

1 Friday, 18 September 2026 2 (10.00 am) 3 (Proceedings delayed) 4 (10.17 am) 5 THE CHAIR: Thank you. Right, yes, good morning. 6 MR DAWSON: Good morning, sir. Today we are hearing the 7 evidence of our neurosurgical expert group comprising 8 Mr Peter Whitfield, Mr Crispin Wigfield and 9 Mr Bob Redfern. 10 THE CHAIR: Thank you. If we can have the witnesses, 11 please. 12 PROFESSOR PETER WHITFIELD (called) 13 MR CRISPIN WIGFIELD (called) 14 MR ROBERT REDFERN (called) 15 THE CHAIR: Gentlemen, good morning. As I think you will 16 have appreciated by now, you are going to be asked some 17 questions under reference to a report that you have 18 prepared for the assistance of the Inquiry during the 19 course of today but before we get to that, there are 20 certain formalities I must observe. 21 So first of all, Mr Redfern, will you stand for me 22 and repeat the words of the affirmation. 23 MR ROBERT REDFERN (affirmed) 24 PROFESSOR PETER WHITFIELD (sworn) 25 Page 1	1 Q. You have been nominated and accepted the position as the 2 lead of the group, is that right? 3 A. Yes. 4 Q. I understand that you received a letter of instruction 5 from the Inquiry and that you have prepared an expert 6 report, is that right? 7 A. Yes. 8 Q. Could we have up on the screen, please, ELJ0001-0001. 9 Is this a copy of the report that you prepared? 10 A. It is. It's the first page of it, yes. 11 Q. Thank you. Could we please go to page 205 and although 12 they're blanked out, Mr Redfern, under -- just above 13 where your name is in the original copy, does your 14 signature appear on that page? 15 MR REDFERN: Yes. 16 Q. Professor Whitfield, if we scroll down a little bit, 17 does your signature appear just above your name? 18 PROFESSOR WHITFIELD: Yes. 19 Q. And Mr Wigfield, does your signature appear just above 20 your name? 21 MR WIGFIELD: Yes. 22 Q. If we could just scroll back to the top, please, it says 23 there that: 24 "We confirm that we have made clear which facts and 25 matters referred to in this report are within our own Page 3
1 MR CRISPIN WIGFIELD (sworn) 2 Questions by COUNSEL TO THE INQUIRY 3 MR DAWSON: Good morning. If I could just start by having 4 you identify yourselves. On my left is Mr Redfern; is 5 that correct? 6 MR REDFERN: Correct. 7 Q. In the middle, Professor Whitfield; is that correct? 8 PROFESSOR WHITFIELD: Yes. 9 Q. And on my right, Mr Wigfield. 10 MR WIGFIELD: That's right. 11 MR DAWSON: If I can apologise in advance if I struggle with 12 your names, I'm afraid the Inquiry has struggled with 13 the similarity between Professor Whitfield and 14 Mr Wigfield as it's been slightly -- it's been even more 15 difficult as we have a professional association with 16 another individual called Professor Wigmore. So if 17 I get the names wrong I apologise in advance, there's no 18 discourtesy meant by it. 19 I'm going to ask some preliminary questions now. 20 Some will be addressed to each of you, but I'm going to 21 address them, in the first instance, to 22 Professor Whitfield. I understand, Professor Whitfield, 23 that you have formed an expert group in neurosurgery to 24 provide evidence to this Inquiry; is that correct? 25 PROFESSOR WHITFIELD: It is. Page 2	1 knowledge and which are not. Those that are within our 2 own knowledge we confirm to be true. We understand our 3 duty to provide independent evidence and have complied 4 with that duty in the provision of this report. The 5 opinions we have expressed represent our true and 6 complete professional opinions on the matters to which 7 they refer." 8 Is that an accurate statement of your opinion, 9 Mr Redfern? 10 MR REDFERN: Yes. 11 Q. Professor, Whitfield? 12 PROFESSOR WHITFIELD: Yes. 13 Q. And Mr Wigfield? 14 MR WIGFIELD: Yes. 15 Q. Thank you. 16 Professor Whitfield, you are an honorary professor 17 and consultant neurosurgeon, is that correct? 18 PROFESSOR WHITFIELD: It is, yes. 19 Q. Where is your honorary professorship from? 20 A. University of Plymouth. 21 Q. You indicate, on the face of the report, that your 22 qualifications are: BM (Distinction) PhD FRCS Eng FRCS 23 (SN) and FAcadMed and FHEA. Can you explain to us what 24 the fellowships are, please? 25 A. Yes. The fellowship of the Royal College of Surgeons of Page 4

1 England. So that is achieved -- when I was training it 2 was achieved by examination relatively early in your 3 surgical training. 4 FRCS Eng is the fellowship of the Royal College of 5 Surgeons with speciality interest in surgical neurology 6 and that is also achieved by examination towards the end 7 of neurosurgical change. 8 FHEA is a fellow at the Higher Education Authority 9 and the final one is a fellow of the Academy of Medical 10 Education. 11 Q. Thank you very much. Mr Wigfield, you're a consultant 12 neurosurgeon and spinal surgeon; is that right? 13 MR WIGFIELD: That's correct. 14 Q. Why do you describe yourself in that particular way? 15 A. Because I have a predominantly spinal surgical practice, 16 I undertook a higher specialist fellowship training in 17 spinal surgery, so I concentrate on the spinal aspects 18 of neurosurgery. But my qualification, the fellowship, 19 is in surgical neurology or neurosurgery. So there's no 20 FRCS spinal surgery. 21 Q. I see. We've heard a little bit in evidence already 22 about fellowships. So just to be clear, the fellowship 23 is in neurosurgery in general but as I understand it, 24 certain neurosurgeons like yourself will, in particular 25 in modern times, specialise in a particular area, is Page 5	1 A. Correct. 2 Q. Thank you. Could we have a look please at page 2 of the 3 report. On page 2 you have provided this statement. 4 You say that: 5 "As a result of our neurosurgical training, 6 participation in Continuous Professional Development 7 (CPD), regional, national and international roles we 8 have prior knowledge and acquaintance with 9 Mr Sam Eljamel. None of the expert witnesses consider 10 that this raises a conflict of interest which undermines 11 the independence of our review in connection with the 12 work of the Inquiry. None of us have any relevant 13 connection with or interest connected to NHS Tayside, 14 the Scottish Executive or Government, Mr Eljamel, 15 Fernbrae Hospital, Dundee, Circle Healthcare or any 16 other body named in the Inquiry's Terms of Reference." 17 Can I just confirm -- I'll do it through 18 Professor Whitfield and others can contribute if they 19 want to, that you are indicating here that, as -- during 20 the course of your neurosurgical practices you have come 21 across Mr Sam Eljamel who, at one stage, was also 22 a consultant neurosurgeon in the UK, is that right? 23 PROFESSOR WHITFIELD: Yes, that's right. 24 Q. And I think what you're trying to tell us here, please 25 correct me if I'm wrong, is that you wish to indicate Page 7
