. All right.

4 A. So it's very ironic, really.

5 Q. You say in your statement that --

6 A. It's them being alarmist, not us.

7 Q. All right.

8 You say in your statement, Professor, there are some  
9 lessons which can be drawn.

10 A. Yeah.

11 Q. Firstly, the limitations of models needs to be more  
12 clearly, widely understood?

13 A. Yeah.

14 Q. These are scenario models, they are all contingent, what  
15 might happen if we don't do something. Secondly,  
16 government in future needs to be much clearer and more  
17 straightforward in the way in which it will rely upon  
18 such models and use them and --

19 A. It needs them, of course, it needs to have those forward  
20 looks, and -- but it needs to be treated with some care.

21 Q. And also, thirdly, I think you would suggest that  
22 the way in which this valuable work was treated in some  
23 parts of the press was very unpleasant --

24 A. It was indeed, yeah.

25 Q. -- as well as being wrong?

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1 **A.** Exactly.

2 **Q.** All right. I now want to come, please, to discuss some  
3 of the particular measures that SAGE debated during  
4 the course of February and early March.

5 On 29 January, you were party to an email string  
6 with Professor Chris Whitty.

7 Could we have that up, please, INQ000212194.

8 We can see at the top of the page that the final  
9 email is from Chris Whitty, "Thanks that lot ..."

10 Further down the page, on 29 January you've written  
11 to him saying:

12 "We are going to have a go at looking at the  
13 potential impact of mass school closure over the next  
14 few days."

15 Obviously closing of schools was an important issue  
16 that was being looked at?

17 **A.** Yeah.

18 **Q.** But if we go further down to the -- nearer the origin  
19 of -- the beginning of the string and over the page, we  
20 can see that you've written a fairly lengthy email to  
21 Sir Chris Whitty:

22 "My comments are:

23 "1. Given the apparent speed of spread, it seems  
24 unlikely that contact tracing and isolation is going to  
25 be effective at buying us much time."

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1 literature on it and come to that conclusion.

2 **Q.** And so --

3 **A.** That was for flu, of course, it was concentrating on  
4 flu, but it wouldn't be very -- very -- different, but  
5 we did look at it.

6 **Q.** If we could have INQ000212206, did you enter into,  
7 again, another email string with, I think this time,  
8 Sir Patrick Vallance, Sir Chris Whitty, Professor Sir  
9 Jonathan Van-Tam, Dame Jenny Harries and Charlotte Watts  
10 at the Home Office? You say in this email at the top of  
11 the page:

12 "A concerted travel ban with our closest neighbours,  
13 from whom indirect travel from China would be expected,  
14 is going to be far more effective than us going it  
15 alone. However, even that is likely to have relatively  
16 limited impact, buying a few weeks at best. The  
17 question is what you could you achieve in this time?  
18 Very little in terms of ... vaccines ... [but it might]  
19 give the Chinese enough time to bring the epidemic under  
20 control."

21 **A.** Yeah, well, I thought if they could bring it under  
22 control, they were under lockdown then, then maybe we  
23 might get away with this.

24 **Q.** And SAGE around the same time, the next day in fact,  
25 3 February, INQ000212208, concluded, based upon a paper

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1 Is that a reflection of the debate in fact -- or  
2 the evidence you gave earlier, which is it was apparent  
3 this was the --

4 **A.** Yeah, so that work was being finalised at the time.  
5 I mean, this is 29th, I think we put it on our  
6 website --

7 **Q.** Yes.

8 **A.** -- one week later.

9 **Q.** So you were clear and you told obviously the recipients  
10 of this email that your view was that contact tracing  
11 and isolation would be unlikely to be effective at  
12 buying much time?

13 **A.** I was taking the glass half empty view of it, of  
14 the results.

15 **Q.** But you were right.

16 **A.** Yeah.

17 **Q.** In relation to --

18 **A.** Unfortunately.

19 **Q.** In relation to travel advice, and exit screening, you've  
20 already given some evidence about that, was the position  
21 that the World Health Organisation had beforehand  
22 generally advised that screening and restrictions short  
23 of complete closure of a border were unlikely to be  
24 efficient or effective?

25 **A.** Correct, yes. They'd done a review of all of the global

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1 with which it was provided, if we could go to page --  
2 I think the second page, please, of this document,  
3 3 February:

4 "1. On the expected impact of travel restrictions,  
5 SAGE estimates -- with limited data -- that if the UK  
6 reduces imported infections by 50%, this would maybe  
7 delay the onset of any epidemic in the UK by about  
8 5 days; 75% would maybe buy 10 ... days; 90% maybe ...  
9 15 additional days ..."

10 **A.** Yeah.

11 **Q.** SAGE considered a report, we won't need to get it up, in  
12 which I think the London School of Hygiene perhaps,  
13 rather than ICL, had concluded that tests or modelling  
14 had shown that 46% of infected persons would never be  
15 detected by screening at a border?

16 **A.** This was looking at temperature screening,  
17 symptom screening, which is usually done  
18 with temperatures. The problem is, of course, if you --  
19 it takes a few days for you to develop a temperature,  
20 you know, five or six days, so if you travel on day 0,  
21 day 1, day 2, day 3, day 4, you don't get picked up.

22 **Q.** Contact tracing.

23 Professor Sir Chris Whitty asked in January for  
24 an investigation to be carried out into whether or not  
25 that would be effective. The London School of Hygiene

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1 produced a number of papers which they put online and  
2 then they published, I think, in *The Lancet*.

3 **A.** Yeah.

4 **Q.** Let's have a look at that Lancet health article,  
5 INQ000212222.

6 **A.** I think this is the same one as before, with  
7 Joel Hellewell, is it?

8 **Q.** It's the one to which you were a contributor. 212222.  
9 "*Feasibility of controlling Covid-19 outbreaks by*  
10 *isolation of cases and contacts*". The findings, if we  
11 could scroll in -- thank you very much.

12 There is a description of the consequences or the  
13 analysis of simulated outbreaks, but essentially,  
14 without going into the detail of that paragraph, what  
15 that data or what that analysis showed is that in order  
16 to be effective, contact tracing has to pick up a very  
17 large percentage, an overwhelming percentage of  
18 the people who are the contacts in order to work?

19 **A.** Correct.

20 **Q.** Was the fraction of contacts which have to be picked up  
21 to make it work as high as 70% to 80%?

22 **A.** It's very difficult to tell, because of course, almost  
23 by definition, you don't pick up the contacts you didn't  
24 pick up. Yeah?

25 But there are clever ways that you can get to that,  
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1 found, or I'd found on a Google, I'd found some  
2 attendance data, how many -- how many times -- what the  
3 global attendance -- or the entire attendance of  
4 sporting events in the UK in, I think, 2018 or 2019,  
5 I can't remember. And it was something like 75 million  
6 ticket holders, as it were, 75 million attendances at  
7 sporting events of every type, whether it's the cricket  
8 or the football or Wimbledon or whatever it might be.  
9 And if you think about it, there's 67 million of us,  
10 roughly, so that means on average -- on average -- we  
11 attend about one sporting event per year. And so if you  
12 stop the sporting events, is that going to stop the  
13 virus? Well, no, because it's going to make a tiny  
14 impact on the total number of impacts that we make. So  
15 that --

16 **Q.** Throwing, it's been described as, a lit match on  
17 a raging fire?

18 **A.** Yeah. So -- but that's looking at it at the population  
19 level, so -- and of course that's what we do, we are  
20 modelling things at the population level. Whereas  
21 actually at the individual level maybe it's not a good  
22 idea to go to a sporting event in a pandemic. So for  
23 an individual, you know, sensible public health advice  
24 might be to say, well, "Don't go". But that doesn't  
25 mean to say it's going to have a big impact on

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1 and actually later in the epidemic, when Test and Trace  
2 was launched, it was one of the things we -- I myself  
3 kept raising with Test and Trace was to try to put these  
4 measures in, to see whether -- to see what fraction of  
5 the contacts were being missed. But at that time it was  
6 impossible to tell.

7 **Q.** Sporting events. This was analysed by CMMID, the London  
8 School of Hygiene research institute or centre, as well  
9 as SAGE. Could we have INQ000212210.

10 This is dated 11 March, on page 1, "*The impact of*  
11 *banning sporting events and other leisure activities on*  
12 *the COVID-19 epidemic*", prepared on behalf of the CMMID  
13 Covid modelling team.

14 Did it essentially conclude that banning mass  
15 gatherings would be unlikely to have a great deal of  
16 impact?

17 **A.** When looked at in the whole of the epidemic. So we  
18 were -- we were -- I think this is a kind of example of  
19 where there was a kind of over-reliance on modelling.  
20 So, yes, attending a sporting event would be, you know,  
21 more risky than staying at home, of course, but actually  
22 if it's outside that risk was probably quite low,  
23 although we didn't know it.

24 But at the population level, stopping sporting  
25 events is not really going to do very much, because we'd  
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1 the epidemic. It wouldn't.

2 **Q.** So if answer to a question that in fact my Lady put to  
3 an earlier witness, if you attend a mass gathering  
4 event, there is a risk you will become infected and it's  
5 a risk that you wouldn't otherwise have run?

6 **A.** Yes and no, depends what you would do if you hadn't have  
7 gone to the event. So if you'd have gone to the pub  
8 instead, then maybe the risk in the pub was greater than  
9 being at the event, if the event is outside.

10 **Q.** All right. But at a micro level there is obviously  
11 a risk for the individual?

12 **A.** Yes.

13 **Q.** But if you look at it on a population modelling level,  
14 there is a tendency, isn't there, to overlook  
15 the significance of that risk?

16 **A.** Because of the population level, it's tiny. It makes  
17 a tiny contribution to the entire -- yeah, your analogy  
18 is a very good one.

19 **Q.** So, in truth, by relying upon modelling in order to  
20 answer the question, should we ban mass gatherings --

21 **A.** It's the wrong -- you're really -- you're asking  
22 the wrong group of people, you should just take  
23 a decision about it. And, you know, there's a lot --  
24 this is -- you know, there's lots of reasons why you  
25 might -- might -- why you might want to do it even

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1 though it might not have an effect or a very small  
 2 effect at a population level. One we just talked about,  
 3 an individual risk. Two is the optics, it doesn't  
 4 necessarily look good. You know, imagine the situation  
 5 if we'd had our schools closed and the football was  
 6 still going on. I don't think anybody would have  
 7 accepted that. It would have looked a bit strange.

8 **Q.** And in terms of the precautionary principle to which you  
 9 referred earlier, there was obviously a good argument  
 10 for banning mass gathering events?

11 **A.** Yes, even though I think, and we did work on it later,  
 12 actually, it's something we did some work on later in  
 13 the epidemic, and it did show that actually the risk is  
 14 really quite small.

15 **Q.** You've referred to the fact that modellers were  
 16 handicapped to some extent by the delays in, originally  
 17 or initially, receiving data from China, and  
 18 understanding that data, and then towards the end of  
 19 February and the beginning of March the delays of which  
 20 you spoke in relation to the delays between testing and  
 21 getting the data to you in terms of delays in people  
 22 getting tested or testing the right number of people or  
 23 getting an understanding of who was infected.

24 You raised with SAGE, didn't you, on 13 March your  
 25 concerns about how the significant delays were impacting

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1 was two bits of work that we were doing that week.  
 2 I don't know if you want the details or not.

3 **Q.** I don't think we need trouble you for the detail of  
 4 the work. The main point is you were working very hard  
 5 on the modelling, but the output --

6 **A.** It was much worse. There was two bits, there was  
 7 this -- and we used to start SAGE meetings with a quick  
 8 update, like a one-minute update from Chris Whitty or  
 9 Jonathan Van-Tam on -- just on the numbers of cases that  
 10 had been reported. And of course those cases -- because  
 11 of this delay, those cases hadn't actually been --  
 12 become a case on that day that we were getting reported.  
 13 They'd actually become a case a week earlier. So what,  
 14 you know, Chris was reporting on what was happening  
 15 a week earlier.

16 And it's worse than that, if you think about it,  
 17 because it takes about five or six days between getting  
 18 infected and becoming a case, and so actually we were  
 19 being -- you know, I thought that we were being lulled  
 20 into a bit of a false sense of security here, in that  
 21 actually the numbers of cases -- because what was being  
 22 reported on was infections that had happened perhaps  
 23 two weeks earlier.

24 **Q.** All right.

25 **A.** And that's just the ones we knew about.

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1 your ability to model efficiently?  
 2 We'll just have a look at that. INQ000212212.  
 3 Page 1 shows 13 March, the second page, paragraph 1,  
 4 this is the date on which --

5 **A.** Yeah --

6 **Q.** -- SAGE says: we now believe there are more cases in the  
 7 United Kingdom than SAGE currently expected.  
 8 Paragraph 7:  
 9 "... we may be further ahead on the epidemic  
 10 curve ..."

11 **A.** Yeah.

12 **Q.** "The change in numbers is due to the 5-7 day lag phase  
 13 in data availability for modelling."  
 14 So you in essence said to SAGE, "We've been undone,  
 15 there has been a delay in getting data to us, but now  
 16 that we've got a better understanding, our situational  
 17 awareness is better, we can now see we're further ahead  
 18 on the curve than we thought we were"?

19 **A.** We always thought there would be a delay, because  
 20 of course there is, nothing's -- you know, it takes time  
 21 for the data to come in, of course. But that was  
 22 the first time we'd been able to estimate it. And that  
 23 was the average delay. Some individuals on  
 24 the database, the delays between them was up to  
 25 three weeks. And so, yes, with having estimate -- it

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1 **Q.** Because for all the asymptomatic infections --  
 2 **A.** Or even just the cases that had come through different  
 3 routes, because we were still -- to be tested you had  
 4 to -- there had to be a reason for you to be tested and  
 5 to become a case, as it were, and that was you had to  
 6 have symptoms but you also had to have come from  
 7 a high-risk area, China, Singapore, mostly other places  
 8 in the Far East initially. And so we weren't testing  
 9 people who had symptoms that hadn't come from there  
 10 initially.

11 That did -- we did put systems in place at the end  
 12 of February that would give an idea of infections in  
 13 the community, infections in the community, and they  
 14 immediately picked up a case -- cases. So that --

15 **Q.** Sporadic?

16 **A.** These were the sporadic ones.

17 **Q.** All right, I'm going to pause you there, because we've  
 18 got to move on to other topics.

19 So in summary, Professor, by this time,  
 20 the beginning of February --

21 **A.** No, this is March.

22 **Q.** Well, sorry, I meant to say March. In fact 13 March.

23 **A.** Yeah.

24 **Q.** You've told us that by the end of January, the broad  
 25 nature of the threat was known. By February,

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1 mid-February, the broad nature of the possible  
2 fatalities and hospitalisations and infections were  
3 known. The modelling process and the enormous amount of  
4 work dedicated to trying to bottom out the figures and  
5 get a proper handle on the nature of this pandemic  
6 continued. And then at the beginning of March SAGE was  
7 blindsided by the discovery that not only, as you've  
8 described, was there no effective means of containing  
9 the virus, and not only the virus was as deadly as it  
10 was, but that it had spread through the United Kingdom  
11 far further than anyone had realised?

12 **A.** Yeah. By picking up these sporadic cases they were not  
13 linked to importations or anything like that. So  
14 hopefully we'd have seen no -- none of them. And  
15 this -- by no means were we picking up every sporadic  
16 case. It was -- this was like a sieve with huge holes  
17 in it. But there was two systems, if you think of two  
18 sieves, mostly holes and very little ...

19 **Q.** Professor, I'm --

20 **A.** But at this point, so we should have seen none and  
21 of course we did start to see them, so -- and we were  
22 trying to work out from the growth of those -- so at  
23 this point it really was apparent that there was far,  
24 far more -- not just had the -- was the infection  
25 spreading but it was spreading much more widespread than

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1 Italy and France and Spain in the early parts and we  
2 were not looking there, initially at least.

