

Wednesday, 2 October 2024

(10.00 am)

**PROFESSOR KATHRYN ROWAN (continued)**

**LADY HALLETT:** Ms Rowan, I'm so sorry about yesterday afternoon and my rapid departure. In over 40 years as a barrister and a judge, I've never had to leave a hearing in that manner but I'm afraid I had no alternative, I was about to be violently sick. So I'm really sorry.

**A.** That's absolutely fine, my Lady, and I hope you are feeling a lot better today.

**LADY HALLETT:** I'm on the mend, thank you.

**Questions from COUNSEL TO THE INQUIRY (continued)**

**MR FIREMAN:** Professor Rowan, if we could go back to what we were discussing briefly yesterday. Just towards the end of your evidence yesterday we were discussing the concept which you have termed as ICNARC ICU capacity strain, and you described the impact during the pandemic on what you described as pandemic high and pandemic extreme as capacity strain.

Just in terms of a headline point that we can derive from that, is it right, I think that you were saying, that that meant that, certainly in the second wave, during periods of pandemic high or pandemic extreme strain, a patient who went into ICU at that time, with all other factors being equal, was more

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from the Chief Medical Officer for England, Professor Sir Chris Whitty, and he said that very early on in the pandemic it became clear that age was a very high-risk factor for Covid-19 infection and admission to critical care and death.

ICNARC did their own analysis. Did that align with that message?

**A.** Yes, it did. What we did with data from the first wave was we did some modelling, what we call multivariable modelling. It's where you're looking at all the possible factors that could impact on hospital death, and in that analysis, where you allow, if you like, each factor to compete with itself in terms of importance, age was the most significant factor driving likelihood of not surviving in intensive care -- sorry, not surviving to hospital discharge.

**Q.** Is age a significant risk factor with a number of different diseases as well?

**A.** So age is an important factor. When you look at it in isolation, obviously as we get older we get frailer, we get -- I think what you have to remember is what comes with age are comorbidities, chronic conditions. So, you know, looking at age *per se* alone is it's, sort of, almost like a proxy for number of other things and, therefore, one of the reasons we build these

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likely to die than had they gone into ICU at another time; is that correct?

**A.** Yes. What we showed was that in the second wave patients admitted in pandemic high and pandemic extreme the association with the likelihood of dying before discharge from hospital was greater, absolutely.

**Q.** In very simple terms, does that demonstrate that capacity is not just a figure or a stat but can have a real clinical impact on outcomes?

**A.** I think -- obviously I do not deliver critical care and my very noble clinical colleagues do and they're probably better able to answer what it's like to work in a very busy unit. But it does suggest that when there is too much going on, when there are too many patients -- and you've got to remember, as I said yesterday, there was also those patients being managed outside the critical care unit -- that that appears to be associated with, sort of, patients perhaps not -- less likely to survive to hospital discharge.

**Q.** I want to ask you about some of the data surrounding the characteristics of the patients who were actually being admitted to ICU and the messages that we can glean from this.

With respect to the first characteristic I want to ask you about, it's age. We heard evidence last week

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multivariable models is to allow all those other things to sort of compete in terms of determining.

But age is an important risk factor for survival to hospital discharge for intensive care patients.

**Q.** For clarity, your multivariable approach, does that strip out some of those other factors?

**A.** True. When you do those sort of models, yes, some of them prove not to be statistically significant in the model. So you're looking at the factors that are driving or most impactful on not surviving to hospital discharge. So the ones that are most strongly associated with all the others in the model, and some prove not to be associated.

**Q.** Can we then look at, please, age in the context of the pandemic.

And can we, please, go to INQ000474239, and this is figure 5.

Can I ask you to start, please, by just describing what we see in terms of the three lines and what they tell us.

**A.** Okay. So as yesterday, this graph is set out like the other graphs. So what you see here is that during the first two waves of the pandemic and prior to the roll-out of vaccines, patients admitted to critical care for Covid-19, the orange line, were of a similar age to

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1 patients admitted for other reasons.  
 2 During the Delta wave, in mid- to late 2021,  
 3 patients admitted to critical care were younger, and we  
 4 think that's most likely related to the vaccine policy,  
 5 where they started -- the vaccines were -- the policy  
 6 for the roll-out of vaccine were to vaccinate the most  
 7 vulnerable, but also starting with the most -- the  
 8 oldest sort of population.

9 During the Omicron wave, patients admitted to  
 10 critical care for Covid-19 were, again, of a similar age  
 11 to patients admitted for other reasons.

12 **Q.** If we now take a look at the dotted -- black dotted  
 13 line, that's overall patients.

14 **A.** Yes.

15 **Q.** If we could have a look, in terms of the comparison,  
 16 between the pre-pandemic period and the pandemic period,  
 17 what notable messages are there in comparison between  
 18 those two periods?

19 **A.** So really looking at the orange line, that's the Covid  
 20 patients, and the lighter blue line, because obviously  
 21 the dark dotted line is a combination of the two, you  
 22 can see a drop in the mean age.

23 Now, what --

24 **Q.** Sorry, just to be clear, do you recall -- we can't see  
 25 on the zoomed-in version but, I think, is it right, this

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1 **A.** Indeed. I think it would be hard to see dips but I'm  
 2 just looking at it, maybe slight dips, sort of,  
 3 November/December/January but they would be hard to see  
 4 in these data but, yes, we don't see a dip of the same  
 5 sort of magnitude in the pre-pandemic period.

6 **Q.** We then see that dip which you were talking about --

7 **A.** Yes.

8 **Q.** -- and you mentioned the potential impact of elective  
 9 care being suspended. Is a potential other explanation  
 10 something which you touch on in your paragraph 7.6 of  
 11 your witness statement, that there was potentially  
 12 evidence from the data of rationing of care going on?

13 **A.** So perhaps I could tackle that paragraph. So I want to  
 14 just talk about that pool. So what we don't know is  
 15 what patients or what people are not getting to  
 16 hospital. We don't know about what people are getting  
 17 to hospital later than they might have got during  
 18 outside a pandemic. We don't know what people were not  
 19 getting referred because in a busy hospital and busy  
 20 critical care, the sort of systems for referral may not  
 21 have been working the same. We don't know what sort of  
 22 what I might call subconscious rationing might have been  
 23 going on, and that's the notion where you know the unit  
 24 is full, so the patients are not being referred. And  
 25 then there may have been, there is

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1 is around March or April 2020?

2 **A.** That is -- I'm just looking at that myself. Yes, it's  
 3 sort of -- it starts to drop in early March and you can  
 4 see it coming down and then recovering. So it's sort of  
 5 March and April and May. So it's during the wave.

6 **Q.** Wave 1 of the pandemic?

7 **A.** During wave 1.

8 **Q.** And carry on, sorry, I interrupted you.

9 **A.** So then what I was going to say is obviously, as I said  
 10 yesterday, the patients who end up in intensive care,  
 11 the data on patients who end up in intensive care can  
 12 only tell you who is in intensive care. What changed to  
 13 the pool of patients, if you like, in the hospital are  
 14 a number of factors.

15 So, for example, in wave 1 there was a policy to  
 16 stop elective work and other things, and that may have  
 17 impacted on the age of the pool of patients, you know,  
 18 with other conditions presenting for critical care.

19 **Q.** If we look, though, at the pre-pandemic period, it's  
 20 right, isn't it, that the "All other patients" line --  
 21 of course, there's no Covid-19 at this point, but it is  
 22 a relatively flat line during the pandemic period?

23 **A.** Indeed.

24 **Q.** That would include, wouldn't it, periods of intense  
 25 winter pressure?

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1 a possibility -- I can't tell you one way or the  
 2 other -- some form of conscience rationing.

3 Now, whether age alone was the reason for any  
 4 decision-making or whether a whole number of factors  
 5 were taken into account in terms of the overall clinical  
 6 picture of likelihood of benefit and the result of that  
 7 was those getting into intensive care units were of  
 8 a lower age, I don't know the answer to that.

9 **Q.** Obviously this is an area that is of significant concern  
 10 to a number of those interested in the Inquiry,  
 11 particularly core participants who are concerned about  
 12 the fact that elderly patients may have been  
 13 disadvantaged by prioritisation decisions.

14 Are you able to say whether or not, and I imagine  
 15 from your answer you may not, but are you able to say  
 16 whether this provides potential evidence that elderly  
 17 patients were disadvantaged by prioritisation decisions?

18 **A.** I think it provides potential evidence, yes. I think  
 19 one would ask the caregivers about the decision-making  
 20 that was taking place during that period.

21 And, as you know, we heard from  
 22 Professor Kevin Fong last week that the whole system was  
 23 under such strain that perhaps, sort of, more rational  
 24 decision-making was not possible because of the strain  
 25 on the whole system. I can only look at the strain in

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1 intensive care.

2 **Q.** Thank you.

3 This particular graph can come down for the  
4 moment.

5 But can I just clarify in terms of the way you  
6 produced this data, it's a mean of all ICUs across  
7 the UK?

8 **A.** So this is all intensive care units providing level 3  
9 care in England, Wales, Northern Ireland and Scotland.  
10 It's from the joint report that we provided. And then  
11 what you're looking at is for every week in the graph we  
12 have basically on a daily basis averaged the patients  
13 ages and then averaged it by seven days, if that makes  
14 sense. So it's sort of a weekly daily average, if that  
15 makes sense.

16 **Q.** I'm not sure we need necessarily worry too much about  
17 this precise way --

18 **A.** It's clear in the beginning of the report if you want me  
19 to --

20 **Q.** We are clear as to the fact that you have totalled up  
21 the ages --

22 **A.** Yes.

23 **Q.** -- and then you have --

24 **A.** You can see it as an average of the patients admitted  
25 that week.

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1 at the data on pre-existing chronic conditions and this  
2 is at INQ000474239 and figure 7.

3 Can I ask you to, again, explain what this graph  
4 shows us?

5 **A.** Absolutely. Forgive me, I'm just trying to find the  
6 right sheet here.

7 So during the first three pandemic waves prior to  
8 the emergence of the Omicron variant, patients admitted  
9 to critical care with Covid-19 are less likely to have  
10 any pre-existing advanced chronic condition than  
11 patients admitted for other reasons and then during the  
12 Omicron wave this pattern reversed and patients admitted  
13 with Covid-19 were more likely to have an advanced  
14 chronic condition.

15 So, sort of, what we're sort of looking at here is  
16 advanced chronic conditions obviously highly, sort of,  
17 associated or correlated with older age and Covid-19  
18 prior to vaccination was -- caused critical illness in  
19 all patients, sort of, type thing. After vaccination  
20 had been established and with the Omicron wave,  
21 admission to critical care tended to be -- for Covid-19  
22 tended to be associated for patients who had other  
23 conditions or other things. So more complex patients or  
24 more -- patients with greater numbers of comorbidities,  
25 Covid was like a tipping point to bring them into

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1 **Q.** So a daily figure?

2 **A.** Yes.

3 **Q.** That makes sense, thank you.

4 It leads me to my next question, which is really  
5 that that doesn't account, does it, for potential  
6 variability amongst intensive care units because there  
7 may well be some where they are admitting older patients  
8 and some where they are only admitting --

9 **A.** Indeed. So this is overall and, you know, one could  
10 produce figures for individual units.

11 **Q.** If we could then turn to another aspect, you said that  
12 age is just one factor and alone it may not tell us that  
13 much. We need to look at other data. Another data  
14 point that ICNARC has looked at is pre-existing chronic  
15 conditions, and going back to your witness statement at  
16 paragraph 7.6 you touch on some of the data in relation  
17 to pre-existing chronic conditions.

18 You say that:

19 "The peaks of the first two waves of the pandemic  
20 were also associated with decreases in the proportions  
21 of patients admitted for reasons other than COVID-19  
22 that were: aged 75 years or older or (for non-elective  
23 admissions) had any prior dependency or any advanced  
24 chronic condition."

25 So just with that paragraph in mind, can we look

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1 intensive care.

2 Prior to that, Covid-19 itself was serious enough  
3 to bring you into intensive care.

4 **Q.** What we also have to bear in mind, don't we,  
5 Professor Rowan, is that this is only telling us about  
6 patients coming into intensive care, and so it's  
7 possible, again -- and I appreciate that it's just  
8 possible but it's possible -- that this could also be  
9 evidence of prioritisation decisions being taken, isn't  
10 it?

11 **A.** I think, again, if you look at the "All other patients",  
12 that that's the line to look at, which is the light blue  
13 one, and that does suggest the percentage with any  
14 advanced chronic conditions dipped slightly. So the big  
15 dark dotted line I think is driven mainly by the Covid  
16 patients, but you do see a dip in the proportion of  
17 patients with advanced chronic conditions.

18 Now I go back to that point I made about patients  
19 not getting to hospital or getting to hospital late as  
20 potentially, sort of, one of the factors that drove that  
21 but, with only data on intensive care, it's difficult to  
22 understand the pool of patients who would have been in  
23 the hospital and potentially eligible for critical care.

24 **Q.** As you said earlier, the data is just one aspect of the  
25 entire picture and there may be a variety of reasons,

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1 but is it -- are some coherent reasons, potentially,  
 2 just to clarify, the lack of elective care, people  
 3 self-selecting and staying away from intensive care,  
 4 people in some cases sadly dying at home rather than  
 5 coming to intensive care, and also potentially some  
 6 decisions being taken to prioritise those patients who  
 7 have the best chance of recovery and those patients  
 8 being admitted to intensive care. Are all of those  
 9 reasons plausible?

10 **A.** All of those reasons are plausible in terms of driving  
 11 that sort of dip of the percentage with advanced chronic  
 12 conditions being admitted.

13 **Q.** Just to clarify the point finally, you do note in your  
 14 witness statement that changes to patient  
 15 characteristics, in the way that they were during the  
 16 pandemic, as you have phrased it, that patients who were  
 17 aged 75 years or older or for non-elective admissions  
 18 had any prior dependency or advanced chronic conditions  
 19 making up a smaller percentage of those in intensive  
 20 care, those changes weren't seen during other winter  
 21 periods of the --

22 **A.** I think that's really important when we go back to just  
 23 thinking about the strain on intensive care in those  
 24 first two waves. It was like nothing -- you know, you  
 25 can't parallel it with our usual winter pressures,

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1 part of the national clinical audit for critical care.

2 **Q.** I just want to run through some of the graphs that  
 3 demonstrate the differences in the way in which Covid-19  
 4 was affecting patients of different ethnicities, and if  
 5 we could start chronologically with the first one in the  
 6 report.

7 This is INQ000480138, and it's figure 29, if this  
 8 could come on, screen please. Thank you.

9 So this shows us the percentage of patients from  
 10 white ethnic groups in England, Wales and Northern  
 11 Ireland combined by reason for admission and month.  
 12 What is the message or the messages that are capable of  
 13 being gleaned from this graph?

14 **A.** So we've spent a lot of time looking at these data, so  
 15 perhaps first we might just look at "All other patients"  
 16 and -- "(elective)" and "(non-elective)", and you can  
 17 see during the relevant period that the pandemic --  
 18 there might be a slight downward trend in the per cent  
 19 from white ethnic groups. We've looked at the data and  
 20 that seems to be mainly coding of ethnicity as not  
 21 stated, so more an artefact of the data than sort of any  
 22 downward decrease in the percentage from white ethnic  
 23 groups.

24 Then it's really looking at the Covid, the  
 25 patients admitted for Covid, and what you can see is at

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1 why -- you know, winter pressures provide or cause some  
 2 strain on the critical care system that we'd rather  
 3 avoid. The waves of the pandemic were unlike anything  
 4 that we'd ever seen and the numbers of patients were so  
 5 much greater.

6 But yes, we don't see these reductions in usual  
 7 winter pressures.

8 **Q.** That can come down now, thank you.

9 Some of the other work that ICNARC has done  
 10 looking at patient characteristics involves looking at  
 11 the ethnicity of patients that were admitted to  
 12 intensive care units. Just to clarify, I think this is  
 13 work you undertook as ICNARC but it's not work that was  
 14 done as a joint effort with SICSAG so I'm just going to  
 15 ask you about England, Wales and Northern Ireland for  
 16 these purposes.

17 **A.** Indeed, we were one of the few data sets that actually  
 18 had accurate data on ethnicity, which we shared with  
 19 other groups early on in the pandemic to make sure that  
 20 data linkage could occur. But, yes, these were data  
 21 from the Case Mix Programme.

22 **Q.** And this is data that you had prior to the pandemic --

23 **A.** So --

24 **Q.** -- that you continued monitoring?

25 **A.** Yes, we -- it was part of the dataset that we collect as

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1 certain periods the per cent from white ethnic groups  
 2 decreases markedly from a level of about 70% down to 50  
 3 or even -- and I'm just reading off the graph here -- or  
 4 even -- yes, the one arrowed is probably about 35/40%.

5 So the converse of that is an increase in non-white  
 6 ethnic groups.

7 But actually these don't coincide with the  
 8 pandemic waves. They occur just after the sort of the  
 9 height of the wave, if you were to superimpose the  
 10 waves, the first and second wave. And our hypothesis,  
 11 and it really is only a hypothesis of what might have  
 12 been going on, is that during the waves, at high rates  
 13 of transmission, Covid was hitting everybody. So  
 14 transmission was high and everybody was getting  
 15 Covid-19.