1 that right? 2 A. That is correct and there are fellowships which are by 3 examination, so the fellowship of the Royal College of 4 Surgeons, a variety of colleges, and fellowships which 5 are by experience and training but not by examination. 6 Q. I think in your report where you give some more detail 7 about your practice you explain that although you now 8 specialise predominantly in spinal surgery, during the 9 course of your career you've done all different types of 10 neurosurgery, in particular in on-call situations; is 11 that correct? 12 A. That's right. 13 Q. Is that a normal arrangement for neurosurgery that one 14 might have a speciality but in particular in on-call, 15 out-of-hours situations one would be expected to be able 16 to deliver a wide variety of neurosurgical services? 17 A. That would be very normal. 18 Q. Thank you. And Mr Redfern, you are also -- you were 19 a consult neurosurgeon; is that correct? 20 MR REDFERN: Yes. 21 Q. You were a consultant neurosurgeon I think between 1992 22 and 2018, is that right? 23 A. Correct. 24 Q. And your qualifications are MB, BS and fellow of the 25 Royal College of Surgeons of England, is that right? Page 6	1 that fact at the beginning of your report but that you 2 have considered the matter and you don't consider that 3 that acquaintance with him, through the mechanisms that 4 you've set out, in any way undermines your ability to 5 provide an independent report to this Inquiry, is that 6 right? 7 A. That's correct. 8 Q. I wanted to ask you in particular, Mr Redfern, about 9 something else in this regard that we discussed at 10 an earlier stage. I understand that you know 11 a consultant neurosurgeon who worked at 12 Ninewells Hospital, Mr Mowle, personally; is that 13 correct? 14 MR REDFERN: Correct yes. 15 Q. And you informed the Inquiry of that as soon as the 16 Inquiry got in touch with you about the possibility of 17 being an independent witness, is that right? 18 A. That is correct, yes. 19 Q. And a discussion took place about whether that, in any 20 way, would undermine your ability to provide 21 an independent report to this Inquiry, didn't it? 22 A. That is correct. 23 Q. And is it your view that the matters that you have 24 contributed to the report are independent opinions? 25 A. Absolutely. Page 8

1 Q. And you have taken care, in the compilation of the 2 report, to make sure your personal acquaintance with 3 Mr Mowle has not undermined that independence? 4 A. Absolutely. 5 Q. Thank you. I suppose, in reality, Professor Whitfield, 6 the neurosurgical community is probably a relatively 7 small one in the UK; is that right? 8 PROFESSOR WHITFIELD: Yes, in most of the relevant period, 9 certainly the first half, around about 150 consultants 10 and probably the same sort of number of trainees and we 11 have a national conference held twice-yearly. So you 12 often met people from other units actually on a not 13 infrequent basis and Mr Eljamel certainly attended those 14 sorts of conferences. 15 Q. So, as a result of that, would it be fair to say that it 16 would be very difficult to find experts in neurosurgery 17 in the United Kingdom who have the requisite experience 18 and expertise to provide the opinions you've been asked 19 for who wouldn't have come across Mr Eljamel in some 20 capacity at some point? 21 A. Correct. 22 Q. Because even beyond the annual conferences that you've 23 mentioned, we've already heard evidence that there are 24 collaborations that go on between different 25 neurosurgical units, indeed, collaborations that go on Page 9	1 duties that are set out here? 2 A. Yes. 3 Q. Thank you. And you understand that the report which 4 you've been asked to provide, requires you to be 5 independent? 6 A. Yes. 7 Q. That, in particular in areas where there may be a range 8 of opinions, professional opinions pertaining to any 9 particular matter you have an obligation to indicate 10 what that range of opinion is? 11 A. Yes. 12 Q. That you require to be clear as to what your evidence to 13 the Inquiry is? 14 A. Yes. 15 Q. That you require to indicate where, amongst the three of 16 you, there is any different opinion on any matter that 17 you require to set that out and explain why? 18 A. Yes, I don't think there were any after our consensus 19 meetings. 20 Q. Thank you. And that you overall require to comply with 21 an overriding duty to assist the Chair of the Inquiry in 22 the fulfilment of his Terms of Reference? 23 A. That's correct. 24 Q. I'd like to say -- I have already had a short word with 25 you beforehand and spoken to you a little about this, Page 11
1 with other types of units as well as other institutions 2 like academic institutions; is that correct? 3 A. It is correct, yes. 4 Q. So, as part of that general network, you'll come across 5 people who are in some way involved in neurosurgery 6 relatively frequently, I would imagine? 7 A. That's true. I should probably say -- I think I said to 8 you right at the outset as well, that when -- I was 9 a consultant in Aberdeen for two years and Mr Eljamel 10 was on the appointment committee. I didn't know that 11 until the day when I turned up for interview. 12 Q. We'll get on to the specifics of that aspects of your 13 background in a moment, but I appreciate you pointed 14 that out, professor, thank you. And it is correct that 15 you did also point that out to the Inquiry at the 16 beginning, as Mr Redfern did, in connection with his 17 personal acquaintance with Mr Mowle. 18 You have, at page 3 of the report, can we go to 19 that, please, set out the background to your report and 20 various duties that you understand to be under. These 21 were derived from your letter of instruction; is that 22 correct? 23 A. Yes. 24 Q. And can I take it that you, in having signed the report 25 in the way that you have done, have complied with the Page 10	1 but for the sake of everybody else listening, I'd like 2 to set out how I intend to take your evidence today 3 which is connected, to an extent, to the way in which 4 you've gone about compiling the report. 5 In your letter of instruction it was the case, was 6 it not, Professor Whitfield, that you were told that you 7 were entitled to decide how you wished, as a group, to 8 go about compiling the report; isn't that right? 9 A. We were, we made our own decisions. 10 Q. Yes, and I think you met to determine how it was that 11 you thought you would be best placed to do that? 12 A. Correct. 13 Q. And I think, broadly speaking, my understanding is that 14 you decided to split up the various different sections 15 by reference to your particular areas of experience, is 16 that right? 17 A. Yes. 18 Q. And that therefore there is a large section in the 19 report where we ask questions related primarily to 20 intracranial surgery and you took the lead, if I can put 21 it that way, on that section, that's right? 22 A. That's correct, yes. 23 Q. And because, as you told us already, Mr Wigfield, you 24 have a predominantly spinal practice, you took the lead 25 in relation to the large section relating to spinal Page 12