3 **Q.** Was that predominantly also the half term --

4 **A.** This was after --

5 **Q.** -- break --

6 **A.** Exactly, skiing holidays and the like. And just because  
7 of the -- just the travel, how much travel there is  
8 between -- between our countries.

9 **Q.** On 3 March, a report was prepared for SAGE, INQ000212223  
10 by the LSHTM CMMID team.

11 **A.** Yeah.

12 **Q.** Which set out in very clear terms what the likely deaths  
13 would be?

14 **A.** Possible. I mean, this is -- these are possibles and  
15 these are scenarios.

16 **Q.** Professor, forgive me, I hadn't finished -- I'm afraid  
17 I was just taking my time in formulating the question.  
18 What the likely deaths would be if social distancing  
19 measures were not applied. It was a classic scenario  
20 model: what might happen if something is not done or  
21 only something else is done.

22 The report showed to SAGE, did it not, we can see  
23 from the results in the middle of the page:

24 "The unmitigated epidemic is expected to result in  
25 570,000 deaths ... in England and result in a peak

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1 all of us hoped.

2 **Q.** All right.

3 **A.** So it was -- we were in big trouble.

4 **Q.** Would the full application of the precautionary  
5 principle in February, based upon the understanding of  
6 how fatal or damaging the virus was, have allowed  
7 the government, the country as a whole, not to have to  
8 wait to find out how far the epidemic had spread before  
9 realising that action and severe action was absolutely  
10 necessary?

11 **A.** Yeah, I'm not sure exactly what we -- what would have  
12 been a proportionate response in February. That's --

13 **Q.** All right.

14 **A.** Of course I wish we had taken more action in February,  
15 but I'm not sure -- I'm not sure what would have been  
16 proportionate when the cases would have been very, very,  
17 very low.

18 **Q.** But in reality, nothing was done in February, other than  
19 a fairly low level surveillance on travellers --

20 **A.** So we were concentrating on kind of trying to pick  
21 cases up coming from overseas and we were concentrating  
22 of course on the places where we knew there was  
23 transmission, and there was always a risk that  
24 transmission was happening somewhere else, which indeed  
25 it was. In fact we imported most of our cases from

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1 demand of [almost a million] non-ICU beds ...

2 130,000 ICU beds ... at peak. Closure of schools is

3 estimated to be the least effective of these

4 policies ... Cocooning of the elderly, general social

5 distances, and case isolation are all estimated to

6 reduce deaths by about 25% ... social distancing reduces

7 peak demand on hospital services more than the other

8 strategies. The combination of school closure and

9 social distancing ... [a reduction] of about 75% [in

10 beds] ... 32% [in deaths]. The combination [that's to

11 say all of them] would reduce demand by about 75% and

12 reduces death by about half.

13 So, again, this was not an alarmist production, was  
14 it?

15 **A.** No, this was just what you would get from those  
16 scenarios. I mean, obviously the worst case --  
17 the unmitigated one, I can't imagine it would ever have  
18 happened, we must have -- we must have taken action at  
19 some point, but ... and of course it doesn't take into  
20 account -- and this is important -- it doesn't take into  
21 account spontaneous behaviour change, because we had no  
22 way of estimating what that might be, what that might --  
23 we'd never done anything like that before. And in  
24 previous epidemics, because I did measure contact  
25 patterns in the 2009 pandemic, people didn't change

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1 their behaviour at all. Obviously it was low risk. So  
2 it doesn't take into account spontaneous behaviour  
3 change, which would have probably happened, but there's  
4 no way we could predict that.

5 **Q.** Estimate that. And it didn't take into account,  
6 of course -- well, it didn't say -- it projected one  
7 outcome of what might happen if these steps were taken  
8 individually or in combination?

9 **A.** And, you know, I regard these as -- as I said before,  
10 I think these are broad sketches of what might happen  
11 rather than precise ... but they were huge numbers,  
12 you know, that was the --

13 **Q.** Huge numbers. And this report set out in clear terms,  
14 did it not, that the NHS would be overwhelmed if certain  
15 measures --

16 **A.** There's no way you can cope with that sort of level of  
17 demand, you know.

18 **Q.** This was plainly brought to the attention of SAGE,  
19 of course, it was consistent, wasn't it, with the  
20 outcome of Professor Riley's reports and also  
21 Professor Neil Ferguson's reports of a few days later?

22 **A.** Yeah, Professor Riley's were less detailed than this, so  
23 I would say that it's more consistent with  
24 Neil Ferguson's estimates. And if you compare the two,  
25 there are differences, but broadly they're kind of in

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1 able to say to the government, "There is this massive  
2 problem coming"?

3 **A.** I guess if there is one thing saying there is a problem,  
4 it is better to come with a solution. And I don't think  
5 we had the solution -- I don't think we had the solution  
6 at that time, so we were looking at these sort of  
7 measures -- you can see, I mean, even with these  
8 measures and combinations of these measures, it still  
9 looked horrendous. The --

10 **Q.** I'm sorry to interrupt you, but you were looking at  
11 measures, you weren't engaging here in a polemic about  
12 whether it's suppression or mitigation or a reasonable  
13 worst-case scenario; you were focusing on what  
14 practically needs to be done?

15 **A.** Yeah.

16 **Q.** All right.

17 **A.** And it was more than this, in my view.

18 **Q.** As proved to be the case.

19 The government had already produced a report on  
20 3 March, a *Coronavirus: action plan*, of which a major  
21 part, the first stage, was contain.

22 Was that a publication of which you had become aware  
23 prior to its publication?

24 **A.** No, I mean, those sorts of strategy documents that  
25 the government published periodically over the course of

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1 the same ballpark.

2 **Q.** Your report notably, or rather the CMMID report notably  
3 doesn't get into the conceptual debate of suppression or  
4 mitigation. Professor Riley's and Professor Ferguson's  
5 do. There are references to that --

6 **A.** They were done later -- they were done later, those.  
7 This was very early March as opposed to sort of  
8 mid-March.

9 **Q.** To what extent did any debate about reasonable  
10 worst-case scenario, whether a response was mitigation  
11 or suppression, whether or not herd immunity was good or  
12 bad, assist in understanding these basic thoughts, which  
13 is unless practical measures are taken, the deaths are  
14 going to be huge?

15 **A.** Yeah. That's the simple message.

16 **Q.** Do you --

17 **A.** And we were not alone in this. So Neil and Steve, their  
18 work was similar. And other people were doing similar  
19 things elsewhere, not just in the UK, but we were all --  
20 it all pointed to extremely -- you know, the sort of  
21 situation that I don't think anybody could possibly just  
22 let happen.

23 **Q.** Did those debates about what was a reasonable worst-case  
24 scenario, was it going to happen, are we suppressing or  
25 mitigating, need to be resolved in order for SAGE to be

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1 the epidemic, of which that was the first one, we didn't  
2 see those before they came out.

3 **Q.** What was your reaction on seeing that the government's  
4 future strategy, because it was a document produced for  
5 what should happen going forward, what was your reaction  
6 on seeing that an element, the first element was  
7 containment?

8 **A.** Yeah, I ... I mean, it would have made more sense for  
9 that to have come out a month earlier. At that time,  
10 I know we were officially still in the containment  
11 phase, I think, but, you know, the -- as I say, from  
12 these sporadic cases you could see, there was -- we  
13 hadn't contained the virus, you know, at that point. So  
14 there was that.

15 There isn't a lot of detail in that document as  
16 well, so it is very general, it doesn't really say what  
17 really we would do. And maybe that was fine, because  
18 I don't think that had been worked out, but it was  
19 a very kind of high level document.

20 **Q.** Bluntly, Professor, the ship had sailed. There was and  
21 could be no containment, the virus was rife in  
22 the population?

23 **A.** Rife I don't think is right, yet. I mean, are we  
24 talking about 3 March? It was certainly here, it was  
25 certainly spreading, and this was the work that we were

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1 trying to do. Actually later than this, it was around  
2 8 March when we were looking at these sporadic cases and  
3 trying to work out how many -- what was the scale of the  
4 epidemic, because the reported cases was not reflecting  
5 that by any means.

6 **Q.** All right.

7 **A.** So we didn't really know the scale of it although the  
8 very fact that we picked up these sporadic cases was  
9 an alarm bell.

10 **Q.** In your statement you say, recognising that some  
11 observers have indicated that SAGE appeared to be  
12 too slow to recommend action during the early weeks of  
13 the epidemic, that you have some sympathy with this view  
14 and that you had become increasingly anxious yourself?

15 **A.** Absolutely.

16 **Q.** Is that because you say that this understanding of  
17 the sheer number of deaths and hospitalisations and  
18 the impact on the healthcare system in  
19 the United Kingdom should have been understood earlier  
20 or --

21 **A.** I mean, it was, I mean, everybody, I mean, I saw  
22 you inter -- well, Mark Woolhouse's evidence from a few  
23 days ago, and, you know, he did this sort of simple  
24 back-of-the-envelope calculation based on  
25 the reproduction number -- and he had done it back in

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1 hospitalised for and what fraction might need intensive  
2 care. So that was the last bit of the jigsaw. I mean,  
3 you could get a guesstimate at it, and a reasonable --  
4 and as February moved on that became more clear, but we  
5 didn't have a -- I would say we didn't have a solid  
6 estimate of it until really that meeting on 1 March, on  
7 the Sunday, 1 March, when we really -- we had a meeting  
8 with colleagues at Oxford, Imperial obviously, and  
9 the NHS, and then we got a much clearer idea. So that  
10 was the final bit of that jigsaw. But you didn't really  
11 need the whole jigsaw, I mean, you could see the picture  
12 was pretty obvious from -- from, you know, much before  
13 then.

14 **MR KEITH:** It's the perfect moment.

15 **LADY HALLETT:** I'm afraid going to complete you today --  
16 sorry, today we'll complete you, but this morning.  
17 I hope you were warned that you might go over lunch.

18 **THE WITNESS:** Yeah, that's okay.

19 **LADY HALLETT:** Thank you very much indeed, I will return at  
20 2 o'clock.

21 (1.00 pm)

(The short adjournment)

23 (2.00 pm)

24

25

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1 January, based on the reproduction number and  
2 guesstimates of case fatality ratio and come with very  
3 big numbers. We'd all done the same calculations back  
4 in January and early February. This was the -- this and  
5 when -- and Neil's was -- and Neil was -- Ferguson was  
6 doing the same, you know, in parallel doing -- looking  
7 at similar things. This was when we had kind of -- it  
8 had gone through the formal modelling kind of process  
9 and those numbers were coming out and they were -- they  
10 were truly horrendous.

11 **Q.** And that should have been understood earlier, is what  
12 you're saying in your statement?

13 **A.** So I think our broad -- if you want -- so we didn't  
14 know -- the last piece of the jigsaw was related to  
15 hospitalisation. It was difficult to understand exactly  
16 what fraction of people would be hospitalised, because  
17 in the early days, particularly in East Asia, and even  
18 here as well, early cases were hospitalised whether they  
19 needed it or not. So they were hospitalised for public  
20 health measures -- reasons, so that they wouldn't  
21 spread. This was in the containment phrase. Yeah?

22 **Q.** All right.

23 **A.** So it was difficult then to know exactly what fraction  
24 would need to be hospitalised for clinical -- on  
25 clinical grounds, and how long they would have to be

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#### CASE DIRECTION

1 **LADY HALLETT:** If Professor Edmunds will forgive me, I'll  
2 just deal with a case management matter. Forgive me,  
3 Professor Edmunds, it won't take long.

4 At some stage I have to decide the issue of whether  
5 to publish the notes made by Sir Patrick Vallance,  
6 Government Chief Scientific Adviser, and one of the two  
7 main scientific advisers to the government during the  
8 worst stages of the pandemic.

9 To date, the extracts from his notes put to  
10 witnesses have been read into the record, and not  
11 brought up on screen in the hearing or published as  
12 extracts. For other documents the whole page has been  
13 displayed and then published, even if the extract  
14 referred to is only a small part of the page.

15 Lawyers representing Sir Patrick have objected to  
16 a proposal from the Inquiry team to adopt the same  
17 process as is adopted for other documents in relation to  
18 Sir Patrick Vallance's notes, and to publish the whole  
19 of the relevant page or pages on screen.

20 They claim that this would be a breach of  
21 his Article 8 rights and of his legitimate expectation  
22 of privacy. Eight media organisations, supported by  
23 some of the core participants, argue that it is in  
24 the public interest to publish the whole page and that

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1 restricting publication of the notes would breach  
2 Article 10 of the European Convention.

3 Issues arise in relation to Sir Patrick Vallance's  
4 notes said to be of an entirely private nature that do  
5 not arise in relation to other documents provided to  
6 the Inquiry, and I must consider those issues very  
7 carefully.

8 Further, I note that I may well face calls for  
9 publication of all the notes at some stage, if I haven't  
10 done so already.

11 The issues of publishing the whole page upon which  
12 an extract appears and publishing the whole of the notes  
13 are inextricably linked. In my view, therefore, it  
14 would be premature to decide the first issue now.  
15 I wish to see how the notes are used and the extent of  
16 the use. I also wish to hear much fuller submissions on  
17 the principal issue of conducting the difficult  
18 balancing exercise of Sir Patrick's Article 8 rights and  
19 the rights under Article 10. The time for preparation  
20 and presentation of submissions at the short hearing on  
21 Monday was extremely limited, and therefore  
22 the advocates did not have, in my view, sufficient  
23 opportunity to address the principal issue in much  
24 detail, if at all.

25 I have decided, therefore, that for the time being  
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1 put out by government, particularly in late February,  
2 early March. Did you attend a NERVTAG meeting, I think  
3 on 21 February, where there was a debate about whether  
4 or not the risk assessment from Public Health England  
5 should be elevated from moderate to high?

6 **A.** Yes, it was on Skype for Business, and for some reason  
7 I couldn't make myself heard, and --

8 **Q.** All right.

9 **A.** But I heard the discussion and afterwards I emailed my  
10 points to the secretariat.

11 **Q.** Could we have, please, INQ000119469, paragraph 5 --  
12 page 5, paragraph 2.4.

13 "PH ..."

14 Is that Peter Horby?

15 **A.** Yes.

16 **Q.** "... asked the committee if anyone thought that  
17 the [Public Health England] risk assessment should  
18 change. No objections were raised however after the  
19 meeting, [John Edmunds] emailed to say that he was  
20 online but for some technical reason could not be heard.  
21 [He] believes that the risk to the UK population (in  
22 the PHE risk assessment) should be high, as there is  
23 evidence of ongoing transmission in Korea, Japan and  
24 Singapore, as well as in China."

25 You needn't deal in detail with how the PHE risk  
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1 we shall adopt the practical approach of bringing up  
2 the relevant extracts being put to a witness on screen  
3 but not the full page. The extracts will then be  
4 published following the day's hearing. We shall proceed  
5 on this basis until the resolution of the substantive  
6 issue. For documents other than Sir Patrick Vallance's  
7 notes, we shall continue to display and publish the  
8 whole page or pages, subject only to redactions for  
9 sensitive and/or irrelevant private material.

10 I acknowledge the concerns expressed by some about  
11 ensuring that all the most significant passages in  
12 the notes are put to witnesses where necessary and  
13 I rely on Counsel to the Inquiry and  
14 the core participants to ensure that that happens.  
15 I too shall be monitoring the situation.

16 I shall also keep under review whether or not  
17 the passages upon which the advocates wish to place  
18 reliance should be put into greater context by  
19 publishing larger sections of the text.

20 Thank you.

21 **PROFESSOR JOHN EDMUNDS (continued)**  
22 **Questions from LEAD COUNSEL TO THE INQUIRY (continued)**

23 **MR KEITH:** Thank you, my Lady.

24 Professor, during the course of the morning, you  
25 mentioned the reassuring nature of the messages being  
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1 assessment process works, because the Inquiry has  
2 already heard evidence about that. In short, however,  
3 at that stage it was at moderate, and it indicates, does  
4 it not, what the exact risk is on that day? It's not  
5 a prospective forward-looking exercise, it's at that  
6 time, and you believe that as at that time, on  
7 21 February, the risk was high?