16 Outside the waves we might hypothesise that some  
 17 groups were at higher risk, and this is perhaps  
 18 reflected, in this graph, as the per cent of patients  
 19 who were non-white may have been at -- more vulnerable  
 20 for a whole host of reasons and more likely to be  
 21 admitted outside the waves for Covid-19.

22 **Q.** So there are two messages, are there, Professor Rowan,  
 23 in terms of how this pandemic was affecting white  
 24 patients? First of all, Covid-19 was perhaps less  
 25 dangerous for white patients than other conditions may

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1 have been in terms of admission to ICU based on this  
 2 graph; is that right?  
 3 **A.** Let me just ... I think Covid-19, the per cent of  
 4 patients, white ethnic group patients getting Covid-19  
 5 was lower than other conditions that require admission  
 6 to intensive care.  
 7 **Q.** Thank you. But also, as you have rightly said, the  
 8 message may be clearer when we look at some of the  
 9 non-white groups --  
 10 **A.** Yes, I think it's --  
 11 **Q.** -- which we are going to do now.  
 12 **A.** We also saw this pattern in patients admitted from the  
 13 most deprived quintile, which -- again, you see this  
 14 post-wave, that patients more deprived were a lot more  
 15 likely to be admitted to --  
 16 **Q.** Could you just explain what you mean by that?  
 17 **A.** So one can, by residential postcode and area the patient  
 18 lives, divide postcode areas into the degree of  
 19 deprivation in that area, if that makes sense.  
 20 **Q.** And the message was what with respect to those patients?  
 21 **A.** So, sort of similar to this, which is, in the periods --  
 22 inter-wave periods, we saw patients who lived in more  
 23 deprived residential areas more likely to be admitted to  
 24 intensive care.  
 25 **Q.** That's clear.

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1 what the reasons are but it does seem that between the  
 2 waves there was a greater vulnerability and it seems  
 3 that patients of an Asian ethnic group were more likely  
 4 to be admitted. There were a greater proportion of them  
 5 admitted to critical care with Covid-19.  
 6 **Q.** With respect to the blue line, the "All other patients"  
 7 line, horizontal line, would it be right that that  
 8 broadly corresponds to what one might expect to see for  
 9 patients from an ethnic background in terms of the  
 10 proportion of the population, but if we look at, in  
 11 particular, the period which I think you spoke about  
 12 just before between January 2021 and July 2021, it looks  
 13 as if there's a much, much, much more significant, quite  
 14 stark, increase in the number of Asian patients there.  
 15 Is that correct?  
 16 **A.** Yes, indeed, absolutely. So, generally, patients  
 17 admitted to critical care with Covid, there were  
 18 a higher proportion from Asian ethnic groups relative to  
 19 other conditions. The "other conditions" lines, as you  
 20 must imagine, are a whole host of different conditions,  
 21 elective and non-elective, that are reasons for  
 22 admission to critical care. So overall Covid, and  
 23 between these waves, there were marked increases between  
 24 the waves of Covid.

I think it's just this notion of these spikes do

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1 Could we now look, please, at figure 33.  
 2 Thank you.  
 3 This is the percentage of patients from Asian  
 4 ethnic groups in England, Wales and Northern Ireland  
 5 combined by reason for admission and month. It would be  
 6 fair to say, wouldn't it, this tells us a very different  
 7 picture in terms of the impact of Covid-19 on these  
 8 patients in terms of admission to ICU?  
 9 **A.** So what this suggests is that patients with Covid-19 who  
 10 come from an Asian ethnic group seemed to be at a higher  
 11 risk of being admitted to critical care with Covid-19.  
 12 However, what you also see is, again, there's a sort of  
 13 fairly steady, when we talk about the first couple of  
 14 waves, sort of rate at about -- and I'm looking at the  
 15 graph here, forgive me -- about 15%.  
 16 But what you can see is between the waves the  
 17 number, the proportion of patients from an Asian ethnic  
 18 group actually increases and this is this notion again  
 19 of between the waves it appears that those who were more  
 20 vulnerable were the ones who were getting sick, and this  
 21 might have been an increased exposure to the risk of  
 22 Covid-19 and again it -- sort of, possibly for  
 23 multifactorial reasons, including, sort of, potentially  
 24 health inequalities, barriers to equitable care, uptake  
 25 of testing, uptake of vaccination. One can't be sure

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1 not correspond to the waves -- the first two waves of  
 2 the pandemic.  
 3 **Q.** From the analysis that ICNARC has done, am I right that  
 4 in terms of the proportion of patients, in terms of  
 5 disproportionate representation in intensive care units,  
 6 Asian patients or patients from an Asian ethnicity were  
 7 most significantly affected in terms of disproportionate  
 8 representation in ICU?  
 9 **A.** So when we looked at all the prognostic factors for  
 10 30-day mortality and critically-ill patients with  
 11 Covid-19, age was by far the most --  
 12 **Q.** Sorry, just in terms of ethnicity.  
 13 **A.** -- significant factor. Asian ethnicity indicated an  
 14 increased risk too.  
 15 **Q.** And if we could now look at figure, I think it's 37,  
 16 please, this is the percentage of patients from black  
 17 ethnic groups in England, Wales and Northern Ireland  
 18 combined by reason for admission and month.  
 19 What is the message with respect to these  
 20 patients?  
 21 **A.** This is sort of -- at one level it's showing a sort of  
 22 similar pattern but it's quite difficult to interpret  
 23 this one in terms of sort of increased risk. Certainly  
 24 in our multivariable analysis, black ethnicity did not  
 25 shown a statistically increased risk but it is true that

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1 for patients admitted to intensive care for Covid-19 it  
2 sometimes parallels the lines for all other patients,  
3 non-elective and elective, but there are definitely  
4 periods where black ethnicity is greater, the proportion  
5 of patients from black ethnicity is greater for patients  
6 admitted with Covid-19. I think that's about all I can  
7 say about that.

8 **Q.** Thank you, that can come down.

9 Just reflecting on all of the graphs we have seen,  
10 it seems that up until the Omicron variant, at least, it  
11 was particularly true that patients from non-white  
12 backgrounds were at greater risk of admission to ICU.  
13 That's a message we can glean from the data, is it?

14 **A.** It is.

15 **Q.** Thank you.

16 Are there any other messages from the data that  
17 you feel we haven't covered having looked at those  
18 graphs which you would like to address?

19 **A.** I think when you put all that data together, age,  
20 advanced chronic conditions, ethnicities, deprivation,  
21 and wider reading of what was going on during the  
22 pandemic, it does suggest health inequalities. And  
23 health inequalities are, sort of, avoidable, unfair and  
24 systemic differences in health between different groups  
25 of people, including differences in life expectancy,

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1 **A.** So it is true. Would you like me to clarify on why?

2 **Q.** Yes, please.

3 **A.** Yes, sure.

4 So clearly when one's looking at trends and  
5 statistics on groups, one needs a sample size that one  
6 can feel confident that the statistics that one is  
7 generating are sort of robust and we awaited the numbers  
8 essentially to get to a sufficient sample size so that  
9 we could put out what we might call, I think, robust,  
10 reliable, statistics on the sort of non-white ethnic  
11 groups.

12 **Q.** Yes, and this was something that ICNARC introduced sort  
13 of your own motion. It wasn't something you were asked  
14 to do by the Department of Health or NHS England?

15 **A.** If I'm absolutely honest, like I'm sure others watching  
16 TV reporting, one became aware that there was -- there  
17 appeared to be issues around non-white ethnicity, the  
18 causes being, I'm sure, many, and we wanted to fully and  
19 transparently report as best we could and that's why we  
20 introduced that reporting.

21 **Q.** Thank you.

22 Moving on to another topic, and that's measuring  
23 critical care capacity.

24 Now, in February 2020, ICNARC provided a report  
25 about potential and available critical care capacity,

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1 behavioural risks, access to and availability of health  
2 and care services, and the quality and experience of  
3 care, and I think it's important for us to really focus  
4 on health inequalities, because I think they really  
5 come -- they are really magnified during conditions such  
6 as a pandemic.

7 **MR FIREMAN:** Professor Rowan, that's all that I want to ask  
8 you today. I just want to take the opportunity to thank  
9 you on behalf of the Inquiry for the work that you've  
10 done putting together these reports.

11 There are some further questions now for you from  
12 other core participants.

13 **A.** Thank you very much.

#### 14 Questions from MS HAMMAD

15 **MS HAMMAD:** Professor Rowan, I represent the Covid Bereaved  
16 Families for Justice UK and I've got a few topics to ask  
17 you about. The first one -- you have already answered  
18 most of my questions, and it's about disparities in  
19 relation to ethnic groups.

20 Just following on from what you've told us, you  
21 said that you're one of the few datasets that had  
22 accurate data on ethnicity. Is it right that it was  
23 from 5 April 2020 that ICNARC introduced reporting by  
24 ethnic group into your weekly reports that you were  
25 providing?

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1 and is it right that that report looked at the number of  
2 available bed days versus the number of occupied bed  
3 days and that that analysis was based on the number of  
4 physical beds?

5 **A.** So that was based on -- so we -- with quarterly  
6 submissions to the Case Mix Programme, the national  
7 clinical audit, we asked units to give us a number of  
8 their, sort of, operational beds, I think would be the  
9 way to see it. So we've heard in the Inquiry a lot,  
10 it's not just a bed on wheels is a bed, a bed has to be  
11 equipped with a ventilator if it's going to provide  
12 level 3 care and has to be staffed. So it has to be  
13 funded, equipped and staffed with the skilled critical  
14 care nurses that deliver skilled intensive care.

15 So it was based on those numbers rather than  
16 physical beds *per se*. So, you know, sometimes there are  
17 additional beds in the unit that are not equipped or  
18 staffed.

19 **Q.** Moving on to how we assess capacity in the future,  
20 I think you are listed as a contributor to a report by  
21 the Intensive Care Society which was produced in  
22 September -- sorry, in January 2021, and is titled  
23 "Co-developing the future".

24 Now, that report recommended that rather than  
25 looking at physical beds or occupied beds, a better way

24

1 to understand critical care capacity would be to move to  
 2 a classification system based on patient needs for  
 3 multidisciplinary staffing input. Do you think that  
 4 would be a better way to look at capacity ahead of  
 5 future pandemics?

6 **A.** So I think -- obviously, a bed is not a critical care  
 7 bed until a patient is in that bed who is critically  
 8 ill. So I think it's a mix of what that bed is being  
 9 used for and how that bed is equipped and staffed.

10 It's tricky to know exactly the point at which  
 11 a patient becomes critically ill. I think that's really  
 12 important but I do think our ability to provide quality  
 13 care, effective, humane, equitable care, to people who  
 14 become progressively sicker in the hospital is probably  
 15 best done by trying to see to what extent we can meet  
 16 the need of those sort of increasing levels of critical  
 17 illness or whatever.

18 **MS HAMMAD:** Thank you very much. I think my other questions  
 19 have been covered. Thank you.

20 **A.** Thank you.

21 **LADY HALLETT:** Thank you very much.  
 22 Who's next? Ms Shepherd.

23 **MS SHEPHERD:** Thank you, my Lady.

24 **Questions from MS SHEPHERD**

25 **MS SHEPHERD:** Good morning, Professor Rowan. I appear on  
 25

1 intensive care and multi-organ support was much greater  
 2 proportions than we'd seen normally for patients in  
 3 intensive care. So that suggests -- and the word  
 4 "suggests" is important there -- that the patients who  
 5 were being triaged into intensive care were those who  
 6 needed invasive ventilation and those who needed, sort  
 7 of, combinations of advanced support, which were usually  
 8 considered to be advanced respiratory support, advanced  
 9 cardiovascular support, renal support, and neurological  
 10 support. And that's just looking at the data of those  
 11 in intensive care and pre-supposing that those with  
 12 single-organ support needs and sort of triangulating  
 13 that with the data that we know from our clinical  
 14 colleagues, so those having single-organ support were  
 15 most likely being treated in other areas of the  
 16 hospital, so the non-invasive respiratory support.

17 Does that help?

18 **Q.** My question was: is it correct to say that those  
 19 patients who were managed elsewhere saw increases in  
 20 predicted and observed mortality?

21 **LADY HALLETT:** Do you have the figures for the patients who  
 22 were treated elsewhere?

23 **A.** No. So this is why I'm getting a little bit confused.  
 24 Thank you, my Lady.

25 So we don't have -- so what we're saying is the --  
 27

1 behalf of Covid-19 Bereaved Families for Justice Cymru.  
 2 I've got one long question to ask you but I am going to  
 3 break it down into chunks.

4 On the final page of your witness statements you  
 5 say that data suggests that triage decisions were being  
 6 made to prioritise admission to critical care of those  
 7 deemed to require advanced organ support.

8 **A.** Sorry, I'm just trying to find my witness statement if  
 9 you could just bear with me so I'm with you and then can  
 10 follow. Lovely. I apologise.

11 **Q.** Do you need me to repeat any of that?

12 **A.** Could you repeat. Thank you so much.

13 **Q.** You say that data suggests that triage decisions were  
 14 being made to prioritise admission to critical care of  
 15 those deemed to require advanced organ support. You go  
 16 on to say that this meant that patients with lower  
 17 requirements for organ support were managed elsewhere in  
 18 the hospital; in other words, not in ICU.

19 Firstly, did those patients who were managed  
 20 somewhere other than ICU see increases in predicted and  
 21 observed mortality?

22 **A.** Okay, so you want me to comment on that statement?

23 **Q.** Yes.

24 **A.** Sorry. Yes, so the proportion of patients receiving  
 25 advanced respiratory support for those patients in  
 26

1 for the patients in intensive care, the predicted  
 2 mortality is a way of, sort of, assessing their, sort  
 3 of, overall severity and that also suggested that the  
 4 sicker patients were being admitted to critical care.  
 5 We don't have data on the patients who were not admitted  
 6 to critical care but by looking at the predicted  
 7 mortality and the observed mortality it suggests that  
 8 the sicker patients were being admitted to intensive  
 9 care.

10 **MS SHEPHERD:** Thank you.

11 Might those patients with lower requirements for  
 12 organ support have been admitted to ICU in times of less  
 13 demand?

14 **A.** Yes, absolutely, and in that report you referred to  
 15 where we looked at -- sorry, you didn't refer to it, the  
 16 other lady did, we actually did look at patients who  
 17 received simple organ support, and I'm just trying to  
 18 find those figures for you to give you a feel, but some  
 19 of those would be admitted to critical care normally,  
 20 not necessarily all.

21 **Q.** My final question: would the older population have been  
 22 disadvantaged by triaging decisions which prioritised  
 23 advanced organ support?

24 **A.** Sorry?

25 **Q.** Would the older population have been disadvantaged by  
 28

1 triaging decisions that prioritised advanced organ  
2 support?  
3 **A.** No, not necessarily. So triaging on organ support  
4 doesn't necessarily correlate with the age of the  
5 patient. You could argue that those who were hit  
6 hardest by Covid-19 were the oldest population and  
7 possibly those who may have needed advanced organ  
8 support. All we've got is the data on the patients who  
9 got into intensive care. We don't know, if you like,  
10 about the patients who were not admitted.

11 Is that helpful?

12 **MS SHEPHERD:** Yes, thank you very much, Professor Rowan.  
13 Thank you, my Lady.

14 **LADY HALLETT:** Thank you, Ms Shepherd.  
15 Mr Odogwu.

16 **Questions from MR ODOGWU**

17 **MR ODOGWU:** Thank you, my Lady.

18 Good morning, Professor Rowan. I represent the  
19 Federation of Ethnic Minority Healthcare Organisations,  
20 which advocates for healthcare workers from ethnic  
21 minority backgrounds who are disproportionately impacted  
22 by the pandemic.

23 My question relates to health inequalities and  
24 builds on some of the answers that you gave earlier this  
25 morning to Counsel to the Inquiry. And my question is

29

1 doesn't mean that we don't think it's important.  
2 **Q.** Absolutely. My question really goes to whether or not  
3 there was any correlation that you saw between any  
4 characteristics which were drivers for high mortality  
5 and not any particular ethnic minority group but just  
6 ethnic minorities in general. Was there any correlation  
7 between the two?  
8 **A.** So the way that we might have looked at that was to put  
9 ethnicity into a model as non-white so sort of grouping  
10 all the ethnic groups together. We haven't done that to  
11 look at it in totality.  
12 **Q.** Okay. But were you nonetheless able to identify from  
13 your analysis any contributory factors which led to  
14 there being a disproportionate number of both Asian and  
15 black patients in intensive care?  
16 **A.** So the mechanisms by which non-white ethnic -- groups of  
17 people of non-white ethnicity, sort of, becoming  
18 infected with Covid-19 was obviously outside the remit  
19 of what we could do. We reported as transparently as  
20 possible as we could that certain ethnic groups seemed  
21 to be at a higher risk, to be more vulnerable to  
22 becoming critically ill with Covid-19.

23 **MR ODOGWU:** Okay, thank you very much.  
24 Thank you, my Lady.

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

31

1 this: did ICNARC ever undertake any bespoke analysis to  
2 try to understand whether there was a link or  
3 association between any of the characteristics  
4 associated with high mortality, for example, the social  
5 deprivation which you mentioned earlier and higher  
6 mortality in those from particular ethnic minorities?