1 surgery; is that right? 2 MR WIGFIELD: That's correct. 3 Q. There were a number of questions asked about education 4 and training of neurosurgeons and again, I think 5 Professor Whitfield, you took the lead broadly on those? 6 MR WHITFIELD: Yes, mostly. 7 Q. And as we've pointed out, Mr Redfern, you were in 8 practice as a consultant at the time period we're 9 particularly interested in here and therefore you took 10 the lead on what one might describe as the rest of the 11 questions, but predominantly setting out a range of 12 different matters pertaining to neurosurgery in general 13 but with something of a focus on how neurosurgery was 14 generally practised at the time we're interested in; 15 would that be fair? 16 MR REDFERN: That's correct, yes. 17 Q. Thank you. And as I say, the time we're interested 18 in -- again, this was defined in your letter of 19 instruction -- we called it "the relevant period", is 20 the period from 1995 to 2015. And I'll get on to the 21 questions you've been asked about Mr Eljamel in 22 a moment, but the reason why -- did you understand that 23 the reason why you were asked questions about that 24 period is that that's the period, broadly, that covered 25 Mr Eljamel's practice as a consultant neurosurgeon at Page 13	1 you've tried to provide with us information that is 2 relevant to that sort of unit which might differ if we 3 were talking about a bigger or a different geographical 4 place, is that right? 5 A. That is correct. 6 Q. Thank you very much. Indeed, I think actually in your 7 evidence you have also tried to be helpful to the Chair 8 by trying to find and talk about some Scottish-specific 9 documents which might in fact have been directly 10 relevant to Mr Eljamel's practice? 11 A. That's correct, yes. 12 Q. Thank you. Could I just ask, in general terms -- 13 I'll put it this way. 14 You were not asked questions specifically about 15 Mr Eljamel, is that your understanding of your 16 instruction? 17 PROFESSOR WHITFIELD: That's correct, yes. 18 Q. And is it your understanding that the reason for that is 19 not because we may not, in due course, be interested in 20 your professional opinions about specific aspects of his 21 practice, but that the Inquiry consider it to be 22 important to set an appropriate context for broader, 23 more thematic questions to be asked, so that we 24 understood what the practice of neurosurgery was about 25 before trying to address the specifics; would that be Page 15
1 Ninewells Hospital in Dundee? 2 PROFESSOR WHITFIELD: That was our understanding, yes. 3 Q. So the broad position, for the sake of clarity, is that 4 he was appointed as a consultant neurosurgeon in 1995 5 and as we recently heard evidence that he voluntarily 6 removed his name from the GMC medical register in 2015, 7 hence the period being defined the way that it was. Is 8 that your broad understanding? 9 A. Yes, it is. 10 Q. Thank you. So in providing your report, you have, as we 11 asked you to, had regard to that period, although many 12 of the questions asked you about more broad periods of 13 time, is that fair? 14 A. Yes. 15 Q. And also, I think this may -- maybe Mr Redfern will be 16 best placed to answer this question. One aspect -- as 17 you answered a number of questions relating to 18 neurosurgical practice in general, you were aware, when 19 you undertook the report, that we were particularly 20 interested in the neurosurgical service that would be 21 delivered in a unit like the one at Ninewells Hospital; 22 is that correct? 23 MR REDFERN: Yes, yes. 24 Q. Would it be fair to say you have tried -- in the 25 exercise of your duty to assist the Inquiry Chair, Page 14	1 your understanding? 2 A. Absolutely. 3 Q. And also I think we pointed out to you we thought it 4 would be appropriate, at the time you were instructed, 5 for us to make any assumptions about what factual 6 evidence the Inquiry might hear about Mr Eljamel's 7 practice and hence, this is why we adopted the approach 8 that we did? 9 A. Yes. 10 Q. And that was the basis of your understanding as to why 11 you've accepted the instruction and why you're sitting 12 here today? 13 A. It is. 14 Q. Thank you. Could I just -- one other thing that I think 15 it would be important to mention in the instruction you 16 were asked to try to the best of your ability -- it's 17 a difficult task to be given -- to explain things 18 related to the complex areas you were covering in as 19 comprehensible a language as you possible could. Was 20 that something that you tried to do? 21 A. It is. It's something that, as a doctor it happens in 22 clinical practice, of trying to explain to patients so 23 they can understand. So we used those skills to try to 24 help inform the report. 25 Q. I see. Well, the Inquiry would be very much obliged if Page 16

1 you would try to use those skills in your evidence today 2 and the reason for that is, as I've explained to you 3 before you came and took the oath, is that there are 4 many people who are listening to your evidence, 5 including many patients who have an interest in 6 neurosurgery, and they would be most interested to 7 attempt, as I will, to understand as much of the complex 8 material you will speak about as possible. And no 9 doubt, that will also apply to the Chair who will listen 10 with interest to your evidence. 11 Could I just clarify with you that if we could 12 perhaps go to paragraph 2.1. You were asked here to set 13 out the specific way in which you went -- you've covered 14 some of this already, but you say at paragraph 2.1: 15 "The Experts met and discussed their approach to the 16 report. Given the timeframes, we considered that each 17 expert would be nominated as lead author for several 18 individually numbered sections of the report and should 19 compile the initial draft for the allocated sections. 20 The Experts shared drafts providing opportunities for 21 experts to review and where relevant amend or add to the 22 content. Consensus meetings were held to finalise 23 content that all three experts agree upon and approve." 24 Just to understand, Professor Whitfield, what you 25 did -- you've touched on this already -- is you Page 17	1 Could you tell us what a tertiary unit is? 2 MR REDFERN: It's a unit that takes referrals from other 3 consultant practices, specialist practices. So primary 4 care is practised in the community general practice. 5 Secondary care service would be chest physicians, 6 general cardiology, general medicine in a district 7 general hospital and in surgical practice would be 8 general surgery or neurology, orthopaedics. That's 9 generally secondary care. Then a tertiary unit will 10 take referrals from those services. So it's a more 11 specialised level of surgery. 12 In our hospital, for example in medical practice, 13 there were general physicians that had an interest in 14 cardiology but we also then, during the time that I was 15 there, had a regional cardiology unit was built there. 16 So there were two levels of cardiology service. There 17 were the general and then the more specialised complex 18 cases will be dealt with by that tertiary service. The 19 same was held true for us, so we took specialist 20 referrals from other consultant-led practices. 21 Q. Thank you. And is that a usual model for the way in 22 which a patient might end up sitting in front of 23 a neurosurgeon, or are there other ways in which that 24 might happen? 25 A. That's the general route and so, generally, primary care Page 19