8 **A.** I thought the risk was high. I thought there was  
9 a little bit of -- I thought the risk was about to be  
10 very high and I just didn't think -- I thought this was  
11 sending out the wrong message if we said that it was --  
12 that it was moderate.

13 **Q.** Around this time, in fact about a week or so later, we  
14 will see your emails at the beginning of March, you  
15 began to form the view, did you not, that we, SAGE, had  
16 to take much more radical measures -- or perhaps  
17 the government had to take much more radical measures to  
18 mitigate the epidemic?

19 **A.** Yes.

20 **Q.** Could we have, please, INQ000212036 on the screen. It's  
21 a 12 March email. If we can go down to the -- if we can  
22 go to the next page, and an email at -- I think maybe  
23 one more page, to 22.22. Yes, thank you very much.  
24 Towards the top of the page, at around about 10.30 on  
25 Thursday 12 March from John Edmunds:

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1 "1. The data are crap and hopelessly out of date,  
2 so we have little situational awareness. The daily  
3 figures are a joke and the [guesstimate] of 5-10,000  
4 cases is probably too low.  
5 "2. The measures just announced ..."  
6 Were those the measures announced by the government?  
7 "... will do very little. Not quite sure just how  
8 many cases will escape, but I suspect a fair few.  
9 "3. We will have to do a lot more to manage this  
10 epidemic. The current plans will overwhelm the NHS  
11 almost straight away. We need much more stringent  
12 control measures if we want to slow it down. Not  
13 necessarily now, but soon. Very soon."  
14 We will come back to the issue about waves and  
15 autumn and winter epidemics and lowering the peak in  
16 a moment.  
17 So you plainly raised the alarm there. And if we  
18 look, please, at INQ000212 -- sorry, no, perhaps if we  
19 could go back to the second page, we can see that  
20 the debate develops between yourself and  
21 Professor Ferguson, and Professor Farrar, Jeremy Farrar.  
22 You debate what NHS England is likely to say on  
23 the issue of whether it can cope, and then if you go  
24 back, please, to the first page -- this is the email  
25 that, my Lady, Professor Ferguson was asked about.

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1 capacity of the NHS", and is that to the point that you  
2 were addressing earlier about what the impact would be  
3 on the NHS of these figures and of course whether there  
4 was a surge capacity to be able to deal with it?  
5 **A.** It was never very clear what the surge capacity was, but  
6 in my mind, whatever it was, it wasn't going to be able  
7 to cope with the kind of numbers we were talking about.  
8 **Q.** Is that why you therefore say at the top of the page:  
9 "The potential surge capacity is absolute bollocks.  
10 The level of demand at the peak, even with the  
11 mitigations planned, are an order of magnitude higher  
12 than the NHS can cope with."  
13 **A.** Yeah.  
14 **Q.** In this trilogy of emails, all with the same genesis,  
15 INQ000212038. The debate continues between the three of  
16 you, about whether or not:  
17 "... the [Prime Minister and Health Secretary] are  
18 ... more aware of what's coming. But there is [still]  
19 a lack of urgency in some quarters ..."  
20 Professor Ferguson says:  
21 I think we might push for rapid contingency planning  
22 for potential escalation of social distancing -- likely  
23 cessation of all out of home leisure activity, working  
24 from home where possible, school closure.  
25 "Oh and surveillance is a mess. So we don't really

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1 "I think the message got across. I still think part  
2 of the issue is Chris hoping it won't be as bad as we  
3 say."  
4 So, between you, you're essentially debating  
5 the emergency, whether or not the government understands  
6 the position, and of course what can be done.  
7 If we look at INQ000212037, you debate, right at the  
8 top of the page, it commences with the same email  
9 string, but it is a different string.  
10 **A.** Apologies.  
11 **Q.** Don't apologise. If we could scroll back out, perhaps,  
12 and go to the second page, we will see there an email  
13 from Jeremy Farrar:  
14 "Are you both comfortable with the plans [the UK  
15 Government] have [got] ..."  
16 It says "not", but we think it's "got".  
17 "... in place, the pace of actions and the changes  
18 they are making?  
19 "Good if we could talk again before SAGE."  
20 Back one page, please. John Edmunds:  
21 "NO I AM NOT."  
22 Jeremy Farrar:  
23 "Main concerns?"  
24 Then the "data are crap" email. Then back up the  
25 page. Neil Ferguson emails about the "actual surge

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1 know what is happening."  
2 That's a fair summary?  
3 **A.** That's what we were talking about time, yeah.  
4 **Q.** The debate between yourselves and also at SAGE at that  
5 point focused to some extent also on what  
6 the consequences would be of trying to completely  
7 suppress what you knew to be the first wave of  
8 the pandemic; is that right? And on what the dangers  
9 would be thereafter of suppressing a wave, whether it  
10 would come back as an uncoiled spring --  
11 **A.** Yeah.  
12 **Q.** -- and so on.  
13 SAGE debated whether or not the measures which would  
14 have to be contemplated would have the result of  
15 completely suppressing a wave in a way which meant that  
16 it would bounce back later. I've mixed my metaphors,  
17 but you understand the point?  
18 **A.** That was the concern, yeah.  
19 **Q.** Mr Halpern, who is the director of the Behavioural  
20 Insights Team in the Cabinet Office, at INQ000188731,  
21 page 16, paragraph 73, comments on the nature of that  
22 debate. He says:  
23 "... during the meeting [and he is referring to  
24 a meeting of SAGE] Stephen Powis and Patrick Vallance  
25 questioned the modellers on why they were so sure that

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1 suppression of the virus ... was not viable. The  
2 response from Graham Medley and John Edmunds was that  
3 suppression was not viable because as soon as a lockdown  
4 was lifted the virus would spike back up, implying there  
5 was no point. Graham Medley and John Edmunds, both  
6 stated that they were 100% sure about this. This gave  
7 me great concern ..."

8 He expresses the observation that this may have  
9 indicated an over-confidence in the model, and so on.

10 Was SAGE clear that if the first wave was to be  
11 suppressed, inevitably there would be a second wave, it  
12 would re-emerge like an uncoiled spring and have  
13 the obvious consequences?

14 **A.** Yes, because there was no -- if you just, you know,  
15 stopped the circulation of the virus for a while and  
16 then stopped doing that, of course it would come back.  
17 There was no kind of magic about it. Especially if we  
18 implemented a lockdown relatively early, which is what  
19 we were talking about here, then you wouldn't have a lot  
20 of immunity in the population, it would be very few in  
21 the population who would be immune. So the -- when  
22 the epidemic came back, which it surely would -- yeah,  
23 it surely would -- then it would increase then at more  
24 or less the same rate as before because there would be  
25 very few people who would be immune.

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1 **Q.** It's --

2 **A.** We were discussing these things, of course, yeah.

3 **Q.** Was it your view, and Sir Patrick Vallance in his  
4 evening notes believes that it was, that you were  
5 saying: but if you mitigate, if you don't completely  
6 suppress, there is this possibility of some degree of  
7 herd immunity; it is a byproduct of mitigation?

8 **A.** Exactly. So eventually then people will become immune  
9 through those mitigation policies, which is what we were  
10 concentrating on at the time.

11 **Q.** In the event, the impact, the likely impact upon the NHS  
12 required of course the full maximum lockdown?

13 **A.** Yes. We were -- it was so urgent, you know,  
14 the pressure. Projecting forward, you could see that  
15 the NHS would come under severe strain very quickly, and  
16 so action had to be taken. And although it's an extreme  
17 action, you know, in many respects regrettable, I think  
18 it was a necessary evil.

19 **Q.** In order to be able to answer the conundrum as to how,  
20 if you imposed a complete suppression, you would have  
21 a wave which would then re-emerge later --

22 **A.** If you just released that --

23 **Q.** If you released it?

24 **A.** Yeah.

25 **Q.** And because there was a recognition that it would be

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1 What we didn't anticipate was the huge changes in  
2 behaviour that -- we couldn't predict the huge behaviour  
3 changes, so were we right that it would bounce back?  
4 Well, clearly we were, because it did. And not just did  
5 it do it here, but it did it everywhere, because,  
6 you know, everyone who did it and then eased  
7 the restrictions, it came back.

8 So were we right in the big picture? Yes. I think  
9 it came back slower than I was anticipating, I think  
10 possibly many of us, because we didn't know how  
11 behaviour would change when restrictions -- I think  
12 everybody expected when, you know, the pubs were opened  
13 again, they would be packed, and they weren't.

14 **Q.** Is it out of this debate about what the consequences  
15 would be of suppression of the first wave that  
16 the debate on herd immunity emerged, because another way  
17 of going about it would be not to completely suppress  
18 the wave in a way that allows it to spring back up, but  
19 to manage it, so that some part of the population might,  
20 have become infected, have immunity, and therefore  
21 the consequences would be less severe in terms of  
22 the magnitude of the second wave?

23 **A.** I mean, obviously these are related issues and we would  
24 have discussed them together. I don't -- yeah, I don't  
25 see the exact link between those two things, but yeah.

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1 extremely difficult to maintain a full suppression  
2 lockdown for any real length of time, as you describe in  
3 your statement, the SAGE and the London School of  
4 Hygiene team and yourself came up with a potential  
5 solution, which was to have or try to put into place  
6 a series of background social distancing measures which  
7 would, over time, dampen down the level of incidence,  
8 and have periodic lockdowns to try to bring the top  
9 level, the peak, down whenever it was required?

10 **A.** Yeah, that was the -- I thought -- I thought we were  
11 kind of in a -- we were stuck between two dreadful  
12 alternatives, one being this sort of mitigation policy  
13 that would still result in a huge wave and huge numbers  
14 of deaths, versus the other one, which -- you know,  
15 these things were talked about rather -- in a very polar  
16 way at the time, and actually still are -- versus the  
17 other one, which was we just go into lockdown and we  
18 stay there. And of course, until when? So you had to  
19 do that until you -- you were gambling then on a vaccine  
20 being available, so it was a kind of open-ended --  
21 open-ended lockdown. Both of those seemed to me pretty  
22 dreadful alternatives, but for very different reasons.

23 **Q.** Just focusing on --

24 **A.** So this was, I thought, one way of trying to manage  
25 the epidemic that wasn't in either of those two

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1 extremes.

2 **Q.** Just dealing with one of those options, the herd  
3 immunity issue, in outline, is one of the marked  
4 downsides of a herd immunity approach, or rather  
5 an approach which has herd immunity as a byproduct, that  
6 (a) if you allow the virus to flood through any part of  
7 the population, there will be deaths --

8 **A.** Absolutely.

9 **Q.** -- secondly, practically, it's extremely difficult to  
10 hermetically seal off that other part of the population  
11 who you don't wish to be infected?

12 **A.** Yeah. I thought that segmentation time of approach,  
13 which I can't remember was discussed -- yeah, it had  
14 been slightly, I didn't think that was ever, ever going  
15 to be reasonable.

16 **Q.** All right.

17 We therefore come, of course, to the decision of  
18 the government to lock down. I'm not going to ask you  
19 for your views on the government's decision-making,  
20 because that was a matter for government and, as you've  
21 rightly said, bar raising the warnings and raising  
22 the alarm and telling it how it was, telling the  
23 government how it was, it wasn't SAGE's role to say:  
24 this is what you must do, balancing all these terrible  
25 factors.

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1 spent by SAGE worrying about the second peak and  
2 the debate about the flattening strategy?

3 **A.** Yes. I felt there was a huge wave of infections just  
4 around the corner, and that's what we needed to deal  
5 with, not worry too much about what may or may not  
6 happen in the winter.

7 **Q.** Turning to the aftermath of the lockdown and the exit,  
8 rather, from it, I want to ask you some questions about  
9 the position in the care home sector.

10 The epidemic in the care home sector was obviously  
11 recognised at the time, and rightly so. To what extent  
12 was the risk to the care home sector, and also actually  
13 hospitals, obvious to SAGE as it deliberated on what  
14 measures, control measures, might be necessary in order  
15 to control this incipient wave of infection?

16 **A.** It was very clear from early on that the most elderly  
17 and most frail members of our society were the most --  
18 were at most risk. So it was obvious that there needed  
19 to be measures to somehow protect them, whether it was  
20 care home residents or people in the community. I was  
21 extremely worried about people who were very old and  
22 frail and living in the community as well. But also,  
23 you know, hospital patients who were also very  
24 vulnerable, often. So, yeah, all of this was known, was  
25 a major concern.

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1 But as a matter of scientific analysis, do you say  
2 in your statement that 16 March was the first feasible  
3 date that a decision to go into lockdown could have been  
4 announced in a way that was consistent with  
5 the scientific knowledge that had then emerged and could  
6 have been justified by virtue of that knowledge?

7 **A.** I thought that that was the date -- by that time we had  
8 enough data to -- we knew -- we had seen a glimpse at  
9 how bad it was in terms of the cases -- you know, so  
10 I think it was the first date where you could have made  
11 a -- it could have been backed up by the evidence.

12 You could of course have made a decision before.  
13 Many countries did go into lockdown without reams of  
14 epidemiological data and modelling advice and so on.  
15 But I think -- so it's certainly possible to do that.  
16 Many countries did. But I think if you wanted to make  
17 evidence-informed decision-making, I think it took us to  
18 about that time, about that meeting of 13 March, to have  
19 the evidence to say, "This -- you know, this is where we  
20 are".

21 **Q.** There was, after the first wave, in fact in the autumn,  
22 a meeting of SAGE, I think a "What did we get wrong, if  
23 anything?" meeting. To use a terrible modern  
24 expression, a wash-up. And at that meeting did you say  
25 to your colleagues that perhaps too much time had been

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1 **Q.** In April, on 20 April, were you party to an email string  
2 from Professor Medley, from whom the Inquiry has heard,  
3 to Sir Patrick Vallance, in which concern was expressed  
4 about the care home sector and the possible need for  
5 some dramatic measures? And was there at the same time  
6 active consideration by NERVTAG of what measures might  
7 be necessary in order to better protect the care sector?

8 **A.** We were discussing it, yes. You know, in reflection,  
9 I really wish we'd discussed some of these matters  
10 before. How much -- how much of it was a -- we were  
11 scientific committees, how much of it was scientific and  
12 how much of it was operational? So I think most of it  
13 was operational really. But there were issues -- there  
14 were scientific issues around, for instance, testing,  
15 you know, would that -- would that offer -- how much  
16 better protected would different testing regimes be, and  
17 so on. So there were things for us to consider and to  
18 go through, which we were working through.

19 **Q.** In general terms, did you believe that the easing of  
20 restrictions, which took place, of course, over a matter  
21 of weeks, May, June and July, occurred too early?

22 **A.** I was very concerned around that time, around the end of  
23 May, partly because of what I explained before, we  
24 didn't know how quickly this, what you called a coiled  
25 spring, would bounce back, and we were relying very

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1 heavily on an organisation that hadn't -- was being  
 2 created at the time, Test and Trace, and I thought --  
 3 I was very worried that it wouldn't be able to -- that  
 4 it -- it had -- it had to work so perfectly so --  
 5 you know, straight away from day one, that that -- that  
 6 worried me. At the time I think we had wonderful data  
 7 by then. The ONS survey had been set up so we knew  
 8 the level of prevalence in the community. And I think  
 9 in my statement I said that around that time, around  
 10 the end of May, it was about one in 600, and so that  
 11 amounts to about 100,000 people who would test positive  
 12 in the country. I thought that was an awful lot of  
 13 people to test and trace potentially.

14 So, yes, I was very nervous that -- that by opening  
 15 up then that Test and Trace might get overwhelmed and  
 16 cases might start to climb quickly. As it turns out,  
 17 they climbed much more slowly, thankfully.

18 **Q.** The way in which restrictions were lifted and their  
 19 timing was, of course, a decision for the government,  
 20 but did it become apparent from the end of July that  
 21 there was a trend upwards in the cases, so --

22 **A.** Yes.