7 **A.** Sorry, I missed the last bit of that.

8 **Q.** Do you want me to repeat the whole question?

9 **A.** I heard the initial bit. Just --

10 **Q.** It's whether there's a link between any higher risk  
11 characteristics such as social deprivation and any  
12 particular ethnic minorities.

13 **A.** So in that paper where we looked that prognostic  
14 factors, we included ethnicity and deprivation in those  
15 models to look at whether they were drivers of  
16 association with 30-day mortality. We didn't select  
17 a group, a specific ethnic group, and repeat those  
18 analyses, mainly because one wants to look at a large  
19 number of factors and the numbers become very, very  
20 small in terms of being able to conduct those  
21 statistical analyses.

22 But bearing in mind, I'm very conscious of my  
23 language here, each number is a person and a family and,  
24 you know, I just want to, you know, have you understand  
25 that sometimes what we're not able to do analytically

30

1 I think that completes the questions for you,  
2 Professor Rowan. Thank you very much again for all your  
3 help. You have been extremely co-operative and really  
4 informative so we're really grateful to you. Sorry  
5 again for having to bring you back for the second part  
6 today.

7 Ms Carey.

8 **(The witness withdrew)**

9 **MS CAREY:** Thank you, my Lady.

10 The next witnesses will be Professor Charlotte  
11 Summers and Dr Ganesh Suntharalingam. It will just take  
12 a moment to bring them into the room.

13 *(Pause)*

14 Can I ask, please, that both experts are sworn.

15 **PROFESSOR CHARLOTTE SUMMERS (affirmed)**

16 **DR GANESH SUNTHARALINGAM (sworn)**

17 **MS CAREY:** Thank you.

18 Some introductions, if I may. May I start,  
19 please, with you, Professor Summers. You are, I think,  
20 a professor of intensive care medicine and director of  
21 the Victor Phillip Dahdaleh Heart & Lung Research  
22 Institute at the university of Cambridge; is that  
23 correct?

24 **PROFESSOR SUMMERS:** I am.

25 **MS CAREY:** Right. I think in addition to your academic work

32



1 you spent 50% of your time undertaking clinical practice  
2 in intensive care medicine?

3 **PROFESSOR SUMMERS:** I do.

4 **MS CAREY:** And indeed you returned in February 2020 to  
5 full-time NHS clinical service for 14 months, leading  
6 the Addenbrooke's Hospital critical care response for  
7 the pandemic?

8 **PROFESSOR SUMMERS:** I did.

9 **MS CAREY:** You have a number of other qualifications which  
10 I won't read out but they are in your report for those  
11 who'd like to read them.

12 Dr Suntharalingam, you are a full-time active duty  
13 ICU consultant at London North West University  
14 Healthcare NHS Trust; is that correct?

15 **DR SUNTHARALINGAM:** That's right.

16 **MS CAREY:** You too have a number of posts, voluntary, either  
17 elected or appointed, and in particular, I think between  
18 2018 in December and December 2020, you were the  
19 president and chair of the board of trustees of the  
20 Intensive Care Society?

21 **DR SUNTHARALINGAM:** That's correct.

22 **MS CAREY:** And, indeed, as we're going to come on to  
23 consider this morning, you participated in the clinical  
24 prioritisation tool that we briefly examined with  
25 Professor Whitty when he gave evidence last week.

33

1 heard and a number of statements that you have read in  
2 preparing your report that I hope we can draw together  
3 some of the strands of evidence.

4 Clearly one of those matters will also be about  
5 how the stretching of ratios and the like impacts on the  
6 care that is received by the patients in ICU. I'd also  
7 like to consider with you advance care planning for  
8 those who are critically unwell and are likely to die,  
9 I want to look at critical care transfers -- we've heard  
10 a little bit about that -- and indeed the long-term  
11 impact on those that work in ICU.

12 So that's the rough framework of where we're going  
13 to go today. But can I start, please, with just you,  
14 Professor Summers and a very briefly introduction to how  
15 Covid affects the body to such an extent that we had so  
16 many people ending up in ICU.

17 If it helps you, Professor, I think we are in  
18 paragraphs 2 to 3 of your report, because it isn't just  
19 a question, is it, of it attacking the lungs; is that  
20 correct?

21 **PROFESSOR SUMMERS:** That's absolutely correct.

22 SARS coronavirus 2, which causes Covid, is an infection  
23 that causes disruption of multiple organ systems, so of  
24 the lungs, with respiratory failure and blood clots,  
25 altered neurological status, which is things like

35

1 **DR SUNTHARALINGAM:** That's right. It was the guidance  
2 document rather than just a tool.

3 **MS CAREY:** You also have a number of other appointments and  
4 qualifications, which are also set out in your report,  
5 which is dated July 2024. It's in INQ000474255, and  
6 I hope you both have a copy in front of you.

7 Now, Professor/Doctor, there are a number of areas  
8 covered in the report. You've been good enough to  
9 divide them up between you and, as far as possible, can  
10 we stick to that division. But equally, if there is  
11 a point that either of you would like to make that you  
12 think is important for her Ladyship to consider, please  
13 don't feel precluded from jumping in -- but please try  
14 not to overspeak; it doesn't help me or the  
15 stenographer.

16 Can I just give you, though, an idea of the themes  
17 and topics we're going to examine this morning. This is  
18 really taken from your exec summary but clearly we need  
19 to consider ICU capacity and the sufficiency of it or  
20 otherwise.

21 You know, I hope, that we've already heard from  
22 Professor Rowan, as you have just seen, from ICNARC, and  
23 I think you are also aware of the evidence we heard last  
24 week from Professor Fong, and so it's against that  
25 background and indeed the other evidence that we've

34

1 strokes, bleeding in the brain and delirium, altered  
2 kidney function, cardiovascular compromise. Every  
3 single organ system can be affected as a consequence of  
4 being infected acutely with this virus.

5 **MS CAREY:** And when the pandemic struck, were ICU  
6 consultants, doctors, nurses and the like aware that it  
7 was going to have that multi-organ effect or was it  
8 predominantly thought it was going to affect the lungs  
9 in the first instance?

10 **PROFESSOR SUMMERS:** So when the pandemic struck, this was  
11 a novel virus that people had not encountered before.  
12 We were learning all the time. The first cases in the  
13 United Kingdom occurred in January, there or  
14 thereabouts, 2020, and that that point we had some  
15 evidence because there had been spread across the world,  
16 but we were still very much learning exactly what it  
17 looked like and the multisystem nature of it, and indeed  
18 about the longer-term consequences that I know you heard  
19 from Professor Evans and Professor Brightling about.  
20 All of that unravelled over time.

21 **MS CAREY:** Yes.

22 I think, though, you make clear in your report  
23 that in relation to pregnant women there were initially  
24 concerns raised about the impact of Covid on pregnant  
25 women. I'm at your paragraph 6. But did the data in

36

1 fact bear out that there was an increase of pregnant  
2 women in ICU who had Covid?  
3 **PROFESSOR SUMMERS:** So actually the data helpfully provided  
4 by ICNARC and SICSAG relating to intensive care shows  
5 that broadly -- and they used a fairly broad definition  
6 of pregnancy or pregnancy-related complications --  
7 broadly the number of people admitted was not much  
8 different to would have been expected.  
9 **MS CAREY:** Now, we've got to be clear we are always talking  
10 about the admissions into ICU. It's not to suggest that  
11 pregnant women didn't catch Covid and/or were treated in  
12 other areas of the healthcare system.  
13 **PROFESSOR SUMMERS:** Absolutely right.  
14 **MS CAREY:** And that is a caveat, I suspect, that applies to  
15 much of the evidence that you are going to give.  
16 Given the multi-organ impact that Covid has on us,  
17 the kind of treatments that are required -- clearly  
18 there was respiratory support, but what else did the  
19 body need to try to fight off the disease?  
20 **PROFESSOR SUMMERS:** So intensive care in all its forms but  
21 particularly in Covid is a package of care that aims to  
22 support multiple organ systems. We support lungs with  
23 mechanical ventilators, we support kidneys when they  
24 fail with renal replacement therapies, we support blood  
25 pressure and the cardiovascular systems with various

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1 **PROFESSOR SUMMERS:** So both can be provided in ICU. Most  
2 commonly, high-flow nasal oxygen systems are provided in  
3 intensive care but in some hospitals and some settings  
4 they are also provided on the wards.  
5 **MS CAREY:** Thank you.  
6 Then I think we've heard about something called  
7 CPAP, the continuous positive airway pressure. What is  
8 CPAP?  
9 **A.** That's a tight-fitting face mask that either can go  
10 round your full face, your mouth and nose or just your  
11 nose, depending on your face shape and what works for  
12 you, and it provides a continuous single level of  
13 pressure and the oxygen alongside that, and that's  
14 usually provided in critical care settings, although in  
15 the pandemic the majority of CPAP was provided outside  
16 critical care units because we had to reserve critical  
17 care space for people who required invasive mechanical  
18 ventilation, that I think we'll come on to.  
19 **MS CAREY:** We will. I am just going to slow down slightly  
20 because the terminology is one with which we are now  
21 familiar but we need to make sure our stenographer can  
22 keep up.  
23 **PROFESSOR SUMMERS:** Sorry.  
24 **MS CAREY:** So ordinarily CPAP might be provided within an  
25 intensive care unit. And can I just pause there. We

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1 different medications, we support cognitive impairment  
2 in various different ways. So it was complex care  
3 provided for multi-organ dysfunction in patients with  
4 Covid that were admitted to the intensive care unit.  
5 **MS CAREY:** Can I ask for your help, though, please, in  
6 understanding the different ways that oxygen was  
7 delivered to patients, because the oxygen supply or the  
8 lack thereof is a matter that the Inquiry is concerned  
9 about, but can I ask you to talk us just slowly through  
10 the different types of oxygen that is provided and then  
11 which oxygen is provided in intensive care or critical  
12 care units.  
13 **PROFESSOR SUMMERS:** So oxygen can be provided in a number of  
14 ways to hospitalised patients. So it can be provided in  
15 what we term low-flow systems, which are often simple  
16 face masks or nasal specs, cannulae, little tubes that  
17 go up your nose, that produce oxygen, up to about  
18 15 litres per minute.  
19 There are high-flow oxygen systems that, again,  
20 are little tubes that usually go up your nose that can  
21 produce up to about 70 litres a minute worth of oxygen,  
22 so much higher fractions of inspired oxygen.  
23 **MS CAREY:** Just pausing there, are low-flow or high-flow  
24 normally delivered within ICU or is that what you might  
25 get on a ward?

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1 are referring to intensive care, critical care,  
2 intensive treatment units I think there is also. Help  
3 us with the terminology. Is there any real difference  
4 for the purposes that the module is looking at?  
5 **DR SUNTHARALINGAM:** I think for this mode it's pretty much  
6 interchangeable. There are nuances and differences.  
7 "Intensive care" is a kind of -- historically, more of  
8 a UK term, hence the name of the bodies, Intensive Care  
9 Society, et cetera, et cetera. We -- talk about  
10 intensive care nurses. Outside the UK people talk about  
11 critical care. There's been a bit of an evolution  
12 towards greater use of "critical care" because it  
13 implies that it's delivered outside the ICU as well,  
14 which is true. And other organisations, for example,  
15 the British Association of Critical Care Nurses, so --  
16 but essentially they are interchangeable for the  
17 purposes of the discussion.  
18 **MS CAREY:** All right.  
19 **PROFESSOR SUMMERS:** But I think important to clarify that  
20 not all critically ill people are inside critical care  
21 or intensive care units, whatever you call them; the two  
22 things are not synonymous.  
23 **MS CAREY:** Yes, I think we're going to look at some data  
24 that might bear that out, and certainly that was a point  
25 that Professor Rowan was making, that there might be

40

1 a great number of people receiving critical care outside  
 2 of ICU that aren't, therefore, captured in the  
 3 ICNARC/SICSAG data. All right. Understood.  
 4 Help us, please, with non-invasive ventilation,  
 5 Professor.

6 **PROFESSOR SUMMERS:** So, non-invasive ventilation also uses  
 7 a tight-fitting mask either over your nose or your mouth  
 8 and nose and provides one level of pressure when you're  
 9 breathing out and a higher level of pressure to support  
 10 you breathing in. So it's bi-level pressure as opposed  
 11 to CPAP that's just one continuous level of pressure.

12 **MS CAREY:** And does it did follow that non-invasive  
 13 ventilation is ordinarily provided within critical care  
 14 settings?

15 **PROFESSOR SUMMERS:** So not in all settings. Non-invasive  
 16 ventilation is used for the treatment of patients with  
 17 chronic obstructive pulmonary disease, usually under the  
 18 care of respiratory physicians in respiratory wards, so  
 19 not always in intensive care, but it is a therapy that  
 20 can be used outside of COPD in intensive care.

21 **MS CAREY:** Should I take that that if you are on  
 22 non-invasive ventilation, the patient may well be still  
 23 conscious at that stage?

24 **PROFESSOR SUMMERS:** Absolutely. You have to be conscious to  
 25 receive that treatment.

41

1 into -- via another pipe, into the circulation, and is  
 2 used for a small subset of people whose lungs are unable  
 3 to oxygenate the blood.

4 **MS CAREY:** I think you say that is provided in specialist  
 5 centres.

6 **PROFESSOR SUMMERS:** It is. There are specialist  
 7 commissioned centres in the UK to which people are  
 8 transferred to receive that therapy. It is not  
 9 available outside those specialist centres.

10 **MS CAREY:** Can I ask you about one other treatment that  
 11 we've heard about, which is proning. Obviously, that  
 12 became something we learnt about in particular during  
 13 the pandemic, but what is it and how long does it take  
 14 and how many people does it take to prone a patient?

15 **PROFESSOR SUMMERS:** So proning, which means turning  
 16 a patient face down as opposed to lying face up, is  
 17 a treatment that we have known to be of benefit to  
 18 people who have severe respiratory failure for some  
 19 years. There was randomised control trial evidence  
 20 published in 2013 that showed in a subset of  
 21 mechanically ventilated patients it was of benefit.

22 In the pandemic it was used much more widely both  
 23 in people who were mechanically ventilated but also in  
 24 people who were awake and spontaneously ventilating, and  
 25 it was used outside the settings in which we initially

43

1 **MS CAREY:** And then invasive mechanical ventilation  
 2 I suspect we know what it is, but could you just tell  
 3 us, please.

4 **A.** Invasive mechanical ventilation involves the patient not  
 5 being conscious, or certainly being at least to a degree  
 6 sedated, and a tube passed through their airway down  
 7 into their lungs and a machine being responsible for  
 8 their breathing. You can have that in a way that  
 9 supports your only patient-initiated breath but also in  
 10 a way where the machine takes over all of the breathing  
 11 and your spontaneous attempts to breath are abrogated.

12 **MS CAREY:** That requires a ventilator --

13 **PROFESSOR SUMMERS:** It does.

14 **MS CAREY:** -- and a degree of specialised care being  
 15 provided to monitor --

16 **PROFESSOR SUMMERS:** So CPAP non-invasive ventilation and  
 17 invasive ventilation all require specialist teams to  
 18 support the delivery and care.

19 **MS CAREY:** Thank you.

20 And we've heard it mentioned, something called  
 21 ECMO. Can you help us with what ECMO is, please.

22 **PROFESSOR SUMMERS:** It's extracorporeal membrane  
 23 oxygenation. It is a type of oxygenation of the blood  
 24 that involves taking the blood outside the body through  
 25 a machine that oxygenates it and then the blood back

42

1 had clinical evidence that it was of benefit, but the  
 2 evidence has accumulated during the pandemic to show  
 3 it's of benefit.

4 For patients who are invasively mechanically  
 5 ventilated when they are prone, it requires a team of  
 6 six or eight people, depending on the individual  
 7 patient, to be at the bedside to carefully manage all  
 8 the lines and tubes so that nothing is displaced and the  
 9 patient to be very carefully turned face down. And  
 10 usually they're left lying on their tummies for 16 hours  
 11 or so and then turned back for a period of time and  
 12 a decision made about whether their oxygenation is such  
 13 that they are required to be reproned or turned  
 14 tummy-down again. It is a hugely labour and  
 15 resource-intensive thing to do.

16 **MS CAREY:** Yes. So six to eight people per patient. Just  
 17 roughly, is there any average of number of beds within  
 18 an ICU?

19 **PROFESSOR SUMMERS:** Intensive care units are of varying  
 20 different sizes, from, you know, 100 beds to 10 beds.  
 21 It very much depends.

22 **MS CAREY:** Can I just look at some pharmacological  
 23 treatments with you.

24 And could we have on screen page 14 of your  
 25 report.

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1 I'm not going to go through them all, Professor,  
2 but there are some which with which I suspect we are  
3 familiar, and I think a number of milestones, you  
4 describe them as, relevant to treatments.

5 So there we are on 19 March, just before the  
6 country went into lockdown, and the RECOVERY Trial  
7 opened to recruitment. What was the RECOVERY Trial?