1 allocated, for first draft purposes, different sections 2 to different individuals but you then came together to 3 discuss what the others had drafted, effectively. And 4 I think what you're saying in that paragraph is that 5 through those consensus meetings by the end of the 6 process, you were all effectively signing up to 7 everything that everybody had said; is that right? 8 A. That's correct, yes. 9 Q. So one could properly characterise this as a report of 10 a group but a report which has been compiled in 11 a particular way, relying on the particular expertise 12 for a first draft to be produced of each individual 13 member? 14 A. Yes. 15 Q. Thank you. Could I just ask a few more detailed 16 questions, please, about aspects of your practice which 17 may be relevant to matters which we will address. Could 18 we look, please, at appendix 1 of the report, page 197. 19 This is a précis CV which you supplied, Mr Redfern; is 20 that right? 21 MR REDFERN: Correct. 22 Q. You say, in it: 23 "My consultant practice was in a tertiary unit 24 located within a DGH (district general hospital) in 25 Swansea." Page 18	1 will not refer directly, in an emergency situation, to 2 a neurosurgical department. They can come through 3 outpatient letters of referral. For example, for spinal 4 cases, they would -- may come directly from primary care 5 it a neurosurgical service, but that that -- in the 6 normal situation would be that we would get referrals in 7 a tertiary service from other consultant-led specialties 8 rather than directly from the community. 9 Q. Thank you. And you worked in what you describe as 10 a district general hospital in Swansea, is that right? 11 A. Correct. 12 Q. I'm interested -- this is one of the areas we touched on 13 just a moment ago. I'm interested to know whether that 14 hospital, which I think was the Morriston Hospital, is 15 that right? 16 A. Yes. 17 Q. Whether that, in terms of its facility, capability in 18 neurosurgery, its sort of catchment area, if that is 19 an appropriate term, the number of people that might 20 potentially be patients, whether that is something that 21 would be broadly comparable to the sort of hospital that 22 we've been talking about at in this Inquiry, namely 23 Ninewells Hospital? 24 A. Yes. My understanding is that the period in time we had 25 a catchment population of about 1 million for Swansea. Page 20

5 (Pages 17 to 20)

1 So that meant that the peripheral hospitals that would 2 refer -- so secondary care hospitals, if you like, that 3 we're referring to our tertiary service, they covered 4 an area of about 1 million population, a mixture of 5 urban and rural communities. And very similar in a way 6 to Dundee, which again of course has a large metropolis 7 around Dundee and then a very large rural area around it 8 as well and my understanding is that the population 9 there was of the order of about 450 to 500,000, you'll 10 correct me of that. So I think that broadly the 11 principles of the DGH process would have been similar. 12 Q. Because in your report you, I think, try to focus on 13 that type of a hospital, but based on your experience of 14 that type of hospital. But you, at one stage, contrast 15 that with what I think you call "a bigger centre" and 16 refer -- in Scotland, I think you say Edinburgh and 17 Glasgow would (inaudible) a bigger centre. What would 18 be meant by a "bigger centre", if I can put it that way? 19 A. A larger complement of staff. So I think, as 20 I've mentioned in my CV, when I started in '92 which was 21 only a few days before the time in which this Inquiry is 22 interested, there were only two of us as consultant 23 neurosurgeons there. We soon became -- by '94/'95 we 24 became three and that was a similar process, as 25 I understand it. I don't have detailed knowledge of Page 21	1 have -- and in a larger unit you're more likely to get 2 more of those uncommon things because you have a larger 3 catchment area, but uncommon things still turn up in 4 small units and you have the dilemma then of how to deal 5 with those. Do you deal with them in-house, with your 6 own experience -- based on your own experience or do you 7 say: actually, we have the time to send that to somebody 8 and a larger unit where they may be dealing with more of 9 those cases. And that's a pressure within a service 10 such as ours, a sub-specialised service such as ours, 11 where you have to make the choice as to where is the 12 best place for that patient to be dealt with. 13 Q. And in a service like that, as I understand it, 14 especially in an emergency situation, as you have 15 said, it would be necessary for the lower number, if 16 you like, of consultants to be able to offer a wide 17 variety of services for the very reason you've said 18 which is conditions will present in a random way and 19 effectively you could have anything walking through, any 20 patient with any sort of problem walk through the door 21 who may require immediate attention, is that right? 22 A. Yes. Yes. 23 Q. And so there is, I think, in the materials that you've 24 provided to us, quite a significant amount of guidance, 25 including from bodies that provide such guidance in Page 23
1 what happened in Dundee but I think there was a similar 2 set-up here in Scotland with about three or four 3 surgeons there and similarly in Aberdeen. Whereas 4 I know some of my trainers when I was in training in 5 Liverpool, they trained in Glasgow. And at that time 6 there were five, six, maybe even seven consultants in 7 Glasgow, five or six I think in Edinburgh. So it was -- 8 those larger centres had clinical opportunities in terms 9 of sub-specialisation that weren't initially available 10 in the smaller units. 11 Q. That's what I was interested in because it's not just 12 a question of numbers in terms of the neurosurgical 13 service that's being provided, that aspect is actually 14 quite important as I understand it because it means that 15 if one works in a smaller unit I think what you said is 16 the opportunities to be exposed to a wider range of 17 neurosurgical issues, if you like, may be more limited; 18 is that right? 19 A. Yes and no, in terms of the numbers of cases coming 20 through. But of course the way in which disease or 21 injury crops up or happens is -- for the purposes of 22 this discussion, are largely random. So anything can 23 turn up on your doorstep so you have to have the 24 ability, and that's what the basis of training is, to be 25 able to deal with whatever confronts you. You then Page 22	1 relation to neurosurgery, about the size that units 2 should be, the number of consultants they should have, 3 the number of junior staff they should have, in order to 4 try to maintain the appropriate level of service for the 5 community; is that right? 6 A. That is correct, yes. 7 Q. The reason I ask these questions is one area that's come 8 up of interest in the evidence that we've heard 9 pertaining to Mr Eljamel himself is that he appeared to 10 have a very wide variety of, I think the term 11 "sub-specialty" you've used, meaning different areas in 12 which he would offer practice. Was that unusual for 13 a hospital of the nature of the one he was working in, 14 and also was it unusual for the time? 15 A. The initial time when it started then, no, it wasn't 16 unusual and we all had to deal with a wide variety of 17 conditions. Can I try and expand a little bit? 18 Q. That would be very helpful, thank you. 19 A. I'm not being flippant when I say that my colleague who 20 had been then when I started, when we were one or two, 21 my late, lamented colleague had been there for 20 years 22 with another colleague, they both trained together at 23 the same unit. And so they ran this practice for nearly 24 a 1 million population and he described himself as 25 a Jack-of-all-trades and a master of none. And that was Page 24