23 **Q.** -- the incidence, the level of incidence, the spread,  
 24 the number of infections, had been brought right down by  
 25 the lockdown, it was at a relatively low level at

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1 **Q.** -- cases are rising.

2 In August -- don't worry, you can take it off the  
 3 screen, thank you -- the Treasury launched the Eat Out  
 4 to Help Out campaign. I'm not going to ask you  
 5 questions about the overall merits of it, the Treasury  
 6 has a number of points and issues and arguments that it  
 7 would probably deploy in support of that scheme. But in  
 8 terms of the public impact of that scheme, in terms of  
 9 the overarching necessity to apply a precautionary  
 10 approach of the type that you described earlier, were  
 11 you concerned about that scheme?

12 **A.** To be honest, it made me angry. And I'm still angry  
 13 about it.

14 It was one thing taking your foot off the brake,  
 15 which is what we'd been doing by easing  
 16 the restrictions, but to put your foot on  
 17 the accelerator seemed to me to be perverse. And to  
 18 spend public money to do that when 45,000 people had  
 19 just died. I couldn't -- you know, I don't want to  
 20 blame Eat Out to Help Out for the second wave, because  
 21 that's not the case, but just the optics of it were  
 22 terrible, I just thought -- and really my feeling was,  
 23 yes, I -- the pub and restaurant sector really needed  
 24 support, I wasn't against that at all, they did need  
 25 a great deal of support, but this was not really just

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1 the end of the restrictions, but it wasn't low enough to  
 2 stop the trend and the level coming back up?

3 **A.** Well, you only need one case. And, you know, we  
 4 didn't -- we brought it down to a very low level, it was  
 5 about one in 3,000, if I remember rightly, something  
 6 around that, which is very low, so many communities  
 7 would have had zero cases, for instance. Many at that  
 8 point. And we never -- we have never, even to this day,  
 9 got the incidence or the numbers anywhere close to that  
 10 level. So we had pushed it to a very low level, and --  
 11 but then of course it did start coming -- it started  
 12 increasing straight away, as it were. The -- I was  
 13 watching the case numbers, as you can imagine, this was  
 14 my job, and the final -- it was 4 July, there was this  
 15 sort of -- "freedom day" was 4 July, you know, and  
 16 the cases starting coming up on kind of 5 July.

17 **Q.** At the end of July did you write to the Government Chief  
 18 Scientific Adviser?

19 **A.** I did.

20 **Q.** INQ000228590. I may have unfairly called for a document  
 21 which I hadn't in fact told our brilliant support staff  
 22 that I was going to. In any event, you wrote to  
 23 the Government Chief Scientific Adviser on 27 July,  
 24 essentially saying the trend is back up --

25 **A.** Yeah.

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1 supporting them, they could have just given them money,  
 2 this was a scheme to encourage people to take  
 3 an epidemiological risk. It only applied if you went  
 4 into the restaurant and ate in the restaurant --

5 **Q.** It didn't apply to takeaway --

6 **A.** It didn't, no.

7 **Q.** You have now mentioned the issue of whether or not  
 8 epidemiologically it contributed to a rise in infection  
 9 in the areas where people were taking up the scheme in  
 10 large numbers.

11 And to make it clear, there is very little or there  
 12 is only weak epidemiological evidence to show that  
 13 infections in the areas in which people took up  
 14 the scheme went up significantly. Your point is about  
 15 the optics of it.

16 **A.** Exactly.

17 **Q.** And why --

18 **A.** -- change people's behaviour. And we were measuring  
 19 people's behaviour at the time, and there was a change  
 20 in people's behaviour in August, and I don't --  
 21 I wouldn't say that it was Eat Out to Help Out but it  
 22 was contributing, it was all part of -- I mean,  
 23 government messaging more generally was about getting  
 24 back to normal and getting -- going back to work and so  
 25 on.

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1 **Q.** On 10 September you were asked by SAGE to chair  
 2 a working group to review where essentially we'd got to  
 3 in terms of the reintroduction of possible further new  
 4 non-pharmaceutical interventions. Did you report to  
 5 SAGE and produce a paper on basically what might need to  
 6 be done to try to re-reduce, to lower the level of  
 7 incidence, which by then had gone up?  
 8 **A.** Yes, the incidence was going up very clearly,  
 9 hospitalisations had started to go up, unfortunately we  
 10 were starting to get outbreaks in care homes again, and  
 11 so, you know, something needed to be done, in the  
 12 classic phrase, and I remember Chris actually initially  
 13 saying, "Come up with a batting order", I remember his  
 14 very phrase, and so I was asked to put this report  
 15 together on -- I was asked on the 10th, I brought it  
 16 back to the SAGE meeting a week later, where we got  
 17 a lot of discussion and input from many SAGE members,  
 18 and then further discussion and input over the weekend  
 19 of -- around the 20th, and it went back to SAGE as  
 20 a sort of -- for final sign-off. There was a special  
 21 SAGE actually just to look at this on the 21st, on  
 22 Monday, the 21st.  
 23 **Q.** Let's have a look, INQ000212102, please. The heart of  
 24 it is in paragraph 2. In essence, because "COVID-19  
 25 incidence is increasing across the country in all age

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1 **A.** Correct. There's two aspects to this.  
 2 **Q.** Please.  
 3 **A.** So, one, the circuit break, this all got -- this got --  
 4 came just with the circuit breaker. The circuit breaker  
 5 was about reducing the prevalence and bringing it to  
 6 a low level, because the only way that we'd -- you know,  
 7 when we had been in the lockdown in March/April then  
 8 we'd reduced the incidence, reduced the prevalence, and  
 9 that's what that was designed to do, to bring  
 10 the incidence right down again. And the other measures  
 11 which were for a longer term were to slow the growth.  
 12 So that was -- there's two aspects to it, is what I'm  
 13 trying to say.  
 14 **Q.** It's very well known that of course very little of this  
 15 happened or at least --  
 16 **A.** Yes.  
 17 **Q.** -- happened in the immediate future after that meeting  
 18 of SAGE. Around about the same time, about -- well, in  
 19 fact, the day before SAGE signed off on this -- and this  
 20 is an extract from the minutes of that 58th meeting of  
 21 SAGE on 21 September, the day before you had been asked  
 22 to attend a meeting with the Prime Minister, on that  
 23 Sunday. You were invited to attend in order to address  
 24 a particular question that the Prime Minister wished to  
 25 be debated. I think in email INQ000212107 you were told

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1 groups", that's paragraph 1:  
 2 "2. A package of interventions will need to be  
 3 adopted to reverse this exponential rise in cases.  
 4 Single interventions by themselves are unlikely to be  
 5 able to bring R [back] ..."  
 6 I interpose that word:  
 7 "... [back] below 1 ... The shortlist of ... (NPIs)  
 8 that should be considered for immediate introduction  
 9 includes:  
 10 "a. A circuit breaker ...  
 11 "b. Advice to work from home for all those that  
 12 can.  
 13 "c. Banning all contact within the home with  
 14 members of other households (except members of a support  
 15 bubble).  
 16 "d. Closure of all bars, restaurants, cafes, indoor  
 17 gyms ..."  
 18 And so on.  
 19 "e. All university and college teaching to be  
 20 online unless face-to-face teaching is absolutely  
 21 essential."  
 22 So a relatively stringent package. You make it  
 23 absolutely plain that it was for immediate introduction,  
 24 and single interventions are unlikely to work on their  
 25 own?

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1 that there would be a balanced group of views presented.  
 2 **A.** Yeah.  
 3 **Q.** So there's a --  
 4 **A.** It's from Julian Fletcher at the bottom, I think.  
 5 **Q.** Yes, he is the official in the Cabinet Office, and then  
 6 you received the invitation, and you forward it to  
 7 Sir Patrick Vallance, talking about the main SAGE paper  
 8 that was due. Of course it was due the following day,  
 9 on the Monday. And then he replies this at 11.16 on the  
 10 Saturday:  
 11 "John  
 12 "The meeting is for him to hear a range of views on  
 13 the forward look (mainly from the 'let it rip' brigade).  
 14 We have tried to put together a balanced group across  
 15 views and so I think what he needs is your view on  
 16 future direction of the epidemic rather than policy  
 17 options."  
 18 What did you understand his reference to the "let  
 19 it rip' brigade" to be?  
 20 **A.** Well, of course there were many people -- well, not that  
 21 many but there were vocal people who took the view that  
 22 we shouldn't have locked down in the first place and we  
 23 shouldn't be considering that again. So, yeah.  
 24 **Q.** You attended the meeting, together with Professors Gupta  
 25 and Heneghan, we will hear from Professor Heneghan next,

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1 as well as a Swedish expert epidemiologist,  
2 Dr Anders Tegnell, and also Dame Angela McLean, who was  
3 then or was to become the Deputy Chief Medical Officer?

4 **A.** No, she was then the Chief Scientist at  
5 the Ministry of Defence.

6 **Q.** Thank you.

7 **A.** She was also co-chair of SPI-M-O.

8 **Q.** At the meeting, which was attended by the Prime Minister  
9 and the Chancellor, as well as other officials, the  
10 debate of whether or not to essentially put into place  
11 a package of relatively strict non-pharmaceutical  
12 interventions, as opposed to allowing the virus to  
13 re-emerge and to re-wash through the population whilst  
14 segmenting or hermetically sealing off parts of it, to  
15 the extent that that might have been possible, was had  
16 in front of the Prime Minister.

17 During the course of that debate, I think you and  
18 Dame Angela McLean WhatsApped each other.

19 Could we have, please, INQ000207199.

20 We are only concerned with the WhatsApps at the top  
21 of the page, dated 20 September, because that's the date  
22 of the meeting, of course, and they commence about 5.30  
23 and the meeting was in the afternoon, so, Professor,  
24 these are plainly WhatsApps sent during the course of  
25 the meeting.

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1 **A.** But it could well be.

2 **Q.** After the meeting, I think Professors Heneghan and Gupta  
3 tried to re-engage battle and to write to say that they  
4 had not had a fair hearing and there was further  
5 information they --

6 **A.** Well, I mean, I had interrupted Professor Heneghan at  
7 one point because he was making some really basic  
8 epidemiological errors, the sorts of ones that we teach  
9 our students on day one, and I couldn't let it go after  
10 a while. And so I did interrupt, and so -- and that  
11 slightly put the wind out of his sails, and -- so, yes.

12 And he hadn't interrupted me, so, you know, it was fair  
13 enough that they complained.

14 **Q.** I think you described his arguments as half-baked in  
15 that email string, but in any event, your argument, your  
16 views did not, to use your own words, find favour with  
17 the Prime Minister?

18 **A.** No, I didn't manage to persuade them.

19 **Q.** As we all know, there was a rule of six, a rule of group  
20 of six put into place. Was that something that was  
21 discussed with SAGE, do you recall?

22 **A.** No.

23 **Q.** There was a tier structure put into place in October.  
24 Was the tier structure something that SAGE had  
25 positively recommended?

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1 Dame Angela McLean refers to:

2 "Are we going to bring up the Seattle fishing  
3 vessel."

4 Was that a reference to data gleaned from a fishing  
5 boat where a number of seamen had been shown to have  
6 antibodies --

7 **A.** And were protected, were well protected.

8 **Q.** Earlier infected.

9 "Angela McLean: Who is this fuckwitt?

10 "John Edmunds: Every statistic is wrong.

11 "...

12 "Angela McLean: Patrick and Chris will discount him  
13 later."

14 Were those all references to the proponents of  
15 the contrary side of the debate, in particular --

16 **A.** I'm pretty sure it's the next witness.

17 **Q.** Professor Heneghan. All right.

18 During the course of this WhatsApp string, we can  
19 also see a reference to "Dr Death the Chancellor" and  
20 Dame Angela McLean saying, "In [ONS] you'd see it".

21 Did you understand that those were references to  
22 the Eat Out to Help Out campaign of which you've spoken  
23 about in moderately --

24 **A.** Honestly it's so long ago I don't know.

25 **Q.** All right.

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1 **A.** No.

2 **Q.** Did the tier structure --

3 **A.** We hadn't discussed it. I mean, I -- you know, we  
4 discussed it afterwards, we tried to work out whether it  
5 would be effective, but it was new to us.

6 **Q.** The idea hadn't come from SAGE?

7 **A.** No.

8 **Q.** And the result of that tier structure was, wasn't it,  
9 it's been described as an epidemiological levelling up?

10 **A.** That was how I described it at the time, yeah.

11 **Q.** The terrible reality was that the spring uncoiled,  
12 the second wave re-emerged, and there was a second  
13 lockdown.

14 By the time of that second lockdown and the peak of  
15 the deaths at the end of December and January,  
16 the beginning of January 2021, was our surveillance  
17 better?

18 **A.** Oh, we, you know, our surveillance from late May/June  
19 was absolutely fantastic. You know, I think it's  
20 difficult to say with any certainty but if it wasn't  
21 the best in the world it must have been one of the best  
22 in the world. It was -- our situational awareness was  
23 fantastic.

24 **Q.** We have heard evidence of the ONS --

25 **A.** Exactly.