8 **PROFESSOR SUMMERS:** So I think the thing it's important to  
9 remember, particularly as we are talking about intensive  
10 care, is that intensive care provides supportive care  
11 for people. It is not a disease-modifying therapy in  
12 and of itself. And so what was required was research  
13 and studies to try to find therapies, such as vaccines  
14 and drug therapies, that would change the trajectory of  
15 the pandemic whilst we were desperately trying to look  
16 after people.

17 The RECOVERY Trial was one such thing. It was  
18 a national clinical trial that looked to find therapies  
19 to improve the 28-day mortality of hospitalised patients  
20 with Covid-19. It opened to recruitment, as I've shown  
21 here, on 19 March, and by 5 June it had shown that  
22 hydroxychloroquine, a therapy that at the time was being  
23 advocated for by many people, was not effective at  
24 improving the mortality, by 28 days, of hospitalised  
25 people, but that dexamethasone was shown -- and it was

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1 48 hospitals in the NHS and aimed to say if we use  
2 standard care, so conventional oxygen therapy of the  
3 low-flow type, or high-flow nasal oxygen, or CPAP, which  
4 of those reduced the chances of you progressing to need  
5 invasive mechanical ventilation or death and showed that  
6 actually CPAP was of benefit and was better than  
7 high-flow nasal oxygen or conventional care at  
8 preventing escalation to invasive mechanical ventilation  
9 or death.

10 **MS CAREY:** So quite an important discovery there.

11 **PROFESSOR SUMMERS:** It was.

12 **MS CAREY:** Help me, these are obviously particular to Covid  
13 but is there the ability to sort of use these again in  
14 the event of a pandemic that's a respiratory virus?

15 **PROFESSOR SUMMERS:** So the answer is we don't know. It  
16 depends on the virus. So in the case of dexamethasone  
17 there was pre-existing data from a clinical trial in  
18 a broader group of patients with very severe respiratory  
19 failure who were mechanically ventilated that had  
20 actually been published in early 2020, a study called  
21 DEXA-ARDS that had shown that dexamethasone may be of  
22 benefit. So there is a reason to suspect that it may be  
23 of benefit but the trial evidence is generated in the  
24 setting the trial was done and it's important not to  
25 extrapolate from one setting to another.

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1 announced on 16 June that people who were receiving  
2 oxygen of the various different types that we've just  
3 discussed had a mortality benefit at 28 days from  
4 receiving dexamethasone treatment.

5 **MS CAREY:** Pausing there, within three months the RECOVERY  
6 Trial had enabled us to work out that dexamethasone did  
7 in fact reduce mortality. And it may not be obvious,  
8 but what is dexamethasone?

9 **PROFESSOR SUMMERS:** Dexamethasone is a corticosteroid tablet  
10 or intravenous injection that has been widely used for  
11 other things, other types of inflammation, other types  
12 of disorders, that's a commonly available generic, so  
13 not under patent with a pharma company, therapy that  
14 could be available cheaply across the world. So it was  
15 a huge finding in terms of improving the worldwide  
16 outcomes from hospitalised patients with Covid.

17 **MS CAREY:** Can I move to the other end of the milestone  
18 figure and 4 August. There's reference there to CPAP  
19 was shown to reduce mortality or intubation compared  
20 with conventional oxygen therapy or high-flow nasal  
21 oxygen in a RECOVERY trial.

22 Just put that into lay speak for me, if you will,  
23 Professor.

24 **PROFESSOR SUMMERS:** The RECOVERY respiratory support (so  
25 RECOVERY-RS) randomised control trial took place at

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1 **MS CAREY:** Okay.

2 I suppose it does show, though, the ability for  
3 the RECOVERY Trial to actually have real practical  
4 benefit across a number of areas.

5 **PROFESSOR SUMMERS:** It shows the importance of research  
6 embedded in care to change the trajectory of what we  
7 were all facing.

8 **MS CAREY:** My Lady, I'm going to move on to how intensive  
9 care treatment is organised. I can deal with that topic  
10 now or if that's a convenient moment for a break.

11 **LADY HALLETT:** Certainly, we can break now. 11.25, please.

12 **MS CAREY:** Thank you, my Lady.

13 **(11.10 am)**

**(A short break)**

15 **(11.25 am)**

16 **MS CAREY:** Dr Suntharalingam, can I turn to you, please, to  
17 help with the organisation of intensive care treatment,  
18 and I'm at your paragraph 28 onwards in the report. But  
19 I think we've heard some evidence about there are  
20 different levels of care provided in acute hospitals and  
21 I wonder if you could just talk us slowly through the  
22 various levels starting, please, with level 0 and  
23 level 1.

24 **DR SUNTHARALINGAM:** So in an acute hospital setting where we  
25 start with is really ward-level care which is what you'd

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1 see in a standard ward, whether medical or surgical or  
2 any area. I'm going to focus initially on the numbers  
3 of people because that will be relevant later, and it is  
4 the people that then determine the equipment and the  
5 interventions that you do safely and it's not just  
6 furniture or bits of kit.

7 So on a ward you might have one trained staff  
8 nurse per eight or so patients. That is the goal, but  
9 sometimes it can be more diluted even in day-to-day  
10 life, going up to -- and level 1 includes slightly more  
11 enhanced levels of care where you might be up to one  
12 trained nurse to every four patients.

13 Supplementing that, there are medical staff, where  
14 the ratios vary according to what team they're in and  
15 what they are covering and, importantly, there are also  
16 pharmacists and allied health professions, which  
17 includes physios, speech and language, therapists,  
18 occupational therapists and sometimes clinical  
19 psychologists. So there's a range of staff ...

20 **LADY HALLETT:** Slow down.

21 **DR SUNTHARALINGAM:** Those staff, relatively small in number  
22 and cover multiple areas of the hospital whereas we  
23 entitled to focus on nurse ratios in particular because  
24 they are very closely associated with the bed numbers  
25 and the beds.

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1 **MS CAREY:** What's the difference between level 2 and  
2 level 3?

3 **DR SUNTHARALINGAM:** It's really a numeric one, so level 2  
4 which historically we tended to call high dependency, is  
5 one trained, in this case a trained critical care nurse  
6 in terms of care nurse to every two patients, and  
7 level 3 is full intensive care which doesn't necessarily  
8 mean any particular level of equipment but it means one  
9 critical care trained nurse to every one patient in  
10 normal times. Those tend to be placed together, so they  
11 tend to be within a footprint which is a critical care  
12 or intensive care unit with the patients moving up and  
13 down levels of care as their needs change.

14 I think an important --

15 **MS CAREY:** Pause there, because there's a figure that shows  
16 that, I think, and can I have up on screen, please,  
17 INQ00474255\_21, and figure 4, which I think will  
18 demonstrate that you can move between levels 2 and 3  
19 depending on how ill the patient is. Thanks you.

20 If we just look at the -- tertiary care and ECMO  
21 out of it for the moment, but if we look at, in an acute  
22 hospital, at level 3 and level 2, I assume the arrows  
23 there under "Critical Care" are to show there may be  
24 a movement between the types of care you might need.

25 **DR SUNTHARALINGAM:** Yes, an individual patient's

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1 So that's the default.

2 **MS CAREY:** Just pause. So that's level 1; is that correct?

3 **DR SUNTHARALINGAM:** Level 0 --

4 **MS CAREY:** Zero or 1 --

5 **DR SUNTHARALINGAM:** -- these days is just ward-level care,  
6 and then level 1 is an enhanced level which can be  
7 spread around the hospital in different specialty areas  
8 or can be put together in designated level 1, so we are  
9 talking about enhanced care, and that's a greater  
10 nursing ratio of 1:4.

11 **MS CAREY:** In short, is it as we get more severely unwell in  
12 theory the ratio should get better in terms of the  
13 number of trained staff looking after a patient; is that  
14 the general trajectory?

15 **DR SUNTHARALINGAM:** That's the general pattern, and as well  
16 as the amount of human attention they are getting, if  
17 you like, it also enables lower levels of care and  
18 interventions which become safer, for example, lines and  
19 so on, that forms the respiratory management that my  
20 colleague has commented on and for those you need  
21 a higher level of staffing in order to safely deliver  
22 those.

23 **MS CAREY:** Levels 2 and 3, is that what would be considered  
24 to be dedicated intensive care units?

25 **DR SUNTHARALINGAM:** Generally, yes.

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1 requirements might change and their physical position  
2 may change or it may be just changing the number of --  
3 the amount of staff and equipment around them within  
4 that unit.

5 I think one thing I would like to highlight is the  
6 sort of vertical arrows with the ward level care below,  
7 and really it is a pyramidal graph, so obviously there  
8 are a larger number of general wards than there are  
9 critical care units and that highlighted part there is  
10 just to highlight there's actually a decision-making  
11 process there as well.

12 **MS CAREY:** We're going to come on to that.

13 Can I just ask you this, though. We've heard  
14 a number of chief nursing officers speak about changing  
15 critical care nursing ratios during the pandemic but,  
16 from the outset, why is it deemed necessary to have one  
17 critical care nurse to one patient if they are on  
18 a ventilator?

19 **DR SUNTHARALINGAM:** That can be the case even if they are  
20 not on a ventilator and it is really reflecting the  
21 patient and their needs and their condition, so if they  
22 are in a condition where they are biologically,  
23 physiologically, very vulnerable, their condition can  
24 change minute to minute and, in addition, the amount of  
25 the treatments they are getting are -- require

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1 attention. So you may have pumps going -- well, you  
2 will have pumps going, you may have ventilators, you may  
3 have kidney machines, those themselves need monitoring  
4 for safety and to make them operate, but it's really  
5 about the patient and the fact their condition can  
6 change really second to second or minute to minute.

7 **MS CAREY:** We're familiar with the changing in nursing  
8 ratios in the pandemic and I might come back to that in  
9 a moment, but just what about consultants, how many  
10 consultants would one expect there to be -- take this as  
11 an example -- for level 3, if there's eight beds there?  
12 How many consultants would there be in an ICU?

13 **DR SUNTHARALINGAM:** For that group of patients you would  
14 expect about one and in larger units, you, certainly  
15 during the day, have greater numbers of consultants. It  
16 can vary 1:8, 1:12, and at night, again, you need enough  
17 people to cover safely, but there may be one consultant,  
18 certainly overseeing care of a larger number but with  
19 backup if required.

20 **MS CAREY:** And then ECMO, as we know, delivered in the very  
21 specialist centres that Professor Summers told us about.

22 Now, you were going to come on to tell us about  
23 how the decision is taken to move someone from ward  
24 level to critical care, and I'm in your paragraphs 30  
25 and 31, Doctor, but essentially how is the decision to

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1 people referring or to the patient themselves and their  
2 families and with supporting staff. But there is  
3 a gatekeeping process.

4 **MS CAREY:** So pausing there, a doctor dealing with a ward  
5 level 0 or 1 patient might think they are deteriorating  
6 to such an extent they may need critical care and, what,  
7 essentially they would ring you in your hospital and  
8 say: I've got a patient, here are the symptoms, will you  
9 admit them? Or who makes the call?

10 **DR SUNTHARALINGAM:** It may be the referring teams, but also,  
11 importantly, there are actually a variety of mechanisms.  
12 So, for example, an increasingly important part is  
13 categorical outreach teams. So there are critical care  
14 trained nursing teams and others who will be around the  
15 hospital. And also there are systems for alerting, so  
16 we have early warning scores, we've heard about marker  
17 score and other measures as well, so there are various  
18 ways of raising the alarm, so to speak, and other staff  
19 around, but it ultimately comes from a referring set of  
20 people to the critical care team.

21 **MS CAREY:** Are any notes taken of the decisions about  
22 whether the patient should or should not be escalated?  
23 Should that be recorded?

24 **DR SUNTHARALINGAM:** Yes.

25 **MS CAREY:** In the patient's notes?

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1 move someone up to ICU taken?

2 **DR SUNTHARALINGAM:** So, firstly, it's about picking up the  
3 fact they are deteriorating, and the earlier that's done  
4 the better, and the earlier you can have those  
5 conversations and decisions the better, so there's  
6 a whole layer of thinking about how to detect critical  
7 illness early, including at the front door of the  
8 hospital and home.

9 The decision to escalate them. So I completely  
10 agree with what the Professor said that -- certainly in  
11 the case of Covid, intensive care is a supportive  
12 process not disease altering, but it is actually a set  
13 of interventions and treatments in itself, as well, in  
14 the process of delivering that.

15 So we are delivering treatments to people in the  
16 same way, as an analogy, of offering chemotherapy or  
17 doing major surgery, and so there needs to be, firstly,  
18 do they need it, and picking that up early, in a timely  
19 way, I should say. Secondly, what they need. Thirdly,  
20 whether it's the right thing for them and --

21 **MS CAREY:** And who makes the decision?

22 **DR SUNTHARALINGAM:** So once you get to level 2 and 3 care,  
23 these are intensivist-led and the evidence is that is  
24 how things work best. So the decision is made by an  
25 intensive care consultant but in discussion with the

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1 **DR SUNTHARALINGAM:** Yes, that is right.

2 **MS CAREY:** Do they have to be made contemporaneously or is  
3 that something that could be written up at the end of  
4 a shift or in a downtime moment if, indeed, there were  
5 any in the pandemic?

6 **DR SUNTHARALINGAM:** Really contemporaneously but even in  
7 normal times, and especially in a pandemic, obviously  
8 there may be a lot going on at the same time, including  
9 stabilising the patient. There are also a lot of people  
10 involved, so it should be possible to document near  
11 real-time but it may not be feasible to do it right  
12 there and then but really they should be.

13 **MS CAREY:** We have heard from the chief nursing officers  
14 that during the pandemic, the nursing ratios of  
15 a critical care nurse were stretched to potentially as  
16 high as 1:6 patients, clearly with other supporting  
17 staff and, indeed, redeployed staff.

18 Can I just ask you about those that were  
19 redeployed. How easy or otherwise was it, in your  
20 experience, for them to take up the mantle of providing  
21 critical care in terms of, firstly, how they looked  
22 after the patient, but also the impact on the staff  
23 having to teach the critical care staff?

24 **DR SUNTHARALINGAM:** In terms of dividing this between what  
25 happens normally and how things changed in the pandemic,

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1 I'll pass that to the Professor and then I can -- it  
 2 might tie into later discussions as well.

3 **PROFESSOR SUMMERS:** I think it should be recognised that it  
 4 was extraordinarily difficult and that staff from across  
 5 roles in the NHS did an amazing thing when they agreed  
 6 to be redeployed to intensive care units to support us.  
 7 They were walking into a situation where many of them  
 8 were, rightly, fearful of what they were going to face,  
 9 often outside the kind of environments that they had  
 10 chosen to work in. There's a reason they didn't work in  
 11 intensive care for many of them and suddenly we were  
 12 asking them to do things, and it wasn't just clinical  
 13 staff, it was administrative staff, support staff,  
 14 who -- I can think of a ward clerk from a day hospital  
 15 who came to be one of the ward clerks, one of the  
 16 intensive care, at my hospital. They did an amazing  
 17 thing and they absolutely did their very best under  
 18 extraordinarily difficult situations.

19 **MS CAREY:** Pausing there, what kind of duties would a ward  
 20 clerk who's been redeployed to critical care actually  
 21 perform?

22 **PROFESSOR SUMMERS:** So they were dealing with all the  
 23 records and the administration. We were opening new  
 24 intensive care units. You cannot do that without  
 25 administrative support. Somebody needs to answer the

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1 really quite frightening environment of intensive care  
 2 unit to help with individual interventions as well, so  
 3 all of it was very much appreciated.

4 **PROFESSOR SUMMERS:** Helping us with putting on PPE and  
 5 making sure we were safe, and that we actually got  
 6 access to food and water, that families were phoned.  
 7 A whole host of support.

8 **MS CAREY:** Notwithstanding the efforts of those that came  
 9 and were redeployed and did their best, does it follow,  
 10 though, that when one stretches the critical care ratios  
 11 to 1:6 that there is inevitably going to be a compromise  
 12 in the amount of care that a patient receives?

13 **PROFESSOR SUMMERS:** Yes, unquestionably. It takes years to  
 14 train specialist critical care staff. We entered the  
 15 pandemic with a number of critical care trained staff  
 16 that we had and recognising, as is recognised in some of  
 17 the evidence from the nursing associations in critical  
 18 care, there was a 10% critical care nurse vacancy when  
 19 we went into the pandemic. We can't just magic up  
 20 specialist care staff because, as I think  
 21 Professor Whitty referred to last week, it takes a good  
 22 couple of years, at least, for minimum critical care  
 23 specialty training. What we had, we had, and we had to  
 24 stretch further and further to provide. So of course  
 25 that impacted on the care that could be provided.

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1 phones, somebody needs to make sure the records, all the  
 2 things that you need, arrive, and that somebody receives  
 3 those.

4 All of the teams that we use, and I think we've  
 5 listed on page 61 just the clinical staff, occupational  
 6 therapists, speech and language therapists, dietitians,  
 7 physiotherapists, pharmacists, it is an enormous package  
 8 of care. Every time we opened an intensive care unit we  
 9 stretched what we had further and further and further  
 10 and drew in more and more resource from elsewhere in the  
 11 hospital and diluted what we already had.

12 **DR SUNTHARALINGAM:** Absolutely.