1 really the day-to-day reality of being a specialist 2 surgeon in a peripheral unit. And I came into that. 3 But of course, I was from the next generation on from 4 him, so I'd had more of the focused training that his 5 generation had not experienced. So I brought particular 6 skills to the unit and towards the end of my time, then 7 people would from the next generation would start to 8 bring things in. 9 So at the time with which we're concerned, then yes, 10 we were dealing with anything and we were trained across 11 the whole range of neurosurgery. So for example, I was 12 trained in paediatric neurosurgery and would deal with 13 some paediatric cases but I wouldn't deal with, as it's 14 mentioned in this report, I wouldn't have dealt with 15 cranial synostosis, premature fusion of the -- things, 16 that would go to a specialist unit that I'm sure you 17 will pick up on in at some stage. 18 So we would deal with the acute cases that couldn't 19 be resuscitated and sent elsewhere but we would take on 20 those in which we had had particular expertise and 21 exposure during our training. And you had to draw the 22 balance there and use some fine judgment as to what was 23 appropriate to be kept in-house and what was appropriate 24 to be referred on. And that required insight, judgment 25 and a steady nerve. Page 25	1 A. They carry on, yes. But -- so this was a realisation 2 led by the SBNS and by the SAC, the neurosurgical 3 society and the training committee, that what I have 4 just said was -- in general terms, was good for patient 5 care and the idea of governance that was coming in at 6 the time, of the overall clinical package. And 7 therefore, it was a good thing if particular conditions 8 became concentrated in specialist units. 9 Q. Thank you. You mention -- you go on to mention, in this 10 passage, certain services that you would offer and you 11 mention -- I think you mentioned it in passing, that 12 paediatric cases, particularly trauma, tumours, 13 hydrocephalus, and CNS infections were also dealt with 14 locally but then at a certain point, a specialist 15 paediatric neurosurgeon was appointed in 1996 and from 16 then on, your exposure to paediatric cases reduced 17 significantly. Is that a personal manifestation of the 18 phenomenon that you've been telling us about, which is 19 that you had to deal with paediatric cases because it 20 was part of the general load, children could come in 21 with neurosurgical problems and if you didn't deal with 22 it, there was nobody else to deal with it but then 23 someone joined who had more specialty in that area than 24 you, and that therefore that caseload was taken away 25 from you; is that right? Page 27
1 Q. Thank you. It would therefore, I think in the context 2 of what you're describing, be wrong to assume that if 3 someone offered a wide range of neurosurgical services, 4 that they would necessarily have chosen to spread 5 themselves too thin. Because what it sounds like from 6 what you're telling us is that in certain types of 7 hospitals that would be necessary so that 8 an appropriately wide range of services could be offered 9 especially for those attending in an emergency 10 situation? 11 A. That was the case but there was also a growing 12 realisation that with a concentration of expertise, 13 an exposure to cases, so I'll think if I can -- just 14 more in general terms, if one surgeon or surgical unit 15 ends up taking more of a particular type of case, then 16 the surgeons and the staff in that that are taking those 17 cases will build up more experience more rapidly. There 18 will also be more clinical material for which their -- 19 to which their trainees can be exposed. So they will 20 have their educational process advanced in those -- in 21 the management of that condition. 22 Q. So it's not just as simple as talking about the service 23 that's offered because there's a trickle-down effect. 24 If you offer a certain service, the trainees become used 25 to that and they carry on that service. Page 26	1 A. That's right. 2 Q. Because I think -- please tell me if I'm wrong, but 3 that's quite a significant context in which 4 neurosurgical services are offered, that sometimes 5 people are trying to spread themselves thinly because 6 they require to do so to service the local area, but at 7 other times, because of the specialty of other 8 consultants, they may not have to practice in certain 9 areas. To an extent, it's driven by the requirements of 10 the patients that walk in the door? 11 A. It was driven by the stark reality of everyday life. 12 When I started, just as an anecdotal situation but it 13 illustrates how this process had to happen. I had 14 a neonate in Swansea but the neonatal cases were dealt 15 with in a hospital that was about five or six miles from 16 my hospital. And this child needed to be seen every 17 day, so after I finished my day's work doing my routine 18 work in my base hospital, I then had to travel and drive 19 and go and see this child every day for about 20 three months. I wouldn't at weekends, when I would get 21 somebody else who was on-call to do it, but that child 22 was seen every day for about three months. And that is 23 practically not possible and so there had to be -- that 24 would have been reflected around many district general 25 hospitals, that people were having to do things in order Page 28