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1 Q. -- coronavirus Infection Survey, the REACT Study, the  
 2 multitude of surveys, as well as, by then, a much more  
 3 developed testing structure?  
 4 A. Exactly.  
 5 Q. And a huge serological -- a platform on which all these  
 6 tests could be ascertained and made.  
 7 SAGE had been warning since September, you've showed  
 8 us the report and -- the paper that went into that  
 9 meeting. What is your view as to whether or not that  
 10 second wave was inevitable or the consequence of not  
 11 having acted earlier?  
 12 A. So, you asked me earlier this morning about being --  
 13 you know, why didn't we raise the alarm in February or  
 14 whatever, and I wanted to make sure that that didn't  
 15 happen again. And of course our surveillance, as you  
 16 just described, was so much better, so we did know what  
 17 was happening. I think -- so we had all the  
 18 information, we knew how to do it -- you know, that was  
 19 what that report on the 21st was all about. So we could  
 20 have avoided the -- much of the autumn wave -- we  
 21 wouldn't have avoided everything but we could have  
 22 reduced the incidence. And if we'd have then put  
 23 the longer-term measures in place, we could have kept it  
 24 low, you know, over the autumn. Cases would have  
 25 happened, some people would have unfortunately, have  
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1 pathogenic. So we were -- we couldn't have been worse  
 2 prepared really.  
 3 Q. Why did the lockdown from the beginning of November to  
 4 the beginning of December not bring the levels of  
 5 incidence, the overall rate down enough to stop  
 6 the re-emergence of the greatest part of that second  
 7 wave, in fact the peak, in January?  
 8 A. So it wasn't as stringent as the original lockdown. The  
 9 key reason: that the schools were open. And I think  
 10 everybody wanted the schools to be open. But there were  
 11 other things that had -- there had been slight  
 12 adjustments in who would be key workers and things like  
 13 that.  
 14 Q. Was it long enough?  
 15 A. Well, if it had been done earlier on, if it had been  
 16 done, you know, in September, it would have been plenty  
 17 long enough, or we could have done it around half term,  
 18 so you'd have had the combination of the schools being  
 19 closed.  
 20 As it was, it happened just after half term, it was  
 21 really -- made no -- again, it showed there was no real  
 22 strategy, no long-term thinking. You know, instead of  
 23 just bouncing into, you know, a panic decision as  
 24 opposed to taking a strategic view of it and getting  
 25 a grip of the epidemic and doing what was necessary when  
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1 been hospitalised and died, it would have happened, but  
 2 as it was, we let it go and, you know ...  
 3 And so when we did eventually -- as I'd explained on  
 4 the 20th with the Prime Minister, I said the decision  
 5 isn't to lock down or not, the decision is either you do  
 6 it now and get on top of this epidemic and control  
 7 the epidemic or you let it control you, and it will  
 8 force you into a lockdown at a later date when you'll  
 9 have to lock down harder and longer and many people will  
 10 die as a consequence.  
 11 And unfortunately that is what happened: over that  
 12 autumn from around 20,000 to 25,000 people died, and  
 13 there's ... some would have done, but there is no reason  
 14 for that number of people to have died at all. And then  
 15 we -- then we entered the winter phase with our  
 16 hospitals full, NHS staff having been under stress for  
 17 months, as opposed to having -- you know, they could  
 18 have been doing routine stuff that autumn and clearing  
 19 the backlog from the -- and that was not the case. And  
 20 then we got hit by the Alpha wave.  
 21 And so on top of all of this pressure, we then had  
 22 this new virus that was -- you know, it took a little  
 23 while, a couple of weeks to work out, but it was  
 24 significantly more transmissible. Even worse, though we  
 25 didn't know this until January, it was also more  
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1 it was necessary.  
 2 Q. Is that why, on account of all the things that you say  
 3 were not done that should have been done and because  
 4 the consequence is so terrible, you describe in your  
 5 statement that that second wave was, for you, the worst  
 6 moment of the epidemic?  
 7 A. I said it publicly at the time, I really did think it  
 8 was truly awful. And of course it did -- it was.  
 9 Another 65,000 people died over the next few months.  
 10 Q. Alpha --  
 11 A. Yeah.  
 12 Q. -- was more transmissible and to a slightly lesser  
 13 extent more severe, more pathogenic, it was very, very  
 14 transmissible?  
 15 A. Yeah.  
 16 Q. To what extent did the emergence of Alpha at the end of  
 17 November and the beginning of December contribute to  
 18 that terrible level of death --  
 19 A. Oh, to a great extent, but of course we were starting  
 20 from such a terrible starting point. You know, we  
 21 were -- with our hospitals full and resources stretched  
 22 and so on, so it was easy to miss it initially, because  
 23 cases were so high that how would you pick up -- it was  
 24 easy to miss an increase. If cases had been low you  
 25 would have seen an increase much more quickly. So it  
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1 was -- we were in such a terrible state when that  
 2 happened, that was -- you know, it may well have  
 3 happened -- you know, the Alpha wave may well have  
 4 happened anyway, there's no way of being able to tell  
 5 that. Of course actually by letting the incidence  
 6 increase, it made it more likely that we would have --  
 7 you know, that the virus would be able to mutate. But  
 8 I think it probably would -- I think we'd have probably  
 9 dealt -- but it might have happened -- if we'd have been  
 10 in a lockdown we might have stopped it at source, when  
 11 it first emerged. Who knows?  
 12 I don't think you could say that the -- that that  
 13 wave was a consequence of what happened in the autumn,  
 14 it might have contributed, but we would have been in  
 15 a much better place to deal with it.  
 16 **Q.** The government acted, in your words, relatively quickly,  
 17 however, in December --  
 18 **A.** Yeah.  
 19 **Q.** -- realising the consequences of Alpha, a great deal of  
 20 work was done in ascertaining its transmissibility, its  
 21 pathogenicity, the severity of the disease, and  
 22 the government rapidly realised that Alpha had changed  
 23 the dynamic and therefore there was the third lockdown  
 24 imposed.  
 25 **A.** So it still was a little bit -- yes, they did act  
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1 kind of a vaccine passport, so you couldn't get into  
 2 a bar, for instance, unless you had been vaccinated.  
 3 Which probably didn't make much difference to  
 4 transmission, but made people get vaccinated. So they  
 5 actually had -- so, particularly in their younger  
 6 population, they had -- you know, as I say, I'm  
 7 grouping, of course, all of Europe or something here,  
 8 but many of our Western European neighbours had higher  
 9 levels of vaccine coverage in younger individuals than  
 10 we did. They had also started vaccinating children much  
 11 earlier than we did. So I remember at the beginning of  
 12 term, September of 2021, at that time France, about 80%  
 13 of -- I may have these numbers slightly wrong, but  
 14 roughly speaking about 80% of their kids had --  
 15 secondary school age children had had one dose and about  
 16 50% had two dose, we hadn't even started vaccinating our  
 17 children.  
 18 **Q.** It's important to note, isn't it, though, that in terms  
 19 of -- and this is for a later module, but in terms of  
 20 the United Kingdom's vaccination programme, its  
 21 development of vaccines, getting them out there, getting  
 22 people vaccinated, in a general sense that that was  
 23 a very considerable success?  
 24 **A.** It was, and I think we started absolutely fantastically.  
 25 We were fast. There were some very brave decisions made  
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1 quick -- you know, they did act quickly.  
 2 There was a -- so the -- there was a tier 4 that  
 3 then arose and was imposed in the south east and London,  
 4 but there was still a little bit of a sort of  
 5 shambolic -- I remember the schools opened for one day  
 6 in January and then they were closed. You know, again,  
 7 hadn't really thought it through as a government,  
 8 I don't think, you know, across the different sectors of  
 9 government, properly.  
 10 But yes, they then acted relatively quickly.  
 11 **Q.** After the final national restrictions were eased in July  
 12 of 2021, the following summer, you describe how  
 13 the epidemic settled at a relatively high level. By  
 14 that, do you mean that the level of incidence again,  
 15 the general level of infection through the population,  
 16 plateaued, but by comparison to other countries, and  
 17 perhaps in particular our Western European friends, at  
 18 a relatively high level?  
 19 **A.** Yeah, it was higher.  
 20 **Q.** Why was that?  
 21 **A.** We didn't have any measures in place, they did, so they  
 22 had -- I say "they", of course it varied from country to  
 23 country, but as a general -- as a sort of generalisation  
 24 most countries had some measures in place. Mask wearing  
 25 was still -- was still required. Many countries had  
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1 about the timing of one and two doses and things early  
 2 in January of 2021, around then, which were vindicated  
 3 for sure. I'm not sure we finished quite so well. We  
 4 were a bit slow to finish the job.  
 5 **Q.** Then, of course, the further variant, the Delta wave,  
 6 arrived and there were very significant further deaths,  
 7 were there not, between May 2021 and December 2021?  
 8 **A.** There were, despite all the vaccination, and we rolled  
 9 out then a booster dose in the autumn of 2021 and so on,  
 10 so -- but still I think there's about 15,000 people died  
 11 in that -- in that long drawn-out -- I don't know  
 12 whether you would call it a wave because it was just  
 13 a long drawn-out period of high -- of high incidence.  
 14 **Q.** That was going to be my next question.  
 15 What link, if any, is there between the continuing  
 16 high, relatively high level of incidence and the number  
 17 of deaths that ensued?  
 18 **A.** Oh, well, there's a clear link if you -- the higher the  
 19 incidence then the greater the risk, of course, of  
 20 someone vulnerable being -- acquiring infection, and so  
 21 yeah.  
 22 **Q.** By the time that the Omicron wave arrived in the winter  
 23 of 2021, of course, there was a very extensive  
 24 vaccination programme in place, booster programmes had  
 25 been initiated for higher risk groups, and, as it turned  
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1 out, the Omicron variant was not as -- you know, it was  
2 no worse, it was no more severe or pathogenic than its  
3 predecessors?

4 **A.** It was far more transmissible, and it was able to evade  
5 the immune response. So even though we had high levels  
6 of immunity in the population mainly through  
7 vaccination, it could still spread amongst immunised  
8 individuals. So it was -- and we didn't know that it  
9 was less pathogenic. There were anecdotal reports, but  
10 I'm not sure you can really make government policy on  
11 kind of one or two anecdotes. So it took a while to  
12 work out -- some really nice work by Imperial College  
13 and others, PHE and others, to look -- to try and work  
14 out the risk. And the risk was lower. And thank heaven  
15 it was.

16 **Q.** I want to conclude just by putting to you some general  
17 questions and propositions from the core participants or  
18 some of the core participant groups in this Inquiry,  
19 which I have not so far addressed.

20 The Long Covid groups ask whether the 14 April 2020  
21 post-lockdown epidemiological scenarios paper didn't  
22 refer to long-term sequelae, if you can recall?

23 **A.** I really don't remember, I'm sorry. I mean, we all knew  
24 of course by then this was becoming a -- it took a while  
25 of course to realise anything about Long Covid. You

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1 routinely -- that's routinely looked at. We didn't look  
2 at it in terms of the risk of you actually becoming  
3 infected, so it wasn't in our mathematical models. We  
4 didn't distinguish people's ethnicity in our  
5 transmission dynamic models.

6 **Q.** We now know, of course, that there were varying degrees  
7 of severity of impact depending on ethnicity. In  
8 future, would you agree that that is an issue which  
9 needs to be better modelled?

10 **A.** Absolutely.

11 **MR KEITH:** Thank you very much, Professor.

12 My Lady, those are all my questions.

#### 13 **Questions from THE CHAIR**

14 **LADY HALLETT:** Could I just ask one question,  
15 Professor Edmunds.

16 You have mentioned an awful lot of work, and for  
17 which I know the public would be extremely grateful that  
18 you and your colleagues were doing. I've seen the times  
19 of some of the emails; I'm not sure when you lot were  
20 sleeping. But there are a lot of groups, committees and  
21 subgroups. Was that the right structure? Did they  
22 work? In other words, just looking out as the layperson  
23 it looks like an awful lot.

24 **A.** It looks terrible, doesn't it?

25 But actually they did work quite well, very well.

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1 have to have people to have Covid and then not recover,  
2 so it takes a little while for this to be sort of  
3 realised, but by then it was starting to become clear.

4 **Q.** When this debate about mitigation and suppression and  
5 levelling the peak or squashing the sombrero was being  
6 had, to what extent were long-term health conditions  
7 considered?

8 **A.** They were, actually, considered. This was something  
9 that I remember that Chris Whitty was very, very, very  
10 keen for us to keep forefront in our mind, that some of  
11 these measures would have significant effects on  
12 people's lives, livelihoods, and, therefore, health  
13 later on down the track. So Chris was -- sorry,  
14 Professor Whitty was very -- was very keen for us to  
15 never forget that and make sure that we tried to take it  
16 into consideration. And they did set up a couple of  
17 studies to try and look into it early on.

18 **Q.** Covid Bereaved Families for Justice Cymru ask: did you  
19 receive any data from the devolved administrations which  
20 was used in your modelling?

21 **A.** Yes.

22 **Q.** FEHMO ask: do demographic data sources and early  
23 statistical modelling typically include ethnicity?

24 **A.** If you're looking at the risk, so the risk if you -- of  
25 severe outcomes if you're infected, then yes, that's

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1 And it was -- some of the key ones that was planned,  
2 that had been planned long before, so that SPI-M would  
3 feed in to SAGE, that NERVTAG would feed in to SAGE.  
4 Because before that they were standing committees and  
5 they would feed in somewhere in the Department of  
6 Health, but in an emergency they would feed in to SAGE  
7 and they did.

8 And the way of working particularly of SPI-M was  
9 planned long in advance that we would always try to  
10 have -- or SPI-M would always try to have multiple  
11 groups looking at the same question independently so  
12 that -- to give some sort of validation. You know,  
13 models, you know, they're coming -- I'm sure they're  
14 going to get overly criticised in the next session and,  
15 you know, they are very uncertain. You know, projecting  
16 forward, it is uncertain. And so the idea was always to  
17 have these multiple groups looking. And that had been  
18 planned a long, long time ago and it worked -- clicked  
19 into gear very well, and the expansion of SPI-M worked  
20 to SPI-M-O worked extremely well and it was brilliantly  
21 led by Graham Medley.

22 And the other groups, it made sense. You were  
23 talking about ethnicity just now, that wasn't obvious  
24 before the pandemic, that there would be a greater risk  
25 in ethnic -- maybe we should have thought it through

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1 more carefully, but that wasn't obvious to -- certainly  
2 to me at least, so an ethnic group -- an ethnicity group  
3 was set up, and that, and I think that was very  
4 important that it was, to get to the bottom of why --  
5 why there was a higher risk, so -- and other things like  
6 that happened.

7 I think you had Cath Noakes this morning. She --  
8 they played a fantastic role of terms of understanding  
9 the physics of transmission. We were sort of the  
10 population dynamics and they were looking at the kind  
11 of, you know, does -- how -- does ventilation work. And  
12 that became -- you know, that -- suddenly, that --  
13 you know, in sort of April, whenever it was, it became  
14 obvious that we needed something like that.

15 So, yes, it looked -- at the end it looked like  
16 there was this enormous spaghetti, but actually, no,  
17 there was a sensible reason for all of those groups.  
18 They fed in to SAGE. And, okay, that meant perhaps SAGE  
19 did get rather big, but it worked incredibly well,  
20 actually, at being able to assimilate all of that  
21 information. I mean, you asked me before about the role  
22 of the secretariat. I mean, I'm still astounded that  
23 they managed to keep all of that together and -- and  
24 yes, we can criticise the SAGE minutes, they are a bit  
25 terse and they are -- you know, but all together, the

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1 **THE WITNESS:** Thank you.

2 **(The witness withdrew)**

3 **LADY HALLETT:** Shall we break now?

4 **MR KEITH:** Indeed, my Lady.

5 **LADY HALLETT:** I shall return at 3.20.

6 **(3.06 pm)**

7 **(A short break)**

8 **(3.20 pm)**

9 **MR O'CONNOR:** My Lady, our final witness for today is  
10 Professor Carl Heneghan.

11 **PROFESSOR CARL HENEGHAN (affirmed)**

12 **Questions from COUNSEL TO THE INQUIRY**

13 **MR O'CONNOR:** Can you please give us your full name.

14 **A.** Carl James Heneghan.

15 **Q.** Thank you. Professor, you have prepared at our request  
16 a statement for the Inquiry, which is being brought up  
17 on the screen, and I know that you're familiar with the  
18 contents of that statement.

19 We can see, I don't ask for this to be brought up on  
20 screen, but on the final page of your statement you've  
21 signed the statement below an assertion that you believe  
22 the facts stated within it are true, and that signature  
23 was dated 24 September of this year; is that right?

24 **A.** Correct.

25 **Q.** Thank you.

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1 role that the civil service did to support that enormous  
2 effort -- so there was huge scientific efforts going on  
3 but -- you know, to bring it together, to make it  
4 available to government, it was a huge effort by the  
5 civil service. And it worked. So that our government  
6 really was -- perhaps not at the beginning, not up to  
7 March, but after that it really was incredibly well  
8 informed.

9 **LADY HALLETT:** Thank you very much indeed.

10 If I may say so, Professor, I think you were unduly  
11 harsh on yourself this morning. You had a job, and you  
12 described it yourself, your job was to provide expert  
13 advice to the policy and decision-makers, and if the  
14 system is working properly that advice is relayed to  
15 them, then they consider advice coming from other  
16 quarters about economics and social consequences and the  
17 like. I'm not sure you could have done more than you  
18 did, consistent with your role at the time, but you  
19 obviously did as much as you felt was appropriate. So  
20 I'm really grateful to you, I'm sure we all are.

21 **THE WITNESS:** Thanks.

22 **LADY HALLETT:** And I'm afraid you're not the first and you  
23 won't be the last scientist whose work is misunderstood.  
24 It probably goes with the territory, I fear.

25 Thank you very much.

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1 You are a professor of evidence-based medicine at  
2 Oxford University. Could you please explain what that  
3 discipline entails?

4 **A.** Yes. So evidence-based medicine is the integration of  
5 the best available evidence with clinical experience and  
6 expertise with patient values, about making decisions  
7 about healthcare for individual patients or systems. It  
8 largely grew out of about the 1980s when there was  
9 a growing recognition that there were severe harms being  
10 caused in healthcare --

11 **Q.** Professor, I'm just going to interrupt you. If I could  
12 ask you to try to keep your voice slow. I appreciate  
13 it's not an easy thing to do, but it would make  
14 everyone's life a little easier if you could.