13 And just to add to that, so as well as people  
 14 doing, sort of, their jobs, but in an intensive care  
 15 environment, there were people working -- firstly, they  
 16 were being exposed to things which they wouldn't  
 17 necessarily be in their normal jobs, people  
 18 deteriorating and dying in front of them, the emotional  
 19 distress of that, and I think that's well worth  
 20 recognising, and also people who weren't in a position  
 21 to come and staff intensive care unit, because they had  
 22 other jobs to do, or non-clinical also came to help with  
 23 activities such as proning, so we had dedicated trained  
 24 proning teams who might come from dental staff or admin  
 25 staff, and they were voluntarily entering into the

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1 **MS CAREY:** Whilst looking at stretching further and further,  
 2 can I ask you please about the measuring of ICU capacity  
 3 and the ways it is differently measured across the UK.  
 4 Can we perhaps start with how it is measured in  
 5 Scotland, Wales and Northern Ireland and then look at  
 6 the position in England.

7 Is this you, Dr Suntharalingam, who can help with  
 8 this?

9 **DR SUNTHARALINGAM:** Yes.

10 **MS CAREY:** I would like to look at the figure 5, please, on  
 11 page 22 of the report.

12 And although we're looking at a graph relating to  
 13 Scotland, I just want to understand how intensive care  
 14 capacity is measured in Scotland, Northern Ireland and  
 15 Wales, and this, I hope, graph will help us understand  
 16 it.

17 **DR SUNTHARALINGAM:** Yes. So just, if I may, rewind a little  
 18 bit. So measuring capacity across all intensive care  
 19 units across all four nations is, in a way, the same.  
 20 You have the number of beds that you expect to be  
 21 staffing. It is actually more difficult than you would  
 22 think to get a national picture, even with all the  
 23 reporting, because you have beds, physical beds, you  
 24 have beds that are staffed for that shift, if you like,  
 25 or that week, and then you have actual numbers of people

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1 and the patients in them, which change minute by minute.

2 So it's not as simple as you might think.

3 I think, to go back to your question, in this  
4 graph, the Scottish government figures quoted in BBC  
5 Scotland during the pandemic show the live numbers of  
6 occupied beds. They also show, and I think this is  
7 where the important difference is, the line there shows  
8 the normal capacity of the entire system --

9 **MS CAREY:** The purple line is, what, about 175 or  
10 thereabouts?

11 **DR SUNTHARALINGAM:** Yes. And then the higher line shows  
12 right up at the top there, shows the theoretical surge  
13 capacity if every unit went to the maximum dilution at  
14 the time, 1:6, let's say, and it gives a sight of  
15 where -- how close things are to total saturation but,  
16 as we've said, that's delivering really quite diluted  
17 care in which the details are diluted where the skill  
18 mix is boosted with redeployed people and although we  
19 may have numbers of hands and bodies, the familiarity  
20 and the skill mix is different. So you are delivering  
21 a different form of care.

22 **MS CAREY:** Pausing there, if one takes this graph, by some  
23 point between 27 March and 28 April 2020, ordinarily ICU  
24 capacity was exceeded in Scotland --

25 **DR SUNTHARALINGAM:** Yes.  
61

1 **MS CAREY:** Pause there while we get the England figure up,  
2 please. It just takes us a moment to flip between the  
3 graphs.

4 Perhaps can we expand it, please.

5 Let's just explain the graph and then you can come  
6 on to make the point that I know you want to make. This  
7 is taken from north London, a hospital in north London,  
8 Northwick Park, and the total capacity is the grey  
9 shading and then it's also broken down into the number  
10 of ICU patients that were in the ICU in that hospital  
11 and, indeed, the non-Covid patients, but it's the black  
12 line, I think might be the easy one to understand, and  
13 it was ordinarily this hospital had 22 ICU beds.

14 **DR SUNTHARALINGAM:** Yes.

15 **MS CAREY:** Right. However, the total capacity changed, if  
16 we look at the grey, quite considerably as 2020  
17 progressed, as you have no doubt surged up the number of  
18 beds available. So at its highest in April, 60 beds.

19 **DR SUNTHARALINGAM:** Yes.

20 **MS CAREY:** So nearly three times as many beds as you had in  
21 non-pandemic times.

22 **DR SUNTHARALINGAM:** Yes, and as Professor Summers has said,  
23 that also -- hiding in that almost is the fact that more  
24 of those beds were level 3 than usual, so the staffing  
25 was even greater diluted than 1:3, it would have been up  
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1 **MS CAREY:** -- when they went over 200-odd beds even though  
2 in theory they have got 175 in normal times.

3 **DR SUNTHARALINGAM:** Yes.

4 **PROFESSOR SUMMERS:** Just to remind that not all of those  
5 175 beds would be level 3 beds necessarily in normal --  
6 some of them would not necessarily be staffed for the  
7 kind of patients that they happened to have in them when  
8 they had those 200 or so patients.

9 **MS CAREY:** So that is a, sort of, easy to understand diagram  
10 of how intensive care capacity was measured in Scotland  
11 and similar measurements are taken in Wales and Northern  
12 Ireland. Can I contrast that now with the position in  
13 England, and it might be easy to understand by reference  
14 to figure 6 at page 39 in your report.

15 **DR SUNTHARALINGAM:** Can I, while this graph is up --

16 **MS CAREY:** Yes.

17 **DR SUNTHARALINGAM:** -- the bit where the -- sorry, my fault.

18 Just that little bit where it blips over the  
19 normal line it shows that it's over 100% of normal  
20 capacity, which I think you have already mentioned. So  
21 just to contrast that. And then the next graph. And  
22 this is really not so much about how it is measured but  
23 how it's expressed, I think. So due to, kind of, the  
24 size and complexity of England in terms of the  
25 regions --  
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1 to 1:6 and more.

2 **MS CAREY:** So if we look at the black line and then look at  
3 the figures above it, from about 15 March, or  
4 thereabouts, onwards this ICU was operating at either  
5 twice or nearly three times its normal baseline  
6 capacity.

7 Now, help us with how it's differently expressed  
8 in England, if I may ask you.

9 **DR SUNTHARALINGAM:** So a decision early on which is  
10 explained in NHS England's statement is to, firstly, ask  
11 each hospital what it could surge up to because that  
12 gives you a maximum figure, and that is logical, it  
13 shows when you are in danger of reaching saturation  
14 point locally and nationally. I think the difference is  
15 that that's how it's expressed and then communicated,  
16 not through any kind of ill intent but I think because  
17 of the way internal communications and assessment  
18 worked, became what was then put out nationally in media  
19 and so on, and it is just a very different way of  
20 looking at it.

21 So looking at percentages of all surge beds gives  
22 you, you know, what can be a lower percentage -- well,  
23 obviously, is a lower percentage occupancy than if you  
24 are measuring it against a standard capacity.

25 **MS CAREY:** So if we go to the end of this graph and look at  
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1 April into May, it is suggesting there that there are up  
 2 to nearly 50 beds available of which, if we look at the  
 3 blue line, perhaps just under 40 are taken up and the  
 4 proportion of those of Covid. It's giving the  
 5 impression there that there may be ten beds available,  
 6 or so, that day but it doesn't reflect the fact that you  
 7 are already running at double the capacity you would  
 8 have ordinarily run at in non-pandemic times.

9 **DR SUNTHARALINGAM:** Yes, and when it comes to an individual  
 10 hospital that information is obviously well known, can  
 11 be communicated easily, planned around. When you map  
 12 that up to regions and nations, then it looks as -- the  
 13 risk is it looks as if you've got lots of spare capacity  
 14 in the system at all times.

15 That wasn't the intent of the way it was used but  
 16 there's a difference between how things are seen within  
 17 the system by people that know what it means versus how  
 18 it then gets interpreted later on or more externally.

19 **MS CAREY:** So although you make the point that's not the  
 20 intent, it is potentially misleading if people don't  
 21 understand that the baseline capacity is significantly  
 22 less than the surge capacity.

23 **DR SUNTHARALINGAM:** Yes.

24 **MS CAREY:** Right.

25 **PROFESSOR SUMMERS:** I think it doesn't reflect the  
 65

1 this graph, what this graph doesn't show us is what the  
 2 kind of dilution of the nursing ratios were going  
 3 through March into April into May 2020 in this  
 4 particular hospital. So it's not just about the beds,  
 5 it's about the number of staff available to care for the  
 6 patients in the beds.

7 **DR SUNTHARALINGAM:** Yes, out of the 22 at any one time  
 8 normally there would be a mixture of level 2 and level 3  
 9 patients whereas at times like this everyone would have  
 10 been level 3 almost.

11 **MS CAREY:** Can you help me, Doctor, in your particular  
 12 hospital, what kind of nursing ratios were you  
 13 stretching to in intensive care?

14 **DR SUNTHARALINGAM:** I think within the range of what we've  
 15 discussed. So at peak times up to 1 in 6 and sometimes  
 16 beyond. It was only in wave 1. I am not really here to  
 17 talk about individual sites there.

18 **MS CAREY:** No, can I make it clear. We have sitrep data  
 19 from NHSE that covers nursing ratios, but I just, since  
 20 you were here, wanted to know at its worst, how bad did  
 21 it get, and in the medium bad, if I can put it like  
 22 that, what were you running at in your hospital?

23 **DR SUNTHARALINGAM:** It fluctuated and it's -- also the  
 24 pattern changed across the waves. So by wave 2 there  
 25 was a greater understanding across the system that  
 67

1 experience of the staff at the bedside.

2 **DR SUNTHARALINGAM:** Absolutely.

3 **PROFESSOR SUMMERS:** That's the critical bit.

4 **MS CAREY:** I wanted to come on to that because when you are  
 5 running at double or even, now, perhaps, triple the  
 6 capacity that was usually at, what is the impact on the  
 7 staff in terms moral distress and moral injury? And we  
 8 haven't actually defined those phrases, so perhaps we  
 9 ought to deal with that first.

10 What is moral distress?

11 **DR SUNTHARALINGAM:** So moral distress is if you -- when you  
 12 have the skills and the knowledge to know what you  
 13 should be doing and what you could be doing to do the  
 14 best for the person in front of you -- and that's not  
 15 just in healthcare, it can be in teaching or any other  
 16 endeavour -- but if you then are unable to do it,  
 17 whether due to resources or the workload or anything  
 18 else, that sets up a conflict in your brain,  
 19 essentially, that says: I should have been doing this  
 20 but I can't.

21 So that's moral distress.

22 Where that then becomes moral injury is when it's  
 23 accumulated over time, there's a crescendo effect, and  
 24 it can lead to long-lasting psychological effects.

25 **MS CAREY:** And what this graph, just finally dealing with  
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1 having localised hotspots was potentially harmful and  
 2 there was a greater understanding of the need for  
 3 earlier decompression. Conversely, that meant some of  
 4 the other sites got busier because people had been moved  
 5 into them.

6 **MS CAREY:** Well, shall we look at actual critical care  
 7 transfer since you mention decompression there? And  
 8 obviously we've heard from Professor Rowan on that, and  
 9 I think if you turn to your paragraph 75 onwards in your  
 10 report there are some diagrams and documents that may  
 11 help us deal with critical care transfers. But do  
 12 I understand this, that transferring a patient from one  
 13 critical care unit to another ought to be a transfer of  
 14 last resort?

15 **DR SUNTHARALINGAM:** Yes, in the sense that it's not directly  
 16 in the patient's interest, so in an ideal world, whether  
 17 in pandemic or not, every patient should have access to  
 18 critical care where they need it, which they do, but in  
 19 some cases it may involve having to move them elsewhere.  
 20 Normally, you would want to transfer people for clinical  
 21 benefit, so not every hospital can offer every service,  
 22 whether it's surgery or ECMO or anything else, so  
 23 escalating somebody and moving them elsewhere for care  
 24 they can't deliver is appropriate clinical transfer.

25 **MS CAREY:** Fine.  
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1 **DR SUNTHARALINGAM:** Moving them closer to home or somewhere  
2 for rehabilitation after that is also kind of  
3 appropriate and in their interests.

4 What we call a capacity transfer, which does  
5 happen in day-to-day life as well, but nothing on like  
6 the same scale, is something that you would prefer to  
7 avoid if you can, both for --

8 **MS CAREY:** So, pausing there, because we saw some graphs  
9 dealing with repatriation because it's nearer to the  
10 patient's home, for example, and take moving a patient  
11 perhaps to an ECMO unit or a baby that requires  
12 specialist care out of it, I just want to focus on the  
13 capacity transfers, and you say they do happen in  
14 non-pandemic times and we've seen some graphs dealing  
15 with the scale of them.

16 But the mechanisms in place I think vary across  
17 the UK and I think you said in your report that in  
18 Northern Ireland there is a Northern Ireland specialist  
19 transfer and retrieval system to help move patients,  
20 babies, paediatrics and adult transfers, 24/7; is that  
21 right? That's a service available all the time.

22 **DR SUNTHARALINGAM:** Yes. So this is -- this is a clinical  
23 need that was identified before the pandemic. Various  
24 bodies, scientific papers, and editorials all  
25 recommended it. Okay, there were resource issues in it.

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1 So EMRS, firstly, picks up -- it is essentially  
2 a pre-hospital service that can pick up and retrieve  
3 patients where needed. It is used for critical care  
4 transfers primarily, I believe, for -- initially for  
5 clinical escalation from the smaller hospitals outside  
6 the central belt into the specialist centres where  
7 needed. Clearly it can also be used for capacity  
8 transfers in that setting.

9 **MS CAREY:** Understood. Then in England and Wales there is  
10 the regional Critical Care Operational Delivery Networks  
11 that has existed since 2000. How does that work in  
12 England and Wales?

13 **DR SUNTHARALINGAM:** There is a minor error in this actually  
14 in that I think the Wales network is now part of the  
15 All-Wales trauma group of care network, and at the time  
16 this was in place wasn't an operational delivery  
17 network. So from 2000, the report Comprehensive  
18 Critical Care, which looked at how critical care can  
19 best be delivered across the country and brought in  
20 critical care outreach and more use of the term  
21 "critical care" outside ICU, among other things that  
22 pointed out that networking between hospitals would help  
23 regional collaboration, help move patients, where they  
24 did need to be moved, move closer, or over shorter  
25 distances, but also help with load balancing, and all of

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1 And different nations had different, not so much  
2 different approaches but different abilities to deliver  
3 that depending on the scale. So the Northern Ireland  
4 NISTAR system -- you will have to excuse me, I have lost  
5 my place.

6 **MS CAREY:** Paragraph 82.

7 **DR SUNTHARALINGAM:** Thank you. Just to make sure I get  
8 my -- so the Northern Ireland system is fully funded for  
9 24/7 from 2017 onwards, organised from Belfast but  
10 with -- in coalition with the ambulance service and are  
11 able to pick up and deliver patients and deliver care,  
12 obviously, during the transfer in a variety of settings.

13 So that's that example.

14 **MS CAREY:** So they had a system that had been in place for  
15 at least three years by the time we started the  
16 pandemic.

17 In Scotland you say there is the Emergency Medical  
18 Retrieval System, EMRS, that has existed since 2008.  
19 And help us with that, please, Doctor.

20 **DR SUNTHARALINGAM:** Again, this is from reading and  
21 conversations, so not my personal experience, and also  
22 I think some of the variation is partly geographic, so  
23 in Scotland you obviously have the central belt with  
24 large population areas, more rural areas, and smaller  
25 hospitals, and less hospital cover in other areas.

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1 this as well before the pandemic.

2 **LADY HALLETT:** Could you slow down, please. I am sorry.  
3 The stenograph is struggling and I am afraid I am too.

4 **DR SUNTHARALINGAM:** Sorry, okay, apologies.

5 So Wales, I think is -- for a while was not an  
6 operational network but more clinical collaboration but  
7 now certainly fits into that category.

8 In England these were -- in some regions the  
9 network activity paused and came back but now there are  
10 operational delivery networks across the country, across  
11 the nation, these were all in place before the pandemic.  
12 They were there to help units collaborate with each  
13 other. Not all of them, in fact probably a minority,  
14 had transfer systems running. Everyone wanted to but  
15 the resources weren't there, prior to the pandemic, and  
16 that has changed since then.

17 **MS CAREY:** Pausing there, different systems in different  
18 countries but all essentially able to do the same thing  
19 if there is a need for a critical care transfer for  
20 capacity reasons; is that what it comes to?

21 **DR SUNTHARALINGAM:** That's what it should come to. They  
22 weren't all there before. They are coming into place  
23 now and as you've touched on, it is not so much about --  
24 I mean, there are special service specifications for  
25 these, they do differ a bit between the nations, but

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1 what it comes down to, fundamentally, is everyone  
2 getting access to the treatment they need and if it's  
3 not where they are that they should be able to be safely  
4 transported to where they can get it and that's the  
5 goal.

6 **MS CAREY:** We've seen this graph before but can we put up  
7 figure 9, please, on page 41.

8 This is data provided by ICNARC and SICSAG,  
9 dealing with the average daily number of ICU transfers  
10 between critical care units across the UK from both  
11 pre-pandemic and (*unclear*). We looked at it, I think  
12 yesterday afternoon, with Professor Rowan.

13 But there we can see that if you take March into  
14 April 2020 they jump to 60 daily transfers between  
15 critical care units across the UK and if you go on to,  
16 then, just after Christmas of 2020, we can see a jump  
17 there again to potentially over 80 patients a day being  
18 transferred.