1 to provide a continuity of care. So that's just 2 impractical. The process had to change and it had to 3 have specialist services more centralised. 4 Q. Thank you. 5 THE CHAIR: It does suggest -- and we may well cover this in 6 due course, the situation now as opposed to back at the 7 time that you're talking about, but the evolutionary 8 process, development of neurosurgical services, is 9 a relatively recent phenomenon. Would you agree with 10 that? 11 A. I think by the late '80s, the early '90s, that was when 12 there -- the realisation that there had to be -- 13 sub-specialisation came into force. There were, of 14 course, people before then who had particular interests, 15 but paediatrics is one of them that was coming in, in 16 the 80s. And I think if I'm allowed to consult my 17 colleagues, I think that in around about 1990, give or 18 take two or three years, the British Neurosurgical 19 Paediatric Association was commenced; is that correct? 20 It was about that time, yes. 21 THE CHAIR: Thank you. 22 MR DAWSON: You mentioned in your evidence, when you were 23 describing this sort of system in this sort of hospital 24 in a neurosurgical unit, that it would be necessary to 25 exercise judgment a lot of the time, to work out whether Page 29	1 consultants, each consultant has to be doing that half 2 the time; is that right? 3 A. Yes. 4 Q. And if you have three consultants, you're doing it 5 a third of the time, is that right? 6 A. Yes. 7 Q. So that's another aspect of stretching an individual's 8 ability to offer a service, it's a sort of time-based 9 limitation as well as a skill-based limitation, that you 10 would have to be on-call effectively half of the time; 11 is that right? 12 A. And the stark reality of it was, if you just say: well, 13 that's every other night, you would be -- you might be 14 called in because, as I said, we had relatively junior 15 trainees, we had a rotation with Cardiff, but we tended 16 to take the trainees in their first year of training and 17 Cardiff had them in their second year, and they didn't 18 come back, they'd then move elsewhere. And so the first 19 year was when they needed to hone their skills with the 20 emergency work and they would need someone looking over 21 their shoulder and so, if they had an emergency in the 22 theatre, we would generally have to go in and supervise 23 and assist. You would do that at 3 or 4 o'clock in the 24 morning, go home, have an hour or two of sleep and then 25 get up and you'd then be back in to do your ward round Page 31
1 a patient that presented fell within your competency, 2 whether there was an alternative to send the patient to 3 the more -- the issue to a more specialist unit and of 4 course that would involve consideration of how pressing 5 the issue actually was. Is it -- do you recognise the 6 phenomenon, within a unit of that nature, that it may be 7 possible that someone is spreading themselves too thinly 8 and offering services that really perhaps they 9 shouldn't? 10 A. Yes. Yes, I mean that's something we all had to do. 11 Q. It seems almost logical I think that it follows from the 12 context you've described; is that fair? 13 A. Absolutely, yes. 14 Q. Thank you. You mention -- just on a technical point, 15 you've mentioned it already -- you mention in your 16 précis CV that you were on a 1:2 rota which then changed 17 to a 1:3 rota. Can you tell what you say that means? 18 A. It meant that you were on-call for all emergencies 19 coming in every other day, every other night, every 20 other weekend. Yeah. 21 Q. So it is, I think, a requirement that a neurosurgical 22 unit, or perhaps other units as well, offers a 24-hour, 23 consultant-led service, is that right? 24 A. Yes. Yes. 25 Q. And what you're telling us there is if you only have two Page 30	1 or your list or whatever at 8 o'clock the following 2 morning. There was no sort of compensatory rest period 3 after that. It was quite an interesting period of my 4 life. 5 Q. There's an aspect of the way in which those services 6 were delivered which you, I think, comment on in the 7 report. You talk in a particular section about various 8 innovations and changes in neurosurgical practice as 9 time went on, but one that you mention which actually 10 has come up quite recently in our evidence is to do with 11 the Working Time Directive. That's a piece of 12 legislation which is derived from European Union law 13 which impose limits on the number of hours individuals 14 in any employment are allowed to work. It seems that 15 there was -- that that concept, against that context, 16 is -- the two things don't seem compatible; is that 17 correct? 18 A. That is -- and I think particularly within some acute 19 surgical services there was a realisation that this 20 would cause a number of difficulties with training. Of 21 course it was to be welcomed in terms of work-life 22 balance but in terms of the training, there were 23 difficulties that were going to arise because I think in 24 the document we put about workforce planning, the 25 numbers of people that you need for an EWT-compliant Page 32

1 rota -- EWT being the European Working Time Directive 2 compliant rota, that would go up perhaps to -- you'd 3 need six people on a rota whereas formerly, we'd only 4 had three trainees. And of course, if those six 5 trainees are now sharing the educational opportunities 6 in terms of clinical experience, that's going to be 7 diluted. 8 Q. Yes, you focus on the training aspect but obviously 9 there's also the aspect of the service that's delivered 10 to the patients being stretched as well; is that right? 11 A. Yes. 12 Q. Professor Whitfield, if I can move on to you, please, 13 focusing on certain particular aspects which have 14 a wider relevance to us from your CV and using that as 15 a basis, as I have done with Mr Redfern. You are 16 a general cranial -- when you started working as 17 a consultant, you had a general cranial and spinal 18 practice; is that right? 19 PROFESSOR WHITFIELD: That's correct, yes. 20 Q. And your first consultant position, as I understand it, 21 was in 2000 in Aberdeen; is that right? 22 A. It is. 23 Q. Could you give us, based on what Mr Redfern has already 24 told us, some information about what sort of a service 25 you were working in at that time with the sort of Page 33	1 you're on duty and when you're not on duty, you need to 2 be sure that someone else is looking after your 3 patients. It's a very -- in my recollection, a very 4 open, loose contract. And you had to live within ten 5 miles, 30 minutes of the hospital, to provide that 6 service. 7 In Aberdeen the level of junior cover was poor. We 8 had one registrar who was on duty about every third or 9 fourth night. So you were often on with totally 10 non-specialist junior doctors who would telephone you. 11 You couldn't look at scans on your phone then, you had 12 to go into the hospital to look at the scans, make your 13 decisions. And then it was a very consultant-led 14 service. 15 The breadth of work, there was a bit of 16 sub-specialisation then, so one of my colleagues did all 17 of the pituitary operations and my practice then, I did 18 a lot of the skull base operations, acoustic neuromas, 19 meningiomas lower down in the skull, which tend to be 20 the more difficult meningiomas, and I did quite a lot of 21 aneurysm surgery, blood vessel surgery. I also did 22 quite a lot of spinal surgery. The spinal surgery I was 23 doing was mostly non-instrumented, meaning degenerative 24 disease, where you're alleviating compression of nerves 25 that are causing pain. Sometimes I would use implants Page 35