15 **A.** In the 1980s, a realisation that the use of poor quality  
16 evidence or opinion was harming patients in quite  
17 significant numbers and leading to excess mortality.  
18 Over time, what's happened is there has been a change to  
19 the use of best available evidence. And a very good  
20 example of that, which you saw yesterday in the  
21 RECOVERY Trial, you would expect to see randomised  
22 controlled trials for the use of interventions in  
23 healthcare around drugs and vaccines. That's the same  
24 as well for non-pharmaceutical interventions.

25 We particularly sit at the top of the tree doing

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1 systematic reviews, we try to take -- look at all the  
2 available evidence, diagnostics, prognostics and  
3 treatment effects.

4 **Q.** Thank you. So that's a taste, at any rate, of that  
5 field in which, as we've said, you are a professor at  
6 Oxford University.

7 It's also right, is it not, that you are a member of  
8 the Royal College of General Practitioners and in fact  
9 still a practising GP alongside your academic work?

10 **A.** Yes, so I qualified as a doctor in 2000 and received  
11 MRCGP status in 2005, and I work as an NHS urgent  
12 care GP, who basically works right at the frontline, and  
13 my speciality is doing visits and I continued to do that  
14 right throughout the pandemic.

15 **Q.** Professor, in the time we have this afternoon, I want to  
16 ask you about events that took place during the autumn  
17 of 2020, in particular a time, as we know, when calls  
18 were made to alter the approach to the pandemic. There  
19 was a public debate, was there not? On the one hand we  
20 heard calls for a circuit breaker lockdown and  
21 an increase in the restrictions that were in play, and  
22 on the other hand there was argument about reducing  
23 the restrictions and, as we'll come to see, the Great  
24 Barrington Declaration.

25 And as part of that debate, as in fact we've already  
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1 **A.** Yeah, so let me elaborate on where my expertise lies.  
2 You know, it lies in the evidence base in the community,  
3 and increasingly what we see now is a realisation that  
4 most of what we're seeing requires a generalist  
5 approach, because it's two areas broadly which you can  
6 consider, is non-communicable diseases, things like  
7 cancer, heart disease, and then you've got communicable  
8 diseases, acute respiratory infections, and what's  
9 particularly important is how they interact in the  
10 community, and you develop an evidence base. And as we  
11 sit here, about 27% of the English population has  
12 multimorbidity, that's two or more chronic conditions.  
13 By the time that goes to 65, that becomes over 50% of  
14 the population.

15 Now, you'll have started to realise in the Inquiry,  
16 and we've learned, the relationship between  
17 multimorbidity and the impact of communicable diseases  
18 is interesting and important because of its elevated  
19 risk and the exacerbations in the severity of disease  
20 that's caused by that interaction.

21 My expertise is in how we develop the evidence on  
22 diagnostics, prognostics and treatments to look at those  
23 areas.

24 **Q.** All right.

25 **A.** And --

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1 heard, you and others met the Prime Minister in  
2 September 2020, and that's another area that I will wish  
3 to ask you some questions about.

4 Before we get into the detail of those events, I'd  
5 like to ask you a little bit more about your expertise  
6 in this area, as it stood at 2020, at the outset of  
7 the pandemic.

8 As you know, because I think you have been following  
9 the Inquiry, we have heard this week from a series of  
10 academics who have spent, in the main, their  
11 professional careers researching, analysing the spread  
12 of infectious diseases, developing models, to analyse  
13 how such diseases are spread and how they can be  
14 controlled, and considering large-scale public health  
15 issues relating to pandemic preparedness and so on.

16 You don't have a comparable type of expertise in  
17 this area, do you?

18 **A.** So if you mean do I have a narrow expertise in a single  
19 specific disease, the answer is no.

20 **Q.** Well, that wasn't quite my question. That may be right,  
21 but it's also the case, isn't it, that you have not  
22 studied, over the course of your academic career,  
23 preparedness for pandemics, infection control, the way  
24 in which viral diseases spread through populations and  
25 so on?

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1 **Q.** Sorry to interrupt you there, Professor.

2 I would like just to call up a document, because  
3 before we get into the detail of 2020 I'd like to just  
4 have a look at the types of matters that you were  
5 researching in that period or rather the year or so  
6 before 2020.

7 Could we call up on screen, please, INQ000314600.

8 **LADY HALLETT:** Whilst that document is coming up, Professor,  
9 could I repeat the message: it's really important that  
10 we get your evidence down in full.

11 **A.** Okay.

12 **LADY HALLETT:** Although I'm not taking every word, I'm  
13 struggling, and so I suspect our stenographer is too.

14 I speak too quickly as well, so I understand the  
15 problem.

16 **A.** Apologies.

17 **LADY HALLETT:** If you could just slow down a bit.

18 **A.** Mm-hm.

19 **MR O'CONNOR:** Professor, as you know, because you've seen  
20 this document today, it's actually just an extract from  
21 your website.

22 **A.** Yeah.

23 **Q.** On your website you list the peer review publications  
24 that you have published down the years, and these are  
25 the publications from 2019, 2018, 2017 and so on, in

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1 other words the years running up to the pandemic.

2 If we can look briefly, one can see, for example, on  
3 this first page, in the last few months of 2019, papers  
4 that you published included papers about urinary tract  
5 infections, shoulder pain, a couple of papers about  
6 bacterial infections in older people.

7 If we can go over to the next page, please, there  
8 are papers there, are there not, about heart attacks,  
9 strokes. There is a paper towards the bottom about  
10 sodium valproate, which I think is a drug used to treat  
11 epilepsy; is that right?

12 **A.** Yeah.

13 **Q.** If we go over to the next page, childhood cancer in  
14 Egypt, cardiovascular risk, about halfway down the page  
15 there's a paper on hypertension. And looking at these  
16 papers, you seem to have had a particular interest in  
17 high blood pressure; is that right?

18 **A.** I need to answer the question in full, so --

19 **Q.** Well, let me just look at one or two others and then you  
20 can respond.

21 If we look over at page 4 there are papers about  
22 people who suffered strokes, the effects of statins in  
23 the elderly. Towards the bottom of the page, vitamin D,  
24 whether or not it prevents fractures and falls.

25 **A.** Mm-hm.

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1 But if you go across the breadth of what I -- you do  
2 go back to 2014, where you start and go: oh, well, with  
3 the Tamiflu reviews in the last pandemic where we spent  
4 four and a half years doing that evidence. The second  
5 aspect is within the respiratory team -- is it's a team  
6 effort. So when I am in a position where we're looking  
7 at something and there's something, for instance, not  
8 quite there in a disease specialist, we will pull that  
9 to us.

10 As an example, when we was asked by the World Health  
11 Organisation in 2020 to do the systematic reviews on  
12 transmission, of which we published 17 papers, there was  
13 a microbiologist, a virologist, immunologist, medical  
14 statistician, and there is also an expert in  
15 the clinical epidemiology of respiratory viruses. So we  
16 bring -- I bring together a team. But yes, it's fair to  
17 say I have a view, particularly diagnostics,  
18 particularly harms. And I would say more so in  
19 the elderly I have an interest in the interaction  
20 between communicable and non-communicable diseases. So,  
21 for instance, some of those diseases we see, like  
22 diabetes, has a huge impact when you look at acute  
23 respiratory infections in the community.

24 It's also important to realise, what does  
25 the community respiratory transmission look like when

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1 **Q.** Then finally, this takes us to the end of that year of  
2 2019 on page 5, for example another paper about  
3 hypertension, something about sleep-wake disturbance and  
4 ocular disease. And at the top of the page there,  
5 a paper about the human papillomavirus -- I think  
6 I pronounced it correctly -- which I think is something  
7 that can cause warts and in some cases cancer.

8 So, Professor, the general picture I would suggest,  
9 at least looking at your published papers prior to the  
10 pandemic, is that you had a sort of general interest in  
11 matters relating to primary care, perhaps running in  
12 parallel with your practice as a general practitioner,  
13 but -- let me put the question -- but not that detailed  
14 interest in viral transmission of diseases that we've  
15 seen with the other experts?

16 **A.** So, number one, in 2019 you're referring to my role as  
17 editor in chief of BMJ evidence-based medicine, so  
18 you've referred to a number of editorials, which I will  
19 have wrote. Secondly, as you're referring to, I'm also  
20 director of programmes in evidence-based healthcare,  
21 which is a global programme that supports DPhil  
22 opportunities and Master's, so when we're talking about  
23 cancer in Egypt, that's -- I'm supervising a DPhil  
24 student at that moment in time is publishing in that  
25 arena.

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1 you understand there are 30 different pathogens that can  
2 cause viral immunity in the community in the UK. That  
3 broad understanding allows me to then use  
4 the evidence-based approach to come and say what's  
5 the best available decision we should be using for  
6 a decision or action.

7 **Q.** Professor, I think really we're not disagreeing over  
8 very much at all, you describe a broad approach, which  
9 is different from the very specialist experience and  
10 practice of some of the other experts we've heard.

11 Just finally on this, many of the experts, the  
12 academics who have given evidence this week have sat on  
13 either SPI-M-O or SAGE or NERVTAG, and I think it's  
14 right to say that you have not sat on those committees?

15 **A.** No, I have not.

16 **Q.** Thank you.

17 Let me move, Professor, then, to, as I said,  
18 the debate in autumn 2020 about appropriate Covid  
19 guidance or regulation.

20 By way of context, as I've said, we saw that cases  
21 in that period were rising, there had been a call for  
22 circuit breaker lockdowns, others arguing that so-called  
23 whole-population measures were inappropriate.

24 Amongst those making that latter argument were  
25 Professor Sunetra Gupta, also of Oxford University, and

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1 also yourself.

2 We have heard that on 20 September, which was  
3 a Sunday, there was a meeting with the Prime Minister  
4 and the Chancellor which you and Professor Gupta  
5 attended. I said "attended", it was, of course, a Zoom  
6 meeting.

7 **A.** Mm-hm.

8 **Q.** The day after, 21 September, we just heard from  
9 Professor Edmunds that there was a SAGE meeting but it's  
10 also right, isn't it, that you and Professor Gupta and  
11 others published an open letter on that day relating to  
12 Covid regulations? We may look at that in a moment.

13 Then the third date I wanted to mention was a couple  
14 of weeks later, on 4 October, when the Great Barrington  
15 Declaration was published.

16 I would like to start, if I may, with that document,  
17 the Great Barrington Declaration.

18 It's helpfully been brought up on screen. It's  
19 a relatively short document, and we can take it page by  
20 page. We see at the top, after the title, there is  
21 a summary which states that:

22 "As infectious disease epidemiologists and public  
23 health scientists we have grave concerns about the  
24 damaging physical and mental health impacts of the  
25 prevailing COVID-19 policies, and recommend an approach

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1 than a thousand-fold higher in the old and infirm than  
2 the young. Indeed, for children, COVID-19 is less  
3 dangerous than many other harms, including influenza."

4 Then perhaps really the core of the declaration,  
5 it's asserted that:

6 "As immunity builds in the population, the risk of  
7 infection to all -- including the vulnerable -- falls.  
8 We know that all populations will eventually reach herd  
9 immunity -- ie the point at which the rate of new  
10 infections is stable -- and that this can be assisted by  
11 (but is not dependent upon) a vaccine. Our goal should  
12 therefore be to minimize mortality and social harm until  
13 we reach herd immunity."

14 Reading on, it's said:

15 "The most compassionate approach that balances  
16 the risks and benefits of reaching herd immunity, is to  
17 allow those who are at minimal risk of death [by  
18 inference the young who have been referred to] to live  
19 their lives normally to build up immunity to the virus  
20 through natural infection, while better protecting those  
21 who are at highest risk."

22 That paragraph is a description of, it is said, this  
23 policy of "Focused Protection".

24 Then next paragraph emphasises the need to adopt  
25 measures to protect the vulnerable, that's one half of

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1 we call Focused Protection."

2 I'm going to come to ask you about that "Focused  
3 Protection" policy.

4 While we're looking at this page, one notes that at  
5 the end of the document there is a reasonably lengthy  
6 list of signatures which doesn't include your own, but  
7 there is a reference here to 937,000 signatures. Are  
8 you one of the 937,000?

9 **A.** No.

10 **Q.** You didn't sign the declaration?

11 **A.** No.

12 **Q.** Well, if we may, we will simply note the contents of  
13 the declaration. I'll come and ask you why you didn't  
14 sign it.

15 So if we can go over the page, the first substantive  
16 paragraph really just repeats the summary we've already  
17 noted. There is then a paragraph which refers to the,  
18 as it's said, devastating effects on short and long-term  
19 public health of current lockdown policies. Examples  
20 are given: lower childhood vaccination rates, fewer  
21 cancer screenings, and so on.

22 Over the page, please, there is a reference to  
23 the fact that the understanding of the virus is growing,  
24 and in particular it is said that:

25 "We know that vulnerability to death ... is more

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1 the equation, and the paragraph afterwards stresses  
2 the other half of the equation, which is:

3 "Those who are not vulnerable should immediately be  
4 allowed to resume life as normal."

5 Simple hygiene measures are referred to, but then  
6 the theme is schools and universities should be open,  
7 restaurants and other businesses should open, arts,  
8 music, sport and so on should resume. And finally,  
9 people who are at more risk may participate if they wish  
10 while society as a whole enjoys the protection conferred  
11 upon the vulnerable by those who have built up herd  
12 immunity.

13 So that's the declaration.

14 Why was it, as you've told us, Professor, that you  
15 did not sign this declaration?

16 **A.** So you referred to the meeting of 20 September.

17 **Q.** Yes.

18 **A.** Can I elaborate on that meeting, or are you going to  
19 come back to that?

20 **Q.** I'm certainly coming back to it, Professor.

21 **A.** Okay.

22 **Q.** I wanted to just use this declaration, this document, as  
23 a way of identifying what that policy was before we go  
24 back to the meeting.

25 **A.** That meeting, when I -- it was announced, was the first

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1 time I met Professor Sunetra Gupta, who is a theoretical  
2 epidemiologist. Subsequent to that, as you talked  
3 about, disease expert, she's a disease expert in  
4 the area of interest, and I spoke to her weekly.

5 We are broadly in agreement about many areas, but  
6 one of the issues that happened after that meeting was  
7 it was subsequently leaked to the press, and then I was  
8 under pressure from articles calling me an agent of  
9 disinformation, abuse on social media, and felt under  
10 pressure. I communicated with Professor Kulldorff  
11 and -- Martin Kulldorff and Jay Bhattacharya and  
12 Sunetra Gupta, was asked to sign it, and at the time  
13 I was -- we was also working on a series of systematic  
14 reviews that we felt we were trying to interpret and  
15 understand.

16 I agree with the broad aims of  
17 the Barrington Declaration, but I would not let my  
18 emotions and opinions run into something when I didn't  
19 have time -- because there are one or two areas where  
20 you might look at it and go, "I think actually it needs  
21 more detail", and -- you know, particularly if you said  
22 everybody should return to work as normal. You know,  
23 that's the sort of thing where, given the gravity of  
24 what was happening, from an evidence-based perspective  
25 I would have derailed it and said, "We need to step back

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1 **A.** Okay.

2 **Q.** -- the meeting in Downing Street.

3 What I'm going to do for these purposes is really  
4 look at Professor Woolhouse's statement, because  
5 he identified what he regarded as the real problems with  
6 the focused protection approach, but I will also take  
7 you to Chris Whitty's statement, because he has said  
8 some similar things.

9 So if we can go to paragraph 175 of  
10 Professor Woolhouse's statement, he says:

11 "As I understand it, the Great Barrington  
12 Declaration ... advocated an approach where vulnerable  
13 individuals are protected but the virus is left to  
14 circulate until enough people have been infected to  
15 reach the herd immunity threshold. I had three concerns  
16 about that approach at the time, and declined to sign  
17 the declaration when invited to do so."

18 Then we can see at paragraph 176 he identifies  
19 the first of those difficulties or objections, which is  
20 that:

21 "... the size of the resulting epidemic would be so  
22 large that the public health burden just in the low risk  
23 segment [by that he means the young people] of the  
24 population would be enough to overwhelm the NHS, noting  
25 that low risk is not zero risk and some of these

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1 and really consider that issue". It would've took me  
2 quite a few weeks with my team to get to an opinion on  
3 that.