19 So that just gives a sort of grounding in what was  
20 happening UK wide. I actually want to look at figure 7  
21 in the report now, please, and the transfers into and  
22 out of Northwick Park, just to take that hospital again  
23 as an example.

24 I think you've provided there -- it's on page 40.

25 **DR SUNTHARALINGAM:** Yes.  
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1 a collaborative approach amongst all the hospitals and  
2 joint transfer education and shared equipment packages  
3 and an approach to transfer that enabled a spontaneous  
4 activation, really, of this.

5 So the network as a group of hospitals and as  
6 management team basically came online, activated on that  
7 day really, when they realised Northwick Park was in  
8 trouble, and all of this sort of came around -- I won't  
9 say *ad hoc*, because it reflected a previous  
10 organisation, but spontaneously to enable this to happen  
11 to decompress the hospital.

12 **MS CAREY:** So when a hospital thinks "We need to transfer  
13 some patients out to relieve the pressure on an ICU", do  
14 they ring a central unit or do they ring a neighbouring  
15 hospital? How, practically, does it happen?

16 **DR SUNTHARALINGAM:** So it will vary around the country.  
17 Again, this particular network, very well established,  
18 people know each other, and also geographically it's  
19 quite proximate, and there is a -- as there is for all  
20 networks now, there's a defined network team, and at  
21 this stage they were able to be activated.

22 So the awareness of what was happening spread very  
23 rapidly through the existing network mechanisms, as did  
24 the activation. Which was actually very fortunate.  
25 I mean, this is what -- how you would want things to  
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1 **MS CAREY:** Just pause there while we bring it up on the  
2 screen, Doctor. Thank you.

3 There we have "Daily admissions to and transfers  
4 out from Northwick Park". This is all in 2020; is that  
5 correct?

6 **DR SUNTHARALINGAM:** That's right.

7 **MS CAREY:** So just starting that beginning of the graph,  
8 1 March, in that week there were a relatively low  
9 number, three or four, ICU admissions steadily rising as  
10 we approach lockdown. And if we take the week of  
11 15 March, there are already a few numbers of transfers  
12 out that then tends to grow as we go through March and  
13 into April.

14 Even in that early stage can you help why there  
15 were transfers out in the week of 15 March?

16 **DR SUNTHARALINGAM:** So that was very early. The -- so, just  
17 for clarity, the reason this is here is because it's  
18 publicly available, it's published as a -- you know,  
19 a scientific journal regarding the transfer mechanisms  
20 and very much around wave 1.

21 It was also published as an example of network  
22 activity. So the Critical Care Network in this area --  
23 which, for transparency, I've been involved in since  
24 it's been there -- was active. It didn't have a funded  
25 24/7 transfer team. It does now. But there was  
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1 work, and how they did work, as the pandemic evolved in  
2 other places.

3 **MS CAREY:** If we look, then, at figure 8, which is just  
4 below this graph on page 40, and the circular --  
5 I hesitate to use that word --

6 **DR SUNTHARALINGAM:** Spider web.

7 **MS CAREY:** -- diagram. Take Northwick Park there at the  
8 top. I'm not going to go through all the hospitals but  
9 one can see there the number of patients transferred out  
10 to a number of hospitals in and around that region, and  
11 indeed to some -- the Nightingale hospital, once it was  
12 opened. It's quite a complicated --

13 **DR SUNTHARALINGAM:** It is.

14 **MS CAREY:** -- picture that is being painted there.

15 **DR SUNTHARALINGAM:** Yes, absolutely. So I think it shows  
16 that, firstly, it's not -- although Northwick Park was  
17 the predominant -- a hotspot right in the early days,  
18 but it -- things evolved very quickly. Some of those  
19 hospitals didn't -- don't have A&Es and were, therefore,  
20 in a better position to take in, but they do have their  
21 own specialist workloads. And as you've seen, there are  
22 patients moving in all directions --

23 **MS CAREY:** Well, quite, I was going to say. So, I mean, if  
24 you take Chelsea and Westminster and Hammersmith,  
25 they're going -- there's backwards and forwards  
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1 transfers between those two hospitals.

2 **DR SUNTHARALINGAM:** Yes, and some of it may be, sort of,  
3 appropriate repatriation, some of it may -- bearing in  
4 mind this was over a period of time, and even this was  
5 only in a fairly small, sort of, capsule of time, in  
6 wave 1, in one area, so as things evolved there would be  
7 different hotspots, different hospitals needing  
8 assistance or to move people back. And although here  
9 the out-of-network transfers are shown to the  
10 Nightingale at the time, in fact as the pandemic  
11 evolved, there were much more wide-ranging transfers to  
12 other areas of London and between regions, particularly  
13 by the time of wave 2.

14 **MS CAREY:** Right. Well, I was going to ask, perhaps. This  
15 is in a metropolitan area, where there's a number of  
16 hospitals nearby or within a number of miles, do you  
17 know what the position was in perhaps a more rural  
18 hospital, where there are many miles between it and its  
19 next neighbouring intensive care unit?

20 **DR SUNTHARALINGAM:** I don't know for sure because -- I mean,  
21 this was a paper that's put together by people involved.  
22 There isn't the same data in this form for other areas.  
23 And obviously geographical distances and, sort of, if  
24 you like, cultural isolation, in terms of not having  
25 their regular contact, means that it may well not --

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1 interval in an ICU stay [that can be] days or weeks."

2 But help us with the study that was done of the  
3 137 ICU transfers in North London. What was  
4 demonstrated by that small study?

5 **DR SUNTHARALINGAM:** Again, it was -- this was by another  
6 group, but in that same patch actually, so fairly  
7 short-range transfers among academic and other  
8 hospitals --

9 **MS CAREY:** So do you mean within a few miles of each other?

10 **DR SUNTHARALINGAM:** Although the message may be  
11 transferable, just as a sort of note of caution, and  
12 again --

13 **MS CAREY:** Slowly, please.

14 **DR SUNTHARALINGAM:** But what it showed is that -- in this  
15 case they looked specifically at respiratory function  
16 and the gas exchange in the lungs and whether the  
17 process of disconnecting, moving to a transport  
18 ventilator, moving the patient between sites, whether  
19 that affected that particular parameter, and they showed  
20 that compared to transfers within the same hospital,  
21 between different units, there was a greater impact  
22 temporarily but that within 24 hours that had  
23 disappeared. That's only looking at one aspect of that  
24 patient group.

25 **MS CAREY:** You set out in your paragraph 90 that perhaps the

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1 have been different.

2 And obviously we don't want to be repeating each  
3 other's testimony, but Professor Fong's statement was  
4 very powerful last week and he spoke for all of us, but  
5 one of the things he mentioned was around going to an  
6 isolated site and hearing them saying, "Well, we didn't  
7 know if we were doing the right thing", but equally that  
8 will apply to transfers and so on as well. You know,  
9 I can't tell you whether everyone that was under this  
10 level of pressure got this level of mutual support at  
11 every stage.

12 **MS CAREY:** It does bring me on though to the outcomes and  
13 lessons learned regarding the critical care transfers.

14 And we can take that figure 8 down, and can I ask  
15 you, please, Doctor, about paragraph 90 onwards in your  
16 report.

17 I think you make the point that:  
18 "Assessing the ... impact of critical care  
19 transfer on a patient's eventual outcome ..."

20 Because we've heard it's a risky procedure, that  
21 you take normally the most stable patient who's likely  
22 to survive the transfer to the new hospital.

23 You say it's difficult to assess the overall  
24 impact:  
25 "... as the transfer is a relatively short time

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1 caveats or the limitations of that study might be  
2 a better way of putting it, and I think there was  
3 another one done in Scotland that used data from  
4 108 patients admitted to a unit in Scotland in the  
5 second wave, and there, even when they made adjustments  
6 for confounding factors, they found no significant  
7 difference in mortality rates for patients who were  
8 transferred for capacity reasons; is that correct?

9 **DR SUNTHARALINGAM:** That's correct, as far as we can  
10 understand it from the data available. And as the  
11 authors themselves said, there may be patterns in that  
12 but the numbers just haven't been large enough to show.  
13 So there was evidence of patients staying in hospital  
14 a bit longer, being on ventilator longer, but didn't  
15 translate to mortality difference.

16 I think an overarching -- I'm just -- if I may go  
17 back just to your point about it being last resort,  
18 because I think that it's true, but I think tying that  
19 to the development of transfer teams, I think what --  
20 one thing we'd learnt -- or to learn from new but  
21 reinforced is that having organised, funded retrieval  
22 and transfer teams, which have drilled together,  
23 practised together, in the same way as the helicopter  
24 emergency services, for example, in another setting, it  
25 can -- it is safe to do transfers, particularly with

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1 a good system. And it provided a role during the  
2 pandemic which does map across to normal life as well,  
3 where setting these things up means the risks of  
4 transfer are lower, and the benefits may be of what we  
5 might call load balancing, ensuring patients do get the  
6 right care rather than being in an over -- a busy  
7 hospital where they -- decisions may be different or  
8 where they don't have access to everything.

9 So I don't want to, sort of, in a way, inverse  
10 caveat it by saying transfers can be made incrementally  
11 safer and the transfer teams are a way of doing that.

12 **MS CAREY:** I suppose the point I wanted to make was there  
13 was no evidential or study done that suggests that  
14 transferring people out had a greater impact on their  
15 mortality, but that's not to ignore the impact it had on  
16 them, their loved ones and, indeed, the staff left in  
17 the unit perhaps caring --

18 **DR SUNTHARALINGAM:** Absolutely.

19 **MS CAREY:** -- for the most sick who may have then ended up  
20 going on to, sadly, die.

21 **A.** Yes, and I know that's been mentioned in earlier  
22 testimony and there's the moral injury aspect of that.  
23 And actually if you are a critical care healthcare  
24 worker of any sort, but particularly the nursing and  
25 other staff who are by the bed of that patient for long

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1 hospital at 1:6 staffing ratios and somewhere else with  
2 more capacity, if you decompress earlier, at say 1:4,  
3 there's less impact on staff, the patients may do  
4 better. So the later transfers -- the ability to do  
5 transfer safely and to be at a lower threshold in fact  
6 and to decompress was part of the learning within the  
7 pandemic, and I think that is transferable to future  
8 ones as well.

9 Load balancing as a term sounds a bit, sort of,  
10 non-humane.

11 **MS CAREY:** It does.

12 **DR SUNTHARALINGAM:** This is not about cargo but as a sort of  
13 technical term, and we don't tend to talk about that day  
14 to day, but it's about evening out the dilution and the  
15 workload under overwhelming conditions, and I think  
16 that -- doing that more readily was an important part of  
17 the learning process.

18 **MS CAREY:** Yes, if I understand what you are saying  
19 correctly, that this was a very reactive need to  
20 transfer out when it got too bad and, if I understand  
21 what you are correctly saying, there might be a lesson  
22 learned to be more proactive and transfer out before you  
23 get to that state of overwhelming pressure?

24 **DR SUNTHARALINGAM:** Yes, and then there's something around  
25 getting the preparations right at the receiving end as

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1 periods, having to then move them somewhere where you  
2 don't see them again, and usually they're moving the  
3 more stable patients, so you don't get there recovery  
4 part of it. And as you have mentioned, the patients  
5 themselves will wake up in a different hospital and  
6 their families, even if it's by virtual and iPads and  
7 not being allowed to visit, the fact that knowing  
8 they've been moved, you know, possibly hundreds of miles  
9 away, is very emotive, and we fully understand that.

10 **MS CAREY:** Is there any lesson learnt, do you think, from  
11 the number of transfers out and the way in which it  
12 happened that could be usefully utilised again in the  
13 event of a pandemic?

14 **DR SUNTHARALINGAM:** I think there was learning during the  
15 pandemic even within the relevant period between the  
16 waves, as I've sort of touched upon. I think if you  
17 start from the point that everyone should go to 1:6 and  
18 cope as best you can, which was appropriate at the time,  
19 but then when it -- once it becomes apparent there are  
20 geographic hotspots, depending on local population --  
21 the learning between the two waves was you can make  
22 transfer safer but also there's a clinical need to  
23 decompress earlier.

24 **MS CAREY:** Yes.

25 **DR SUNTHARALINGAM:** So you might, rather than having one  
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1 well. So the centres that did take in more to  
2 decompress the busier hospitals, there was generally,  
3 I think, a flow from small and medium to larger  
4 hospitals. So obviously they need the resources to cope  
5 with that as well.

6 So, for them, wave 2 was, in a way, more stressful  
7 that wave 1, whereas for other places it was not  
8 quite -- I wouldn't say the converse but there were some  
9 mitigation of the initial shock.

10 **MS CAREY:** Can I stick with you, Doctor, please, and look at  
11 what are called CRITCON levels, the UK Critical Care  
12 Readiness Condition (or CRITCON, as it's known) and this  
13 is about how a hospital conveys to NHS England in this  
14 particular example about their state of overwhelmedness,  
15 for want of a better phrase.

16 Now, I just want to understand: is CRITCON  
17 currently only used in England; is that correct?

18 **DR SUNTHARALINGAM:** It is, yes.

19 **MS CAREY:** Can we have a look at the levels and then we'll  
20 look at what hospitals declared. Perhaps the easiest  
21 way to do this is look at INQ000409921 behind your  
22 tab 5, if you're using the tabs, or on screen.

23 These are the Covid-19 pandemic CRITCON levels.  
24 There is a normal CRITCON 0 for business as usual, where  
25 ICU is able to meet all critical care needs without

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1 impact on other services. Normal winter levels of  
2 noncritical care transfer and other overflow activities.  
3 So the ICU is operating as normal: is that what that  
4 means?

5 **DR SUNTHARALINGAM:** Essentially, and this is -- there have  
6 been different iterations of this. This originates back  
7 from H1N1 and swine flu, when it was created for  
8 a similar purpose, and reflects conditions at the time  
9 where a bad winter is sort of within the normal range.  
10 But things that were unprecedented would include working  
11 in other areas, which at the time of the pandemic  
12 obviously became almost standard.

13 So there's a slight historical lag in the  
14 definitions and that's been addressed by revisions since  
15 then.

16 **MS CAREY:** All right. Then we've got there -- CRITCON 1 is  
17 what is described as a bad winter. CRITCON 2:

18 "Medium surge, unprecedented, the usual funded  
19 critical care capacity is full, overflow into  
20 quasi-critical care areas (theatre, recovery, other  
21 acute care areas) and a high level of non-clinical  
22 transfers. Trusts beginning mutual aid."

23 What does that mean in reality? Try and give us  
24 a picture of what does a hospital or an ICU look like at  
25 CRITCON2?

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1 escalation. It's a way for hospitals, for frontline  
2 clinicians, to escalate to their management within their  
3 region and nationally to say, "Okay, we're now in  
4 unprecedented territory". And then, as you get to  
5 CRITCON3, you're approaching a situation where the  
6 hospital may become overwhelmed, and you're doing that  
7 using how it feels subjectively but trying to put some  
8 objective handles on to it to enable that to happen.

9 **MS CAREY:** So when you move from 2 to 3, there's expansion  
10 now into noncritical care areas, wards or using  
11 paediatric facilities, the trust is operating at or near  
12 maximum physical capacity. There is maximum mutual aid  
13 between the trusts with the network and the regional  
14 NHSE co-ordination. The prime imperative in CRITCON3 is  
15 to prevent any single trust entering CRITCON4.

16 **DR SUNTHARALINGAM:** Yes.

17 **MS CAREY:** That sounds, as described there, as full stretch.

18 **DR SUNTHARALINGAM:** Yes.

19 **MS CAREY:** Is that really there's no other bed available or  
20 we might only have one bed available today? Is that  
21 what we're looking at.

22 **DR SUNTHARALINGAM:** Yes, basically, and bearing in mind even  
23 the one bed is inadequate, so in the height of the  
24 pandemic, if you're admitting four or five or six  
25 patients a day, or more in the larger places, then it's,

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1 **DR SUNTHARALINGAM:** So if I can sort of connect this to a  
2 later discussion we will come to but also a relevant --  
3 originally discussed in 2009 for swine flu which is  
4 tying it actually to decision-making and what happens  
5 when a hospital gets overwhelmed. Is there a risk that  
6 individual clinicians will start making decisions about  
7 admissions which are limited by resource rather than  
8 only what's best for the patient, and how do we avoid  
9 that.

10 This shared escalation ladder, shared language, is  
11 a way of avoiding that. So CRITCON in that context was  
12 meant to represent not only numerical bed numbers from  
13 sort of spreadsheets, if you like, but also a stress  
14 gauge. It's how it feels to that hospital.

15 So the definitions were designed to paint  
16 a picture of at t might look like. That picture already  
17 mutated during pandemic because almost all of us were  
18 already in non-traditional areas by the time the  
19 pandemic started, because that was part of the planning.  
20 But this is saying there CRITCON2 is something that  
21 isn't just a bad winter and, in a rising tide event such  
22 as flu that's creeping up and getting worse, it was  
23 meant to pick up that this is starting to happen.