1 considerations that we've been talking about taken into 2 account? 3 A. Sure. So I started in Aberdeen in 2000. I had two 4 colleagues. I replaced a colleague who moved to 5 Ireland. The first six weeks I was there the most 6 senior colleague actually went to the Sydney Olympics, 7 so there were two of us running the unit and we did 8 a 1:2. And of course when you're down that low and 9 you're on a 1:2 and someone is away for a week, you're 10 doing a 1:1; you're on every day and every night. 11 And the catchment population for Aberdeen is a bit 12 larger than Dundee, I think it's about 700,000 as 13 opposed to 450,000 or thereabouts. And some nights 14 would be quiet with no referrals, some nights you would 15 be up operating, doing emergency procedures. And 16 daytime, back then I was doing two clinics a week, so 17 that would be seeing new patients, often referred by 18 GPs, some from other specialists. I would have 19 a meeting with radiologists, I think that was once 20 a week. I would operate two or three days a week. So 21 it was a busy, full-time job. 22 The new contract for doctors' hours, I think, came 23 in, in 2004. So the contract in 2002 and the contract 24 that Bob will have been on was very much: you are 25 appointed to look after patients in this hospital when Page 34	1 for trauma but that was something I wasn't that 2 comfortable with, I hadn't done that much of it in my 3 training, and those patients -- my preference would be 4 to essentially discuss them with another colleague as to 5 what level of instrumentation and who was best placed to 6 do it. 7 So there was some specialisation coming in. That 8 was in the early 2000s. I had trained in Cambridge 9 which was a big unit and there was a lot of 10 sub-specialisation in the mid-1990s there, so there 11 was a pituitary surgeon, there were two people doing 12 skull base, there was one surgeon doing most of the 13 vascular and there was a surgeon who was specialising in 14 instrumentation of the spine which was an emerging 15 concept really around that time. 16 Q. One aspect of neurosurgery -- you've already covered 17 a huge range of different things, although many more are 18 covered in your report -- neither of you have mentioned 19 so far is functional neurosurgery. I know, from the 20 report, that that's not an area in which any of you 21 specialise or practice particularly, but you have 22 helpfully provided with us some information about what 23 it is. I wonder if you could explain to us what that 24 area is? 25 A. Yes, well functional surgery, the reason none of us are Page 36

1 specialists in it are, in that sort of training era, 2 I'd be guessing, but probably about 10, 12 units in the 3 country were doing functional surgery and Cambridge, 4 where I trained, wasn't one of those units. But 5 functional surgery is a mixture of different aspects of 6 surgery, so there is surgery for patients with epileptic 7 conditions to try and reduce the frequency of seizures. 8 There is surgery of patients with movement disorders, 9 Parkinson's being the archetypal one that everybody has 10 heard of. And essentially the surgery for that type of 11 procedure would be very much guided by a neurologist. 12 So a neurologist would be looking at the treatment, 13 usually medically-based treatment, replacing the lost 14 neurotransmitter, which is called DOPA, with medications 15 to boost the level, medications to reduce the breakdown 16 of the natural levels. And when these treatments become 17 exhausted, the neurologist would then turn to surgeons 18 and based on the evidence around at that time, the 19 surgeons would do lesions, so they would damage a very 20 precise piece of brain, usually deep within the brain, 21 to try to suppress symptoms such as tremor. 22 THE CHAIR: As a consequence of which, the objective is to 23 improve function, hence the name "functional 24 neurosurgery". 25 A. Absolutely, so you're targeting the area to change the Page 37	1 their training either because it happened to be offered 2 in the place they were and therefore they would be 3 exposed to it and require to work in that area, or 4 perhaps if they had a particular interest in it, they 5 may seek out training in a particular place in order to 6 be exposed to it; would that be fair? 7 A. Yes, in part. Very difficult to seek it out at that 8 very early stage when you're applying for jobs. Back 9 then, as a registrar, you would have very little 10 neurosurgical background, extremely competitive posts. 11 So that really, in general, wouldn't be the driver for 12 getting a post, for example in Liverpool. But as 13 a second stage of selection -- or there was then, into 14 the senior registrar grade and at that stage, people 15 might target a hospital because it offers something they 16 have a particular interest in. 17 Q. Because the attractive qualities in a trainee at the 18 lower level are to offer the wide range of normal 19 neurosurgical services that one requires to provide; is 20 that right? 21 A. Yes. 22 Q. Mr Redfern, did you want to come in? 23 MR REDFERN: Yes. I just wanted to expand a bit on what 24 Peter just said. I came into neurosurgery because of 25 Parkinson's. I worked as a very junior trainee in the Page 39
1 function of a patient. 2 MR DAWSON: So in the context of what both of you have 3 described as the way in which a service would operate, 4 including the need to offer a wide variety of services 5 but there being some degree of sub-specialisation and 6 then the consequential effects that has on education and 7 the proliferation of the service, is functional 8 neurosurgery something that one chooses to do, if you 9 like, because of its particular nature and of the fact 10 that it's only offered in a certain number of units. Is 11 it something that isn't part of the suite of skills that 12 a general neurosurgeon requires to have; would that be 13 fair. 14 A. Okay, it's changing. What you've said is definitely 15 applicable to the relevant period. 16 Q. Yes. 17 A. So a trainee might work in a unit, Liverpool for 18 example, which I think is where Mr Eljamel probably 19 picked up his functional skills. Functional surgery is 20 offered in that unit and you develop an interest in it, 21 go to conferences about it, learn the skills and then 22 take it into your consultant specialty area. And 23 I don't know for sure, but that is, in general, how it 24 would evolve. 25 Q. So that's something that someone would pick up through Page 38	1 late '70s in London with Professor Sid Watkins who was 2 a pioneer of Parkinson's surgery. I then trained in 3 Liverpool with John Miles and we were doing Parkinson's 4 surgery there, so I was exposed to it. I did my 5 research in a rat model of Parkinson's and I then went, 6 as a senior registrar, I was in Maudsley and I was 7 trained in epilepsy surgery. I wasn't appointed to 8 a post in a unit in which they were practising 9 functional neurosurgery. It wasn't appropriate to do it 10 in the hospital in which I worked. 11 So it was possible to have those skills but then it 12 would depend on the local departments as to whether you 13 could do it or not. It would have been wholly 14 inappropriate for me to start a functional service in 15 Swansea when there was a very experienced colleague 16 doing it with whom I thought I might have worked in 17 Cardiff. 18 So it is possible to be trained and then not do it. 19 What determines whether you carry on doing that surgery, 20 you're trying to introduce it, would depend on local 21 factors. We have not mentioned, I don't think in our 22 report, a word called "creepage". Creepage is when 23 surgeons are appointed with one aim and then actually 24 start to bring something else in. This may be something 25 which the Inquiry wishes to look at. In the Page 40