4 In doing so, like I said, I agree with the broad  
5 themes but by the time it had been published and was out  
6 there I think the position was clear and there was no  
7 weight to be added by me signing it, and, as I said,  
8 I was under considerable pressure in all sorts of  
9 different ways, and still trying to inform the debate in  
10 the background, as you will see later, with  
11 an evidence-based approach.

12 **Q.** All right.

13 So I think you've made the position very clear,  
14 Professor, which is that you did agree with the broad  
15 terms of the declaration, and you've explained  
16 the sort of pragmatic reasons why you didn't sign it.

17 The evidence that the Inquiry has received is that  
18 there are at least three quite sort of high level  
19 principled objections to the Focused Protection policy,  
20 and what I want to do is go through them with you one by  
21 one. And of course if they sort of overlap with any of  
22 your concerns about the policy, you will be able to say  
23 so.

24 Just to be clear, once we've done that, we'll go  
25 back and talk about --

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1 individuals would develop severe disease."

2 What do you say to that?

3 **A.** Which one, the first or both? Sorry.

4 **Q.** Well, I think he is making a single point.

5 **A.** Oh, so what he's basically coming at is the aspect that  
6 what we've got to understand from respiratory infections  
7 is -- the first thing is to say between summer and  
8 winter there is a large increase in unplanned  
9 respiratory admissions. We go from about 15,000 to  
10 about 30,000 every year. The vast majority of  
11 the deaths in respiratory infections occur in that  
12 winter phase.

13 There is an element that you cannot reduce the risk  
14 to zero for anybody. Some of the respiratory pathogens  
15 will affect younger people much more so: influenza, RSV.  
16 The coronavirus was very much to the elderly population.

17 I think the problem is if you say we're going to  
18 have no approach whatsoever, that was not the approach  
19 that was being undertaken by Sweden. That actually  
20 there were subtle reductions in mobility in  
21 the population. So, for instance, they didn't have mass  
22 gatherings, they didn't -- they had reductions in people  
23 attending restaurants and public houses. You couldn't  
24 stand at a bar, for instance. So they didn't have no  
25 effect.

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1 Q. Can I just interrupt you there? Is this one of these  
2 areas where you didn't agree with the Great Barrington  
3 Declaration? We've looked at it.

4 A. Yeah.

5 Q. It's very clear that really, beyond hand washing, for  
6 that younger segment of the population they would live  
7 their lives as normal. Are you saying that you didn't  
8 agree with that?

9 A. Well, I think that the idea of live life as normal in  
10 the face of an emerging risk is not possible, because  
11 everybody will attenuate their risk in some way.

12 So, for instance, if you are a young person and you  
13 have a grandma who's 85, 90, you have to attenuate your  
14 behaviour, because if you're going to take your illness,  
15 irrespective of whether it's coronavirus, it could be  
16 a common cold, it could be highly harmful for that  
17 elderly person. So I would expect younger people to  
18 change their behaviours in some ways to match the risk  
19 that is presented.

20 Q. Thank you.

21 So are you agreeing with me that you do not agree  
22 with the broad proposal in the Great Barrington  
23 Declaration that young people should live their lives as  
24 normal?

25 A. And I think what's happening there is --  
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1 is what happens is you equalise the risk across all  
2 the age groups, and in doing so the theory says, and  
3 actually the practice is, you actually can increase  
4 the risk of those in the most vulnerable category.

5 As an example of that, in the first wave  
6 care homes -- 45% of care homes had outbreaks and in  
7 some parts of the north it was 55%. What -- the  
8 argument about the younger population, those least at  
9 risk, which is what happens now, is that as they go  
10 about their daily life, they will build up a wall of  
11 immunity and reduce the susceptible population, and in  
12 doing so that means the elderly actually gain  
13 an advantage. But if you're telling me you lock down  
14 and the elderly are at less risk, that didn't happen, as  
15 you saw in the first wave and in the second wave, that  
16 actually there is not a clear relationship between  
17 reducing the risk in the young people and your ability  
18 to suppress the virus in areas like care homes.

19 Q. Professor, I'm going to interrupt you, I think we might  
20 be at slightly cross-purposes.

21 A. Okay.

22 Q. You're now talking about whether lockdowns of the whole  
23 population are effective, but I'm asking you about  
24 whether this policy of focused protection is effective,  
25 and the criticism that was made by Professor Woolhouse  
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1 Q. Professor, could I ask you for a yes or no answer,  
2 please.

3 A. Yes, I am.

4 Q. Thank you.

5 I'm going to move on to the second of  
6 Professor Woolhouse's propositions. He said:

7 "... it wasn't made clear how well the vulnerable  
8 segment could be protected from infection in practice."

9 Here, of course, he is referring to the older  
10 segment of the population.

11 "It certainly couldn't with 100% and that meant  
12 a further, also potentially very large, burden on the  
13 NHS."

14 Now, Professor, before you answer, we're going to  
15 come to your paper that you produced for  
16 the Downing Street meeting, and we will see in there  
17 a number of measures are encouraged to protect  
18 the vulnerable population.

19 The point that Professor Woolhouse is making is that  
20 it just isn't possible to provide a sufficient level of  
21 protection to protect them when the rest of society is  
22 not taking those measures, and it may be that that  
23 rather chimes with the point you just made about young  
24 people visiting their grandparents?

25 A. So when you decide to lock down, one of the key issues  
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1 and, amongst others, by Chris Whitty, is that this idea  
2 of -- we've heard various descriptions -- cocooning,  
3 segmenting, shielding, that vulnerable section of  
4 society, it may be a very attractive idea in principle,  
5 but, to use Chris Whitty's phrase, it's entirely  
6 impracticable, it simply won't work?

7 A. Well, that's -- I think that's an opinion, and it comes  
8 from people's opinions. It's not rooted in evidence.  
9 So, for instance, in care homes there is evidence, for  
10 instance in the US, what they call greenhouse homes,  
11 smaller homes, less mortality, more clinical care  
12 reduces mortality, more nurses reduces mortality. So  
13 there are many areas you could sit in a room, but what  
14 you can't do is come off the top of the head with how  
15 you would look at this and propose this, but there is  
16 evidence to suggest how you might go about this. It is  
17 not an evidence-free zone, as these people suggest.  
18 However, if you want to integrate and understand how you  
19 might go about it, I would argue that's where you need  
20 a generalist who can talk to you about what's happening  
21 in the community and how you might go about that.

22 I'll give you --

23 Q. Can I just interrupt you there, Professor? Again, can  
24 I ask for a yes or no answer: do you agree with the  
25 objection that Professor Woolhouse is making to  
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1 the Great Barrington approach; yes or no?

2 **A.** No.

3 **Q.** I'm going to move on to the last of his objections,  
4 which goes to this question of herd immunity which, as  
5 we saw, is really the sort of bedrock of the Great  
6 Barrington Declaration, isn't it? Because the whole  
7 approach assumes that the younger segment of  
8 the population will acquire herd immunity through  
9 infection, and you have just referred to what you  
10 describe as the advantage of that, because it provides  
11 protection to the older population as well.

12 The point that Professor Woolhouse makes here is  
13 that there was an assumption in the Great Barrington  
14 Declaration that there would be what he describes as  
15 "solid post-infection immunity", and that therefore  
16 "herd immunity threshold could be reached in a matter of  
17 months".

18 He says -- and I think it's clear he is talking  
19 about back in 2020 -- he was concerned that this might  
20 not be the reality, in which case the threshold might  
21 not be reached for years or not at all, and therefore  
22 the strategy would fail.

23 He goes on, and he is clearly now talking about his  
24 current state of knowledge:

25 "We now know that post-infection immunity does not

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1 Professor Gupta, I've never heard her make that  
2 statement.

3 What happens in reality -- there are a number of  
4 other circulating pathogens, like rhinovirus, for which  
5 we know this; there are also other circulating  
6 coronaviruses like 229E and OC43 -- that when you get  
7 an infection, you will get an immune response that will  
8 be of variable nature and will last for a certain period  
9 of time, up to about 12 months, possibly 18 months.

10 But as you've secondly understood, these pathogens  
11 have the ability to escape your immunity. That's where  
12 the variants come in. So if you look at rhinovirus,  
13 there are about 150 different variants that exist.

14 So what happens is, what you're describing is  
15 the position we find ourselves now, with all of the  
16 other viruses that have been post-pandemic, there will  
17 come a position where a part of the population will have  
18 immunity and that will dampen it down from going to  
19 the 60%, 70% that was thought would happen in  
20 the models. That figure is roughly around 30% of  
21 the population.

22 So as you transit into winter now, you are  
23 susceptible to a number of different viruses and you  
24 will re-catch them, but some people are not susceptible  
25 and that's why we will still have waves of infection, we

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1 give 100% protection, that individuals can be  
2 re-infected multiple times ..."

3 It may be that some people in this room know what he  
4 is talking about.

5 "... and that the herd immunity threshold is almost  
6 certainly unattainable."

7 He says:

8 "This undermines a core premise of the  
9 Great Barrington approach."

10 Is he right about that?

11 **A.** Before answering, I need to be clear, where does it say  
12 "solid post-infection immunity" in the Great Barrington  
13 Declaration?

14 **Q.** Well, Professor, it must be right, mustn't it? We  
15 looked at the Great Barrington Declaration. The premise  
16 there was that the younger population who were living  
17 their lives normally would catch Covid, would thereby  
18 gain immunity, and that corporately that segment of  
19 the population would attain herd immunity.

20 If they're not going to attain immunity, having  
21 caught Covid, then the policy just doesn't work, does  
22 it?

23 **A.** So that's a misunderstanding of  
24 the Barrington Declaration and what the authors were  
25 proposing. Having spent two and a half years with

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1 will have problems in the NHS -- 17 of 20 years we've  
2 had a winter crisis -- but a part of the population will  
3 be not susceptible and therefore we won't get these  
4 massive waves that are in the models.

5 **Q.** I see. So is what you're saying that  
6 the Great Barrington Declaration never suggested that  
7 there would be, as it were, complete immunity amongst  
8 that younger segment of the population? Is that -- yes  
9 or no?

10 **A.** I am saying, yes, it never said that.

11 **Q.** All right.

12 There is one more point I want to ask you about  
13 the Great Barrington Declaration, Professor, and that's  
14 an issue which isn't mentioned by Professor Woolhouse,  
15 although it's related to one of them.

16 We've spoken about the risk that the younger segment  
17 of the population would themselves catch Covid and  
18 suffer acute symptoms from it. That was the first of  
19 Professor Woolhouse's objections.

20 But there is another point, which is that already by  
21 the autumn of 2020, when the Great Barrington  
22 Declaration was published, it was becoming understood --  
23 it was already understood -- that a significant group of  
24 people who caught Covid would go on to suffer long-term  
25 sequelae from it, a post-viral syndrome, which of course

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1 we know as Long Covid.

2 That risk, which affects young people and old people  
3 alike, was another reason, was it not, why the proposal  
4 in the Great Barrington Declaration was flawed?

5 **A.** So all of the acute respiratory infections that  
6 circulate in the community have the potential to cause  
7 long sequelae. Now, your influenza increases your risk  
8 of stroke, heart disease, bacterial pneumonia,  
9 meningitis, RSV, bronchiolitis, risk of a hospital  
10 admission, and then there are others like glandular  
11 fever that can give a long immune response.

12 The question you're asking me, which is what you  
13 need to ask, is: to what extent does an infection with  
14 a coronavirus lead to increased complications and  
15 long-term outcomes compared to the other acute  
16 respiratory infections? Because they do have  
17 a significant impact on morbidity and mortality,  
18 particularly in those with comorbidities and  
19 multimorbidities. So if you've got a pre-existing  
20 disease like heart failure, it will be worsened to  
21 the point where it can have a significant impact on your  
22 morbidity and mortality.

23 If you'll let me --

24 **Q.** I'm just going to interrupt you, because I think we're  
25 diverting from the question a little bit, Professor. We

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1 is the example here being given -- why isn't that  
2 evidence for your evidence-based approach?

3 **A.** Because when you compare that -- as the evidence has  
4 just emerged in the last month, if you compare that to  
5 other acute respiratory infections, what you're  
6 interested in is to what extent you get more of  
7 something with the coronavirus.

8 So, for instance, the evidence shows things like  
9 taste and smell is worse with a coronavirus SARS-Cov-2  
10 infection, but your risk of heart attack or stroke might  
11 not be as severe. It could turn out there are specific  
12 respiratory complications in people with, like, asthma  
13 and chronic airways disease, but it's incredibly  
14 important you say, "What's the risk compared to  
15 the baseline?", which is other acute respiratory  
16 pathogens, and not compare it to the normal population.

17 I am not saying that the infection leads to no risk.  
18 It is quite clear it has severe complications.

19 The question is: how much is that more severe than  
20 the other acute respiratory infections for which you  
21 don't have the same restrictive policies, but they do  
22 have a severe consequence in the population.

23 **LADY HALLETT:** I understand the comparison is important, or  
24 the comparative analysis is important. What I'm just  
25 questioning is the fact that -- what Mr O'Connor was

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1 have heard expert evidence about post-viral syndromes,  
2 we know they exist; I would like to focus very sharply  
3 on Long Covid, please.

4 **A.** Yes.

5 **Q.** Just coming back to my question, it wasn't --  
6 the existence of Long Covid, where significant numbers  
7 of people suffer very serious long-term sequelae,  
8 including people in the younger population, wasn't that  
9 another reason why the policy of letting that group of  
10 people, as it was said, live their lives normally was  
11 flawed?

12 **A.** It can be used as an argument, but I think if you're  
13 going to take an evidence-based approach, you really  
14 have to define what you're on about and quantify what  
15 you're on about and then I can truly answer  
16 the question. But it is an argument that people would  
17 put forward for one reason for having alternative views  
18 to try and suppress the virus.

19 **Q.** Thank you.

20 **LADY HALLETT:** I'm sorry, Professor, I'm not following. Why  
21 isn't -- and I understand an evidence-based approach,  
22 it's my approach, it has been as a lawyer throughout my  
23 working life.

24 Why isn't the fact that we now have evidence that  
25 you have post-viral long-term sequelae -- and Long Covid

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1 putting to you was that we know post-viral syndromes  
2 exist, and therefore I was just putting: why isn't that  
3 evidence? It may be there's more evidence that needs to  
4 be put into the balance, but it just seemed to me that  
5 it was evident.

6 **A.** Well, yes, so everything exists as evidence, even my  
7 opinion exists as evidence within --

8 **LADY HALLETT:** Not in my world it doesn't, I'm afraid.  
9 Well, not in a court of law it doesn't.

10 **A.** What you need to do is quantify the size of the effect  
11 of the difference, and that's really important because  
12 then that helps you understand where you need to  
13 intervene if you've had a post-viral Covid infection.  
14 That's incredibly important. What do you treat?

15 And it's particularly important in two groups of  
16 people: those with pre-existing conditions who have  
17 worsened, but also there are some people who would come  
18 with no pre-existing conditions and then will have  
19 complications, for instance maybe they have respiratory  
20 complications. That then helps you understand how to  
21 intervene.

22 **MR O'CONNOR:** Let me just ask you one more question about  
23 that, and perhaps you can answer shortly.