24 Clearly, in the case of the pandemic we knew what  
25 was coming and there was much more accelerated

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1 you know, it's difficult to put numbers on but then  
2 that's why this is meant to be deliberately a little bit  
3 subjective in that it's how it is affecting that site  
4 that day. And it's an alarm bell really.

5 **MS CAREY:** Then CRITCON 4: The ICU is in an emergency, it's  
6 overwhelmed, there is a possibility of triage by  
7 resource (non-clinical refusal or withdrawal of critical  
8 care due to resource limitation).

9 Help us, please, what does "triage by resource"  
10 mean?

11 **DR SUNTHARALINGAM:** It means deciding who comes to intensive  
12 care, not only -- I mean, it remains important to do it  
13 with the patient's perspective but also where there may  
14 be limitations based on the fact you have become  
15 overwhelmed and you can't admit everyone you might  
16 otherwise have done. Again, this discussion arose in  
17 2009 when there was planning for, at that stage, the  
18 H1N1 pandemic. There were models circulating at the  
19 time of deciding whose comes to ICU based on their  
20 physiological state, and saying some people are too  
21 sick. That was not adopted in the UK. Instead, at that  
22 stage, and I was involved with this at the time, there  
23 was deliberately a tying-in of the capacity discussion,  
24 the shared escalation, the mutual aid, with any  
25 discussion of triage in order that the latter could be

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1 deferred and averted by maximising mutual aid before  
2 there was any such discussion.

3 And secondly, to make sure that was done only on  
4 national authorisation so it --

5 **MS CAREY:** I am going to come to how it is authorised in a  
6 moment, but does this envisage, I put it no higher than  
7 that, that potentially if an ICU were in -- or a trust  
8 were declaring CRITCON 4, they could withdraw critical  
9 care due to resource limitation?

10 **DR SUNTHARALINGAM:** I think it's envisaging that that might  
11 start to be -- to feel or be necessary but also -- but  
12 to try and ensure that isn't the case. So every other  
13 hospital that can help would then -- would be coming to  
14 their aid. And, again, this is an early version before  
15 the sort of infrastructure that we now have was  
16 envisioned. Now it would be even more so, but you would  
17 want to be averting it before we get to that stage and  
18 maximising mutual aid within regions and across nations,  
19 really.

20 **PROFESSOR SUMMERS:** The point of it was to make sure that  
21 nobody fails unless everybody fails.

22 **DR SUNTHARALINGAM:** Yes.

23 **MS CAREY:** We've heard that and we'll look at that in a  
24 moment.

25 It says basically that CRITCON 4 must only be  
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1 in accordance with the national guidance. So not to do  
2 it on their own and then say, "We've done it."

3 **DR SUNTHARALINGAM:** No, exactly, absolutely right.

4 **MS CAREY:** I want to just look before -- at CRITCON levels  
5 in April 2020 and can I have up on screen, please,  
6 INQ000226890\_27. Because we -- now knowing what the  
7 CRITCON levels are, we can see here on any given day  
8 throughout April, and I think we should say that CRITCON  
9 levels are reported twice daily, is that right, at 8 am  
10 and 8 pm, or thereabouts?

11 We can see the declarations made to NHS England in  
12 April 2020. Level 3 is the red, level 2 is the orange,  
13 level 1 is the yellow and if we look perhaps to the left  
14 of the screen in and around -- thank you very much --  
15 can we see a tiny few number of CRITCON 4 declarations  
16 as represented by the black on the graph?

17 **DR SUNTHARALINGAM:** Yes.

18 **MS CAREY:** I know it's easy to concentrate on the black but  
19 that's not to ignore that CRITCON 3 is a pretty dire  
20 state, if I understand --

21 **DR SUNTHARALINGAM:** It is, and in a way it's the more  
22 significant of the two. I think my -- and I'm referring  
23 to the statements from Dr Prentice but also in terms of  
24 how the system was meant to work, those are the alarm  
25 bells going off. It doesn't mean those sites were  
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1 implemented on a national directive from NHSE, and

2 I think, indeed, you've seen a statement from

3 NHS England, from Dr Michael Charles Prentice who --

4 **DR SUNTHARALINGAM:** Perhaps, can I comment on that, on the  
5 origin of this.

6 **MS CAREY:** Yes, certainly.

7 **DR SUNTHARALINGAM:** So this was the early draft, and I keep  
8 saying that. So the -- when they said -- actually  
9 probably the wording could have been better at the time  
10 because the "this must only be implemented" meant the  
11 triage.

12 **MS CAREY:** Yes.

13 **DR SUNTHARALINGAM:** So any hospital can say this is  
14 CRITCON 4, because that's the alarm bell, but if they  
15 want to start saying, actually, we're now going to start  
16 restricting our admissions to a different threshold,  
17 that needs to be externally authorised. So that was the  
18 vision in 2009. I think I'd say that is still true, but  
19 the wording -- so it isn't that they can't say they are  
20 CRITCON 4.

21 **MS CAREY:** No, I follow what you are saying. You are saying  
22 that if a hospital got to the stage where they thought  
23 they might have to refuse a patient or, indeed, withdraw  
24 critical care, they would have had to have declared it  
25 and, indeed, that decision-making be authorised by NHSE  
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1 triaging, it meant they were either in error or as --  
2 being at the extremes of CRITCON 3, they were  
3 triggering, and what should then happen, that should set  
4 up a red light and there should be questions asked about  
5 do you need help, is there anything we can do, is this  
6 an accurate definition.

7 So those black blobs don't mean at those sites  
8 triage was happening. (*Unclear*) should happen anywhere.  
9 But it meant the alarm bells were going on, sometimes  
10 out of a pure typo, I think, but other times reflecting  
11 a status of extreme CRITCON 3 which needed intervention.

12 **MS CAREY:** In due course I think you've seen a statement  
13 from Dr Prentice and I just want to show that on screen.

14 Can we have INQ000497473 because, my Lady, we  
15 requested details of the CRITCON 4 declarations from  
16 NHS England and the dates on which the various hospitals  
17 declared CRITCON 4, and we're going to publish the  
18 entire statement of Dr Prentice with your Ladyship's  
19 approval. Some of them were declarations, as in "you've  
20 hit the wrong button". So they need to be excluded from  
21 this, but one can see there, there were some CRITCON 4  
22 declarations and where a hospital declares CRITCON 4,  
23 what is supposed to happen on an organisational level?

24 **DR SUNTHARALINGAM:** So in the England context, and we can  
25 come on to why, you know, the difference with the other  
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1 nations and it is largely one of scale and levels of  
 2 organisation, I think, and direct contact with senior  
 3 people, but in an England context, certainly during the  
 4 pandemic, you had regional medical officers, so there  
 5 should be awareness at the regional medical office  
 6 level, there should be awareness of what it means, and  
 7 there was some variation in whether there was enough  
 8 sort of critical care input in the various regions at  
 9 that level, but people should know what it means, what  
 10 it represents in terms of what's happening on the sites  
 11 and there should be support measures put in place and,  
 12 again, I can't tell you if that's what happened  
 13 everywhere.

14 To sort of put a human face on it, if I can just  
 15 refer back to Professor Fong's testimony, the sort of  
 16 sites where he described where really extreme scenarios  
 17 were happening, that's -- in a way that's what this  
 18 looks like and what should happen with a CRITCON 4 or  
 19 CRITCON 3 declaration, in a word, is really what you  
 20 would want to happen when things like that are happening  
 21 on your watch of the type that he describes and it's a  
 22 way of trying to put a number and a flag on that in  
 23 a way that brings help.

24 **MS CAREY:** If I understand it correctly, where a hospital  
 25 declares CRITCON 4, NHS England contact the hospital to

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1 But I think, you know, we've got named hospitals  
 2 and I think it is important to emphasise that for -- you  
 3 know, there will be people listening whose families were  
 4 in those -- this doesn't mean that people were triaging  
 5 in those hospitals. It means that the alert system was  
 6 going off saying there is extreme pressure.

7 **MS CAREY:** Thank you. That can come down.

8 Now, this is obviously a measure of the strain  
 9 that the English hospitals were under or felt that they  
 10 were under. Are there or do you know are there similar  
 11 ways of measuring the stress levels in Scotland, Wales  
 12 or Northern Ireland? Do they use something similar to  
 13 CRITCON?

14 **DR SUNTHARALINGAM:** I think -- so the differences are ones  
 15 of scale. So, to take one example, I think there's --  
 16 there are 78 beds in total in Northern Ireland, and  
 17 Scotland and Wales smaller numbers of hospitals,  
 18 although very large hospitals themselves. So I think  
 19 the levels of communication are easier because you can  
 20 talk, firstly, in terms of you have got this many  
 21 patients on this many beds. Individual hospitals, of  
 22 which there are fewer, can communicate upwards to their  
 23 networks and -- or equivalence and their managements and  
 24 even, sort of, the political advising people can become  
 25 alerted more quickly.

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1 find out what's going on; whether they are truly at  
 2 CRITCON 4; what steps can be taken to help alleviate the  
 3 pressure on any given hospital; and, indeed,  
 4 Dr Prentice's statement sets out the steps that  
 5 NHS England took to identify if they were correctly  
 6 reporting CRITCON 4 and what steps were taken to help  
 7 the unit.

8 Even if it was incorrect declaration, either by  
 9 pressing the wrong button or in fact there was still  
 10 a bed available in a neighbouring hospital, do you think  
 11 this is an indication of the pressures that the hospital  
 12 themselves felt even if technically CRITCON 4 wasn't  
 13 made out?

14 **DR SUNTHARALINGAM:** Yes, and without sort of stretching  
 15 analogies too far, it's a little bit like a smoke alarm  
 16 or a fire alarm: you want it to go off occasionally in  
 17 error because it shows it's working and that people are  
 18 looking. And, you know, if it's dealt with and we said,  
 19 okay, we can stand down on this occasion, that's fine --  
 20 so a few erroneous triggers. In a way what you want if  
 21 there's nothing happening, it means that perhaps the  
 22 reports aren't getting through or it's not sensitive  
 23 enough. So I think it does reflect pressure and I think  
 24 the number of CRITCON 3s you can see shows the pressure  
 25 that leads to this.

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1 So I think the reason CRITCON isn't sort of  
 2 necessarily -- it wasn't adopted wholesale from 2009  
 3 onwards was because on a national four nation scale  
 4 outside England there was perhaps arguably less need for  
 5 it.

6 On the other hand, it means that there isn't  
 7 a commonality of language. So if you're comparing  
 8 what's at -- and particularly when it comes to mutual  
 9 aid across border -- in a way, you really ideally would  
 10 want (and this comes on to the recommendations) you  
 11 really want Scotland to be saying, you know, we've got  
 12 one region on CRITCON 3 or the country as a whole is  
 13 getting into CRITCON 4 in order to trigger mutual aid  
 14 discussions.

15 And as a lot of those didn't happen or wouldn't  
 16 happen, but there's an argument that sharing the  
 17 language makes that discussion easier, particularly when  
 18 it gets to, sort of, political level when you can look  
 19 across the board.

20 **MS CAREY:** So you would advocate for a similar CRITCON-style  
 21 reporting system across the entire UK?

22 **DR SUNTHARALINGAM:** I would and I think also partly to  
 23 reassure people that the lack of it or the absence of it  
 24 this time doesn't mean that that information wasn't  
 25 passing up. So as the Intensive Care Society, of which

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1 I was president at the time, is a four nations body and  
2 we were in contact with colleagues in all of those --  
3 and this is anecdotal -- but from conversations, I am  
4 sort of -- they felt able to escalate their bed  
5 situation, their strain, in a way that was sort of  
6 parallel to the CRITCON system.

7 **MS CAREY:** I might give our stenographer a break and turn to  
8 you, Professor Summers. And I don't mean that rudely,  
9 Dr Suntharalingam.

10 But let's change the topic slightly and change the  
11 questions. I would like to ask you just a little bit,  
12 perhaps before we take our lunch break in a moment or  
13 two's time, about some shortages or reported shortages  
14 of oxygen, dialysis machines, ventilators, medicines,  
15 and the like.

16 Professor, can I turn to you, please, at  
17 paragraph 167 in your report. I think it's fairly well  
18 publicised that there was a shortage of mechanical  
19 ventilators, both invasive and non-invasive, in the  
20 early stages of the pandemic; is that correct?

21 **PROFESSOR SUMMERS:** So I think the situation was twofold.  
22 We went into the pandemic without anyone being 100%  
23 certain centrally how many devices there were within the  
24 NHS. It was not a part of pre-pandemic planning to know  
25 that the entire NHS had this number of ventilators that

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1 using devices such as the ventilators that are  
2 ordinarily attached to anaesthetic machines and other  
3 devices that were not familiar to the staff for their  
4 everyday work. NHS England, it should be recognised,  
5 provided training packages for unfamiliar devices and  
6 did what they could to support, but the fact was we did  
7 not have enough ventilators of the type we routinely use  
8 in intensive care units to support our patients  
9 available for the number of patients that required them.

10 **MS CAREY:** Are you able to help me, Professor, how long did  
11 it take to get someone up to speed with a new type of  
12 ventilator? Is it a day or actually a few minutes?

13 **PROFESSOR SUMMERS:** It depends on the device and the  
14 experience of the person doing it. Actually, sometimes  
15 to use an anaesthetic machine to provide mechanical  
16 ventilators, which is very different to routine  
17 practice, actually required additional staff. So  
18 particularly operating department practitioners would  
19 come from the operating theatres and help with that and  
20 a whole host of other staff were needed to train, in  
21 addition to providing the care for the already increased  
22 number of people. So it was a significant burden.

23 **MS CAREY:** In addition, then, to not enough ventilators  
24 and/or ventilators that were unfamiliar, can I ask you  
25 about oxygen?

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1 were capable of this type of support. So very rapidly  
2 that data had to be obtained, and a decision was made  
3 that what the modelling suggested might be the number of  
4 patients who were going to require those devices was not  
5 matched by the number of available devices.

6 **MS CAREY:** Yes, I think NHS England and Improvement  
7 certainly put out requests to the trusts in England in  
8 late February that revealed there was only 7,357 devices  
9 available, and that was including paediatric devices  
10 and, for example, ventilators that might be used in an  
11 ambulance and the like.

12 **PROFESSOR SUMMERS:** Yes.

13 **MS CAREY:** And the modelling, as at that time, suggested we  
14 might need 59,000 as against, what was it, 7,500 that  
15 were actually -- just under 7,500 --

16 **PROFESSOR SUMMERS:** By the middle of March the realisation  
17 had hit that there was a huge disparity between what was  
18 potentially going to be needed and what was available.

19 **MS CAREY:** Now, your report sets out the various workstreams  
20 that were ongoing. I'm not going to ask you about those  
21 or indeed the ventilator challenge, but did it by spring  
22 2020 mean that there were a number of ventilators coming  
23 into ICUs that weren't the usual pieces of equipment  
24 that staff were used to working on?

25 **PROFESSOR SUMMERS:** Absolutely. So in spring 2020, we were  
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1 I think you make the point there that supply of  
2 oxygen for critically ill people is clearly one of the  
3 most essential treatments that they require.

4 We've heard a little bit about oxygen shortages  
5 and the like but how did it play out on the ground,  
6 Professor? What was done to try and ensure that all the  
7 patients had the oxygen that they required?

8 **PROFESSOR SUMMERS:** So there were multiple steps that were  
9 taken both organisationally -- so alerts were put out to  
10 all NHS trusts saying, "Please make sure you understand  
11 the oxygen capacity of your individual hospital. Please  
12 make sure that you have consulted with your estates team  
13 and the oxygen engineers".

14 **MS CAREY:** Can I just pause you there. Is that something  
15 that isn't done routinely in non-pandemic times?

16 **PROFESSOR SUMMERS:** I think it probably is, but I suspect  
17 it's been many years since we put so much strain on the  
18 oxygen capacity on some somewhat elderly estate across  
19 the NHS.

20 **MS CAREY:** So they were -- the estates effectively were  
21 asked to make sure they had -- they understood what  
22 their capacity was. In the event that they did not have  
23 capacity, are you able to help as to what steps were  
24 taken to try and ensure that there was still capacity  
25 for oxygen?

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1 **PROFESSOR SUMMERS:** A huge programme of attempting to make  
 2 sure that everybody was very careful what we called  
 3 "oxygen stewardship" and that oxygen was used to the  
 4 amount required. Some devices require a fixed flow  
 5 rate, for example, 15 litres per minute. Make sure that  
 6 you are setting at 15 litres per minute, not at 20 to  
 7 make sure. And then making sure that you are putting  
 8 a number of devices on to a particular bit of oxygen  
 9 infrastructure that will not exceed the delivery  
 10 capacity of that, and also alterations in the oxygen  
 11 saturation targets which I'm sure we're going to  
 12 discuss.

13 **MS CAREY:** I would like to ask you that, please. You say in  
 14 your paragraph 177:  
 15 "There were modified (reduced) peripheral oxygen  
 16 saturation targets proposed."

17 So, what, a reduction in the amount of oxygen a  
 18 patient received. How did that come about? Did that  
 19 come into force and how did it affect the patient.