24 You just said that the risk of, in this case,  
25 a post-viral symptom needs to be quantified. The Great

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1 Barrington Declaration doesn't mention Long Covid at  
 2 all.  
 3 **A.** No.  
 4 **Q.** Now, I know you didn't draft it, but do you know whether  
 5 it was taken into account at all or not?  
 6 **A.** I don't know the answer to that.  
 7 **Q.** All right.  
 8 I'm going to move on, Professor, and finally just  
 9 ask you a few questions about the meeting we've referred  
 10 to once or twice and which we've heard about from  
 11 others.  
 12 It was a Zoom meeting on a Sunday in September 2020.  
 13 The context, as we've heard, was a very public debate  
 14 going at the time about whether there should or  
 15 shouldn't be some form of circuit breaker, as it's been  
 16 described, and it's clear from some of the documents  
 17 that the Inquiry has seen that the meeting -- a Zoom  
 18 meeting, as we've said -- had a title, which was:  
 19 "Should the Government intervene now and if so,  
 20 how?"  
 21 Now, I'm not sure whether you ever were aware of  
 22 that. Some of the attendees, it looks as though when  
 23 they were sent the invitation they were told: this is  
 24 what the meeting's going to be about.  
 25 Was that the case with you, or can you remember one  
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1 **A.** Yes, they did.  
 2 **Q.** All right.  
 3 So we're going to look at the note now but we'll  
 4 bear in mind -- and I think this is what you're telling  
 5 us, Professor -- that it was compiled in something of  
 6 a rush?  
 7 **A.** It was compiled in something of a rush and it was  
 8 compiled with my colleague Professor Tom Jefferson, who  
 9 also had input to the document.  
 10 **Q.** We'll look at some of the detail in the note in  
 11 a moment, Professor, but can I ask you at the outset --  
 12 and, if you like, in summary -- did you argue in writing  
 13 in this note and then, when it came to it, orally at  
 14 the meeting in favour of the type of policies that we  
 15 have been looking at in the Great Barrington  
 16 Declaration?  
 17 **A.** I think in reading that you'd say broadly, yes.  
 18 **Q.** Yes.  
 19 If we do look, for example, about halfway down, we  
 20 see there:  
 21 "Aim: to control the spread of acute respiratory  
 22 illness while minimising societal disruption."  
 23 **A.** Yeah.  
 24 **Q.** So, in summary, a similar approach.  
 25 And we see -- sorry, if we can zoom out again, we  
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1 way or the other?  
 2 **A.** I can't remember one way or the other, apologies.  
 3 **Q.** All right.  
 4 It's right, though, isn't it, that before  
 5 the meeting -- and I know I'm going to ask you about  
 6 when -- but before the meeting, you were asked to  
 7 provide a short note for the purposes of it?  
 8 **A.** Correct.  
 9 **Q.** Now, we know that the meeting took place on Sunday,  
 10 the 20th. When were you asked to provide the note?  
 11 **A.** I was asked about roughly in an email around about 7 pm,  
 12 8 pm on the Friday. I can't quite remember the exact  
 13 time.  
 14 **Q.** Were you able -- or were you told when the note was  
 15 needed by?  
 16 **A.** 12 o'clock the next day.  
 17 **Q.** On the Saturday?  
 18 **A.** On the Saturday.  
 19 **Q.** Were you able to meet that deadline?  
 20 **A.** No, on the Saturday morning I was working in urgent care  
 21 doing home visits, and I didn't finish till 1 pm, so  
 22 I sent them an email and said: can I have till 4 pm, was  
 23 the agreed timeline for me to submit the one-page  
 24 submission.  
 25 **Q.** Did they give you that extension?  
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1 see the bullet points below. Many of them are, as  
 2 I mentioned, focused on that need to protect the  
 3 vulnerable, and there are some practical --  
 4 **A.** Yeah.  
 5 **Q.** -- policies that you were proposing as to how that  
 6 should be done.  
 7 I would like to ask you if I may about a line  
 8 towards the top of the paper. Sorry, we'll need to go  
 9 back. So at the very top after the title there's a bit  
 10 in italics about terminology, and then immediately  
 11 underneath that it says this:  
 12 "The current strategy requires acknowledging  
 13 the virus is endemic and the need to learn to live with  
 14 Covid."  
 15 Now, Professor, I want to ask you about your  
 16 description of the virus as endemic at that point.  
 17 Tell me if I'm wrong, but there is a distinction,  
 18 isn't there, between a virus or a disease which is at  
 19 a stage of being an epidemic, where it spreads quickly,  
 20 unexpectedly and unpredictably -- it becomes a pandemic  
 21 if it acts in that way across a very large area, across  
 22 nations -- but that's on the one hand; on the other  
 23 hand, an endemic disease is one that is consistently  
 24 present in a region or population and where its  
 25 prevalence remains stable and its spread fairly  
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1 predictable?

2 Now, that's what I understand by those terms, but  
3 are you saying -- or were you saying there -- that  
4 Covid, in September 2020, was a disease that was stable  
5 and predictable?

6 **A.** No, because there's nothing predictable about acute  
7 respiratory infections per se. Across the whole of my  
8 20 years -- apart from broad areas, for instance  
9 a seasonal effect, which you can understand -- they're  
10 highly unpredictable agents, and therefore the point  
11 being made is that where we were at, if -- and I have to  
12 elaborate here, if you don't mind -- we'd gone from  
13 March/April to flattening the curve, two weeks to  
14 protect the NHS, to an area now where we were talking  
15 about zero Covid and suppression. The policy on  
16 the table was to reduce infections below 1,000 and then  
17 keep Test and Trace to keep it below that level.

18 What had happened over the summer is, remember,  
19 we're scaling up testing and there was a misperception  
20 that actually out there was far less cases. The only  
21 cases were the ones that were being detected. Well,  
22 actually there's pre-symptomatic phases, asymptomatic  
23 phases, there are also people who don't turn up for  
24 testing.

25 My experience throughout the whole summer was  
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1 predictable natures to January. The second week of  
2 January, about seven of the last ten years you will see  
3 the highest number of deaths from acute respiratory  
4 infections. Most of that occurs in the over 80s.

5 So within -- if you notice my plan is that actually  
6 there is a seasonal effect, but actually what's more so  
7 is unpredictable is the fact you've got the sharp rise  
8 in April/May. I'd say that's more unpredictable.

9 There is a generalised predictability to  
10 the seasonal effect that starts in about 1 December and  
11 goes into January/February --

12 **Q.** I just want to press you though, Professor, because you  
13 used that word "endemic", didn't you, to suggest it's no  
14 longer an epidemic, it's no longer unpredictable,  
15 growing exponentially; it's endemic, it's stable in  
16 the community, it's predictable? And if we look at that  
17 graph, you were wrong to use that word, weren't you?

18 **A.** No. So, you're using interchangeable terms all  
19 the time, which is difficult to follow. Epidemic --

20 **Q.** Just, sorry to interrupt you. "Epidemic" and "endemic"  
21 are not interchangeable terms, are they?

22 **A.** Well, "epidemic" and "pandemic" are.

23 **Q.** I wasn't asking you about "epidemic" and "pandemic",  
24 I was asking you about "epidemic" and "endemic".

25 **A.** So what in terms of endemic is there's widespread global  
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1 telling me, right back to March 15th, that there was  
2 much wider circulation than this virus is being  
3 understood if you're just looking at the case numbers.

4 And that's one of the problems when you're just  
5 research focused and data focused. If you don't have  
6 an ability to triangulate and say what's happening on  
7 the ground, you will read inconsistencies and come to  
8 misperceptions in the data.

9 **Q.** Thank you, Professor, but I do just want to press you on  
10 this sentence here which you put in the note, albeit  
11 drafted in a bit of a rush, for the Prime Minister. You  
12 are a scientist, and you used that word "endemic"  
13 deliberately, and it does mean, doesn't it, a disease  
14 that is stable and predictable?

15 **A.** Well, not in all -- it's not a clear definition that  
16 I would agree with. What it means --

17 **Q.** Well, I'm going to interrupt you a moment.

18 Let's just look, if we may, at a graph just to get  
19 the context here. It's INQ000283367. We can see  
20 there's a date there of 1 October. So we see if we look  
21 just to the left, obviously, that's 20 September of that  
22 year. There was nothing stable or predictable, as it  
23 turned out, about Covid at that date, was there,  
24 Professor?

25 **A.** Well, in terms of the seasonal effect, there are  
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1 circulation of the pathogen that's gone beyond low level  
2 circulation. No acute respiratory infection is  
3 predictable or stable, so I would contest what you're  
4 looking at is not my interpretation of the word  
5 "endemic", and I would have had the opportunity at  
6 the meeting to explain all of the nuances around those  
7 issues of what I meant.

8 Within the problem of, remember, throughout summer  
9 you were scaling up the testing, we were scaling up  
10 the testing, so our actual understanding of what was  
11 going on was fairly limited until we scaled up  
12 the testing.

13 **Q.** I see. I'm going to move on, Professor. You referred  
14 to the meeting. I would like to take you to something  
15 different, please, which is the Prime Minister's account  
16 of the meeting.

17 If we could go, please, to INQ000255836, and it's  
18 page 130.

19 **LADY HALLETT:** The then Prime Minister's account.

20 **MR O'CONNOR:** The then Prime Minister's account.

21 I know you've had a chance to look at this in  
22 advance, Professor. We see at paragraph 462 Mr Johnson  
23 referring to this meeting and the title, "Should the  
24 Government intervene now and if so, how?" He runs  
25 through the attendees that we've heard something about.  
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1 We see your name there, as well as actually many others.

2 He refers at paragraph 463 to the views presented by  
3 Professor Edmunds and Professor Angela McLean, who he  
4 describes as representing the more conventional  
5 epidemiological view, and then he said that  
6 Professors Gupta and you were there to present two  
7 opposing views, and refers to Dr Tegnell presenting  
8 the Swedish approach.

9 He records, about halfway down the paragraph,  
10 Professor Edmunds's advice, which of course we've heard  
11 evidence about this afternoon, and Mr Johnson states at  
12 the bottom of this page:

13 "I greatly respected [Professor Edmunds'] views, but  
14 had always put him at the gloomier end of the spectrum.  
15 I wanted to give the Rule of 6 a chance to work, and to  
16 hear some alternative views."

17 And of course one of those alternative views was  
18 yours.

19 And if we look at the next paragraph, Mr Johnson  
20 says that he thought "we put all the scientists through  
21 their paces". He says that by this point he had a much  
22 better understanding of the data and evidence, and  
23 he certainly thinks that he was able to probe  
24 the different points of view that were being presented.

25 And he says he was willing to be persuaded by the  
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1 was an approach that was responsible and managed it, so,  
2 for instance, as I've said previously, with certain  
3 interventions but minimise the disruption to society  
4 while trying to get your maximum intent in terms of  
5 reducing the impact in terms of disease outcomes.

6 **Q.** Yes. Now, Professor, in the course of his evidence  
7 earlier today, Professor Edmunds made various statements  
8 about you and about the contribution that you made to  
9 the meeting, and I'd like to give you a chance to  
10 respond to them. There were three points.

11 First of all, we looked at an email between him and  
12 Dame Angela McLean where they described the approach  
13 that you and, I think, Professor Gupta were taking at  
14 the meeting as "half-baked nonsense"; we looked at  
15 a WhatsApp message sent by Dame Angela McLean during the  
16 meeting where there was a reference to a "fuckwitt", and  
17 Professor Edmunds I think inferred that that was  
18 probably a reference to you; and he also said today that  
19 he thought you didn't understand basic epidemiology.

20 What are your reflections on that evidence that  
21 the Inquiry has heard?

22 **A.** I would never in a professional capacity use such  
23 language about other individuals.

24 It is not unusual to find yourself in disagreement  
25 and a position of disagreement. We call it uncertainty.  
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1 lockdown sceptics. But then this, he says he:

2 "... found that in reality they [that is you] were  
3 reluctant to argue any such case, or not very hard.  
4 When pressed, the so-called dissenters actually seemed  
5 to agree with SAGE's position and did not present  
6 anything compelling to make me think it was sensible to  
7 change [his] approach."

8 Is it right that at the meeting you more or less  
9 agreed with the SAGE approach?

10 **A.** Well, that's the interpretation of the then  
11 Prime Minister.

12 **Q.** It is, which is why I'm asking you whether you agree  
13 with it.

14 **A.** The approach at that time was the tier system, which  
15 I can't -- I don't know if that's what SAGE was  
16 proposing.

17 **Q.** Did you agree with the tier system?

18 **A.** Yes, I did at that moment in time, because it was a much  
19 better alternative than to the zero Covid suppression  
20 argument that was being put on the table, which was to  
21 get the cases below 1,000 and keep them there.

22 In terms of looking at the tier system, what that  
23 was attempting to do was trying to find a middle ground  
24 between the two positions and match what was going on in  
25 Sweden. Which was not an approach that did nothing; it  
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1 And the job of an evidence-based approach is to try to  
2 reduce uncertainties so that you can make an informed  
3 decision.

4 The very fact that you have opposing views shows  
5 that you there is a problem within the interpretation  
6 and the understanding of the evidence, but it also shows  
7 me a position of: that sort of language would mean  
8 I would become resistant to any other's viewpoint or  
9 discussion. And I think that's unhelpful. And it goes  
10 back to why we were brought in in the first place, is to  
11 try to propose a viewpoint that obviously was not being  
12 aired in SAGE, was not being aired at any point of  
13 the government advice.

14 Despite the fact I'd been working for the World  
15 Health Organisation, I'd given evidence to  
16 the Irish Parliament, I spoke to a number of MPs outside  
17 of the Cabinet Office -- and I said did the work for  
18 the World Health Organisation. So to be clarified as  
19 classed at that, you know, just goes to probably  
20 the heart of the problem here, because one should always  
21 have an open viewpoint about alternative views.

22 It is -- you know, the idea that a statement could  
23 provide all of the answers is not something that you  
24 would recognise, but what it was proposing was  
25 an alternative view, how you might look at the issues,  
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1 how you might develop an evidence base and test some  
 2 things you have to, just as we were doing with drugs,  
 3 and in doing so come to a difference of what the current  
 4 strategy was.

5 In the round, I think it's fair to say that  
 6 everything that we were proposing and the way we were  
 7 looking at the epidemiology, remembering up to that  
 8 point we'd established clearly that many faults in the  
 9 data, as an epidemiological team, we also would be, and  
 10 I would be very ... the idea we would -- so one of  
 11 the evidence-based approaches, we would be looking at  
 12 the data trying to understand what was happening.

13 What I found very difficult was a modelling approach  
 14 which kept looking into the future and saying "This is  
 15 what we now predict", with some certainty. And what  
 16 comes with certainty is a reluctance to engage in  
 17 the discussion, in the debate.

18 **MR O'CONNOR:** Professor, thank you. We've seen  
 19 the contribution you made at that time, and those are  
 20 all the questions I have for you.

21 And there are no questions from CPs, my Lady.

22 **LADY HALLETT:** Thank you very much indeed,  
 23 Professor Heneghan.

24 I'm sorry we haven't had more time, but I think  
 25 Mr O'Connor has explained: if there are other matters  
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1 **LADY HALLETT:** -- at 10.30.  
 2 (4.20 pm)

3 (The hearing adjourned until 10.30 am  
 4 on Monday, 30 October 2023)

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1 that you wish me to explore, by all means submit them in  
 2 writing --

3 **THE WITNESS:** Will do.

4 **LADY HALLETT:** -- and I will consider them.

5 So thank you very much for your time this afternoon.

6 (The witness withdrew)

7 **MR O'CONNOR:** My Lady, that concludes the evidence for  
 8 the day.

9 **LADY HALLETT:** Right.

10 Well, we're now in the position where we're going to  
 11 take a break from the hearings and return on Monday  
 12 30 October, a week on Monday.

13 When I say we're taking a break, I'm afraid it  
 14 doesn't mean that we're taking a break from work.  
 15 I know that the Inquiry team and the core participants'  
 16 teams will all be working enormously hard to ensure that  
 17 we're ready for the next phase of the hearings, and  
 18 there's also a great deal of work going on as far as  
 19 other aspects of the Inquiry is concerned. So  
 20 I'm afraid it's not a holiday break, it's a break from  
 21 the hearings solely.

22 Thank you all very much indeed, and for those who  
 23 wish to follow proceedings, either in person or online,  
 24 Monday 30 October --

25 **MR O'CONNOR:** Thank you, my Lady.  
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