20 **PROFESSOR SUMMERS:** So professional societies issued  
 21 guidance suggesting that the safe oxygen saturation  
 22 measured by pulse oximetry or arterial blood gas  
 23 analysis was 92% for the majority of people. There are  
 24 other people who have respiratory diseases and other  
 25 chronic health issues for whom 92 is higher than the  
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1 saturations over-estimated by the devices, meaning that  
 2 92% oxygen saturations for them may actually be  
 3 considerably lower. It varies from device to device and  
 4 there is ongoing research to assess the extent of this  
 5 and the impact that's happening in the UK at the moment  
 6 funded by NIHR, but is undoubtedly the case that some of  
 7 the devices that were in use were not accurately  
 8 measuring in people with darker skin tones.

9 **MS CAREY:** We're going to hear more about that, I think,  
 10 next week from a witness and I have no doubt, in due  
 11 course, from NHS England and other like bodies.

12 Can I ask you just briefly about renal support  
 13 equipment. Clearly, you've told us that Covid affecting  
 14 multi-organs affected the kidneys. What was the  
 15 position? Do we have enough dialysis machines and the  
 16 like to support the patients that required renal  
 17 support?

18 **PROFESSOR SUMMERS:** We did not. So there was an issue in  
 19 that we have admitted a large number of people to  
 20 intensive care units who had multi-organ dysfunction, so  
 21 there was an increased burden of requirement for renal  
 22 replacement therapies, but at the same time there were  
 23 difficulties with the supply lines.

24 So whilst we might have had machines, what we  
 25 didn't have were the fluids and the consumables that are  
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1 usually recommended oxygen capacity. But for a fit and  
 2 healthy person, normally we say greater than 94; it was  
 3 dropped to greater than 92 because that was thought to  
 4 be safe. I could find no evidence to suggest that that  
 5 had done any harm at any point during the pandemic.

6 **MS CAREY:** Can I just ask you this: is there any harm done  
 7 by giving someone higher oxygen saturation than they  
 8 need?

9 **PROFESSOR SUMMERS:** Yes, there most certainly is. Oxygen  
 10 toxicity is something that worsens lung inflammation.

11 **MS CAREY:** I think, though, you go on to say that whilst the  
 12 oxygen lower saturation targets may not themselves have  
 13 been harmful, there was concern about the equipment  
 14 being used. Can you explain to us, please, what you  
 15 were concerned about there.

16 **PROFESSOR SUMMERS:** So oxygen status of a patient is often  
 17 assessed using peripheral pulse oximetry. So it is  
 18 a probe that gets attached to someone's finger usually  
 19 and measures through the skin how red or not their  
 20 haemoglobin is using a series of lights.

21 There is emerging evidence that suggests that some  
 22 of the devices that are in clinical use actually are  
 23 impacted by the colour of the skin tone of the person  
 24 who is having the device used upon them, such that  
 25 people with darker skin tones may have their oxygen  
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1 needed. A mutual aid system, in the same way as  
 2 transferring patients, was put in place for that but  
 3 that was undoubtedly impacted in places not having or  
 4 coming very close to running out of the ability to  
 5 deliver the usual modalities of renal replacement  
 6 therapy that are used in intensive care and having to  
 7 put in in an emergency other types of systems normally  
 8 used.

9 **MS CAREY:** Two things there. I follow what you are saying  
 10 there that actually a hospital might be borrowing  
 11 a dialysis machine from a neighbouring --

12 **PROFESSOR SUMMERS:** Borrowing the fluid bags and the  
 13 circuits and consumables.

14 **MS CAREY:** Again, when other systems were brought in, was  
 15 there again an unfamiliarity with the way that the new  
 16 equipment was working which brought with it the same  
 17 problems as the new ventilators.

18 **PROFESSOR SUMMERS:** Exactly so.

19 **MS CAREY:** Is any work or has there been any research done  
 20 as to whether the new pieces of equipment and the time  
 21 it took for people to become familiar to use them  
 22 affected the care that the patients were receiving or is  
 23 that a too granular or too difficult task?

24 **PROFESSOR SUMMERS:** Not that I'm aware of. Just to  
 25 highlight that at the point we were doing all of this,  
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1 we were all trying to contribute to understanding Covid,  
 2 finding treatments, and working out the best supportive  
 3 care to give. There was a limit to the research  
 4 capacity alongside the extended clinical care, I think,  
 5 at the time. So that didn't get addressed.  
 6 **MS CAREY:** One other topic, please. You refer in your  
 7 report to medicine shortages. What kind of medicines  
 8 are we talking about here?  
 9 **PROFESSOR SUMMERS:** We have had shortages during the  
 10 pandemic period of the Inquiry's focus and subsequently  
 11 of a variety of medicines in the pandemic.  
 12 Particularly, we were running short of the medicines  
 13 required to keep people sedated and on mechanical  
 14 ventilators; we ran short of different types of  
 15 painkillers; we ran short of, as I said, the fluids for  
 16 some of there renal replacement therapy. The shortages  
 17 were ever-changing and, as I say, have not entirely  
 18 disappeared since the pandemic has eased.  
 19 **MS CAREY:** Can I ask you that -- it sounds like we might be  
 20 missing some basic -- and if that's wrong, I'd like you  
 21 to set me straight because if we're talking about a very  
 22 highly specialised piece of medication, one might  
 23 understand why there aren't vast numbers of supplies.  
 24 But if we're talking about something that helps sedate  
 25 people in ICU or painkillers, it sounds that that ought  
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on Thursday, 3 October 2024)

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1 to be more readily available.  
 2 Why are we running out of what, my term, a more  
 3 basic types of medication?  
 4 **PROFESSOR SUMMERS:** So I think part of the issue is to think  
 5 about where are those medicines produced. Lots of those  
 6 medicines are not manufactured in the United Kingdom, so  
 7 we are relying on supply chains from outside the  
 8 United Kingdom which were impacted for a whole variety  
 9 of reasons over that period. So it was unlikely that  
 10 the supply chains were going to be as robust and we  
 11 don't routinely keep big stockpiles. We keep stockpiles  
 12 of those things for everyday care, but suddenly  
 13 everybody in the world wanted them all at the same time  
 14 in increased numbers.  
 15 **MS CAREY:** Are these the types of medications that have a  
 16 shelf life?  
 17 **PROFESSOR SUMMERS:** They do.  
 18 **MS CAREY:** So you can't keep thousand or millions of --  
 19 **PROFESSOR SUMMERS:** You couldn't keep them for 20 years just  
 20 in case, no.  
 21 **MS CAREY:** My Lady, would that be a convenient moment to  
 22 take lunch?  
 23 **LADY HALLETT:** Certainly. I shall return at 1.35.  
 24 (12.33 pm)  
 25 (The hearing adjourned until 10.00 am  
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<p><b>given [3]</b> 37/16 91/7 94/3</p> <p><b>gives [4]</b> 61/14 64/12 64/21 73/19</p> <p><b>giving [2]</b> 65/4 102/7</p> <p><b>glean [2]</b> 2/22 21/13</p> <p><b>gleaned [1]</b> 15/13</p> <p><b>go [19]</b> 1/13 4/16 12/18 13/22 26/15 35/13 38/17 38/20 39/9 45/1 61/3 64/25 73/15 74/12 76/8 80/16 82/17 94/16 102/11</p> <p><b>goal [2]</b> 49/8 73/5</p> <p><b>goes [1]</b> 31/2</p> <p><b>going [50]</b> 2/14 6/9 7/12 7/23 10/15 14/14 16/12 17/11 21/21 24/11 26/2 33/22 34/17 35/12 36/7 36/8 37/15 39/19 40/23 45/1 48/8 49/2 49/10 52/12 53/1 53/2 53/22 56/8 57/8 59/11 67/2 76/8 76/23 76/25 77/14 78/5 81/20 89/5 90/15 91/25 92/9 92/17 94/1 95/6 98/4 98/18 98/20 101/11 103/9 106/10</p> <p><b>gone [1]</b> 2/1</p> <p><b>good [5]</b> 25/25 29/18 34/8 59/21 81/1</p> <p><b>got [19]</b> 2/15 7/17 22/16 26/2 29/8 29/9 37/9 55/8 59/5 62/2 65/13 68/4 78/10 83/20 85/16 90/22 95/1 95/20 96/11</p>	<p><b>government [1]</b> 61/4</p> <p><b>granular [1]</b> 104/23</p> <p><b>graph [25]</b> 4/21 9/3 9/11 11/3 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<b>he [6]</b> 3/2 33/25 78/4 78/5 93/16 93/21	<b>he [6]</b> 3/2 33/25 78/4 78/5 93/16 93/21	<b>high-risk [1]</b> 3/4	<b>I completely [1]</b> 54/9	<b>I'll [1]</b> 57/1
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<p><b>W</b></p> <p><b>when...</b> [25] 59/10 59/18 62/1 62/7 64/13 65/9 65/11 66/4 66/11 66/22 75/7 75/12 80/5 82/19 83/20 85/7 86/5 87/9 88/17 90/8 93/20 96/8 96/17 96/18 104/14</p> <p><b>where</b> [44] 3/10 3/12 5/5 7/23 10/7 10/8 21/4 28/15 30/13 35/12 42/10 48/24 49/11 49/13 52/22 57/7 61/7 61/15 61/17 62/17 62/18 66/22 68/18 71/3 71/6 71/23 73/3 73/4 77/15 77/18 81/3 81/7 81/8 82/1 84/24 85/9 87/5 88/13 90/22 92/22 93/16 93/16 93/24 106/5</p> <p><b>whereas</b> [3] 49/22 67/9 84/7</p> <p><b>whether</b> [21] 8/3 8/4 8/14 8/16 30/2 30/10 30/15 31/2 44/12 49/1 54/20 55/22 66/17 68/16 68/22 78/9 79/16 79/18 93/7 94/1 104/20</p> <p><b>which</b> [72] 1/16 7/6 7/10 10/4 12/12 14/18 15/3 17/11 17/13 17/21 19/11 21/18 24/21 25/10 27/7 28/22 29/20 30/5 31/4 31/13 31/16 33/9 34/4 34/5 35/22 35/25 38/11 38/15 39/20 40/14 43/7 43/11 43/15 43/25 45/2 45/2 47/3 48/25 49/16 50/6 50/18 51/4 51/7 51/11 51/17 58/16 61/1 61/17 62/20 64/9 65/2 68/18 69/4 71/18 74/23 75/24 76/3 80/22 81/2 82/11 82/18 85/11 86/3 86/7 92/11 92/16 95/22 96/25 99/16 101/11 104/16 106/8</p> <p><b>while</b> [4] 62/15 63/1 72/5 74/1</p> <p><b>whilst</b> [4] 45/15 60/1 102/11 103/24</p> <p><b>white</b> [16] 15/10 15/19 15/22 16/1 16/5 16/19 16/23 16/25 17/4 17/9 21/11 23/10 23/17 31/9 31/16 31/17</p>	<p><b>Whitty</b> [3] 3/2 33/25 59/21</p> <p><b>who</b> [56] 1/24 2/21 6/10 6/11 6/12 8/11 11/22 12/22 13/6 13/16 16/19 17/22 18/9 18/19 18/20 25/7 25/13 26/19 27/4 27/5 27/6 27/19 27/21 28/5 28/16 29/5 29/7 29/8 29/10 29/21 35/8 37/2 39/17 43/18 43/23 43/24 44/4 46/1 47/19 54/21 55/9 55/14 57/14 57/15 58/20 58/24 60/7 80/7 81/19 81/25 88/11 90/3 98/4 101/24 102/24 103/20</p> <p><b>who'd</b> [1] 33/11</p> <p><b>who's</b> [3] 25/22 57/20 78/21</p> <p><b>whole</b> [11] 8/4 8/22 8/25 16/20 19/20 30/8 54/6 59/7 96/12 99/20 106/8</p> <p><b>wholesale</b> [1] 96/2</p> <p><b>whom</b> [1] 101/25</p> <p><b>whose</b> [3] 43/2 88/19 95/3</p> <p><b>why</b> [10] 14/1 23/1 23/19 27/23 52/16 74/14 88/2 92/25 105/23 106/2</p> <p><b>wide</b> [2] 73/20 77/11</p> <p><b>wide-ranging</b> [1] 77/11</p> <p><b>widely</b> [2] 43/22 46/10</p> <p><b>wider</b> [1] 21/21</p> <p><b>will</b> [19] 32/10 32/11 35/4 39/19 46/22 49/3 51/17 53/2 55/8 55/14 60/15 70/4 75/16 78/8 82/5 86/2 86/6 95/3 101/9</p> <p><b>winter</b> [9] 6/25 13/20 13/25 14/1 14/7 85/1 85/9 85/17 86/21</p> <p><b>withdraw</b> [2] 89/8 90/23</p> <p><b>withdrawal</b> [1] 88/7</p> <p><b>withdrew</b> [1] 32/8</p> <p><b>within</b> [19] 38/24 39/24 41/13 44/17 46/5 51/11 52/3 65/16 67/14 77/16 79/9 79/20 79/22 82/15 83/6 85/9 87/2 89/18 97/23</p> <p><b>without</b> [4] 57/24 84/25 94/14 97/22</p> <p><b>witness</b> [7] 7/11 10/15 13/14 26/4 26/8 32/8 103/10</p>	<p><b>witnesses</b> [1] 32/10</p> <p><b>women</b> [4] 36/23 36/25 37/2 37/11</p> <p><b>won't</b> [2] 33/10 75/8</p> <p><b>wonder</b> [1] 48/21</p> <p><b>word</b> [3] 27/3 76/5 93/19</p> <p><b>wording</b> [2] 90/9 90/19</p> <p><b>words</b> [1] 26/18</p> <p><b>work</b> [18] 2/12 6/16 14/9 14/13 14/13 22/9 32/25 35/11 46/6 54/24 57/10 57/10 71/11 76/1 76/1 91/24 99/4 104/19</p> <p><b>worked</b> [1] 64/18</p> <p><b>worker</b> [1] 81/24</p> <p><b>workers</b> [1] 29/20</p> <p><b>working</b> [7] 7/21 58/15 85/10 94/17 98/24 104/16 105/2</p> <p><b>workload</b> [2] 66/17 83/15</p> <p><b>workloads</b> [1] 76/21</p> <p><b>works</b> [1] 39/11</p> <p><b>workstreams</b> [1] 98/19</p> <p><b>world</b> [4] 36/15 46/14 68/16 106/13</p> <p><b>worldwide</b> [1] 46/15</p> <p><b>worry</b> [1] 9/16</p> <p><b>worse</b> [1] 86/22</p> <p><b>worsens</b> [1] 102/10</p> <p><b>worst</b> [1] 67/20</p> <p><b>worth</b> [2] 38/21 58/19</p> <p><b>would</b> [52] 6/24 7/1 7/3 8/19 12/22 18/5 19/7 21/18 23/1 24/8 25/1 25/4 28/19 28/21 28/25 34/11 37/8 45/14 50/23 52/5 53/10 53/12 53/13 55/7 57/19 60/10 60/21 62/5 62/6 63/25 65/7 67/8 67/9 68/20 69/6 71/22 75/25 77/6 85/10 89/13 89/13 89/16 89/16 90/24 93/20 96/9 96/20 96/22 97/11 99/18 101/13 106/21</p> <p><b>wouldn't</b> [5] 6/24 18/6 58/16 84/8 96/15</p> <p><b>written</b> [1] 56/3</p> <p><b>wrong</b> [3] 92/20 94/9 105/20</p>	<p><b>yes</b> [64] 2/3 3/8 4/7 5/14 6/2 7/4 7/7 8/18 9/22 10/2 14/6 14/20 14/25 16/4 17/10 19/16 23/2 23/3 23/12 26/23 26/24 28/14 29/12 36/21 40/23 44/16 50/25 51/25 55/24 56/1 59/13 60/9 60/17 61/11 61/25 62/3 62/16 63/14 63/19 63/22 65/9 65/23 67/7 68/15 69/22 73/25 76/15 77/2 81/21 82/24 83/18 83/24 84/18 87/16 87/18 87/22 89/22 90/6 90/12 91/17 94/14 98/6 98/12 102/9</p> <p><b>yesterday</b> [7] 1/4 1/14 1/15 2/16 4/21 6/10 73/12</p> <p><b>you</b> [348]</p> <p><b>you'd</b> [1] 48/25</p> <p><b>you're</b> [10] 3/10 4/9 9/11 22/21 41/8 84/22 87/5 87/6 87/24 96/7</p> <p><b>you've</b> [12] 2/15 22/9 22/20 34/8 65/13 72/23 73/24 76/21 90/2 92/12 92/19 103/13</p> <p><b>younger</b> [1] 5/3</p> <p><b>your</b> [57] 1/15 4/5 7/10 7/11 8/15 10/15 13/13 22/24 23/13 26/4 31/13 32/2 32/25 33/1 33/10 34/4 34/18 35/2 35/18 36/22 36/25 38/5 38/17 38/20 39/10 39/10 39/10 39/11 41/7 41/7 42/9 42/11 44/24 48/18 53/24 55/7 56/19 61/3 62/14 66/18 67/11 67/22 68/9 68/9 69/17 78/15 79/25 80/17 84/21 92/18 93/21 97/17 98/19 100/11 100/12 101/14 105/6</p>	<p><b>Z</b></p> <p><b>Zero</b> [1] 50/4</p> <p><b>zoomed</b> [1] 5/25</p> <p><b>zoomed-in</b> [1] 5/25</p>
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