1 neurosurgical department where I worked we had creepage 2 which was thrust upon us which was the gradual trend for 3 more spinal surgery to be done in-house by surgeons and 4 taken away from the orthopaedic surgeons. They liked 5 that in our area because they could do more of the bone 6 setting and joint replacement type orthopaedics and they 7 didn't have to do -- and I say this from an orthopaedic 8 perspective, not a neurosurgery one -- the irksome 9 problem of dealing with back ache and discs which we 10 like doing. 11 So there was creepage like that in practice, but to 12 have creepage with a highly specialised service such as 13 functional surgery would not have been appropriate in my 14 unit and I don't know what the setting was in Dundee, 15 but even though I'd been trained in it, I knew that 16 I wasn't going to be able to practice that, even though 17 it was something of particular interest to me throughout 18 my training. 19 Q. In the event that -- hypothetically, in the event that 20 the process you described of services becoming thinner 21 and thinner, not being enough consultants, not being 22 enough doctors, people being away at the Sydney Olympics 23 etc, or on a more permanent scale, what would happen if 24 you got to a stage where you thought: it's not going to 25 be possible for us to continue to offer the wide variety Page 41	1 attention. So I did, I brought it to the medical 2 director's attention and I was told that I was out of 3 order because how they were going to offer a service in 4 this hospital if I refused to do it and I said: I'm not 5 refusing to do it, I'm putting my hands up and saying 6 I don't think I'm safe to do it because I haven't done 7 it practically for nine years. 8 Q. What your personal experience I think shows, tell me if 9 I'm wrong, is that there is a dilemma in the way in 10 which the services are offered because it sounds like 11 responsibly, you thought: hang on a sec, I probably 12 shouldn't be doing this, but when you raised that with 13 the health board what you were told is: well, you're 14 going to have to because there's nobody else to do it. 15 Is that effectively what happened? 16 A. Yes. 17 Q. Obviously that's a personal experience but is that 18 a dilemma which is a common phenomenon particularly in 19 the type of hospital where you worked? 20 A. I think so. I like to think that I took on -- that 21 I'm an honourable individual and that I have some 22 insight into what my limits are. We did come up with 23 a practical solution, I have to say, because I realised 24 the problem that the trust had. They had to keep 25 providing the service and suddenly to withdraw it would Page 43
1 of services we currently offer? How would you go about 2 raising that with, for example the health board, to say: 3 I don't think that we can responsibly continue to offer 4 a service in the wide range that we do? In the event 5 that you're offering services that are beyond what were 6 described as kind of the core services, how would you go 7 about doing -- for example, if you decided: we no longer 8 feel we can offer a functional neurosurgery service 9 because there's too much for us to do elsewhere, how 10 would you go about dealing with that? 11 A. I had personal experience of feeling that I couldn't 12 offer a service. I went to the medical director. As 13 I have said, I had stopped doing elective paediatric 14 surgery for a time and so I realised then, after 15 several years, that it was actually several years since 16 I had operated on a child under the age of 5 and 17 I thought, what happens if a child does come in and 18 I'm asked to deal with this and something went wrong? 19 And I thought how could I -- if the parents took legal 20 action and I was sued, what would I say to a barrister 21 such as yourself if they said: well, what's your 22 experience of this, Mr Redfern, when did you last do one 23 of these? And if I had said: nine years ago, they would 24 have said: well, you shouldn't be doing it. So 25 I thought I had better bring that to someone's Page 42	1 have been difficult. So what I did, as a compromise, 2 was I went every six months to one of your former 3 colleagues in Bristol. And so, for a period of about 4 four or five years, I went -- every six months I went 5 and spent a day operating, or assisting in the 6 paediatric operating theatre in Bristol and trying to 7 get a bit of CME, at least so that I would be familiar 8 with the techniques of dealing with very small children 9 which I used to have but which had fallen out of 10 practice. 11 Q. Thank you. 12 A. It wasn't ideal but it was felt to be the best 13 compromise that they could come up with. I wasn't 14 entirely happy with it but it meant that at least I was 15 safer than I would have been if I had done nothing. 16 Q. Thank you. To go back, a couple of further questions 17 for Professor Whitfield, again, trying to tease out some 18 elements in your CV and your experience that are of 19 wider relevance to matters we are considering. You 20 mentioned, I think, that you trained for a period in 21 Glasgow is that right? 22 PROFESSOR WHITFIELD: It is, yes. 23 Q. When was that? 24 A. That was -- I was in Glasgow for two years. I think it 25 was '88 to '90. Page 44

1 Q. One aspect of -- probably applies to all of you, but 2 certainly your CV, Professor Whitfield, indicates you 3 moved around a lot of different places. In other walks 4 of life, that might be unusual. What was the reason for 5 moving to so many different units in training and 6 indeed, in professional life thereafter? 7 A. Okay, there's quite a few factors. 8 Q. Yes, I'm not interested in personal factors, but 9 professional factors if they are relevant -- 10 A. So I was an undergraduate in Southampton and you develop 11 a mentorship and mine was with someone in neurosurgery 12 and he advised me to go to Glasgow because the Glasgow 13 Coma Scale is world renowned and he had trained in 14 Glasgow and I said to him: I actually need to do a job 15 in anatomy, we didn't do anatomical dissections in 16 Southampton. He thought it was a waste of time but 17 I worked in the university in Glasgow for a year 18 teaching anatomy. 19 Then I did a neurosurgical job at the Southern 20 General, as it was called then. And I did my A&E job at 21 the Royal Infirmary in Glasgow. Then, at that stage in 22 your career, you are then are trying to get on to the 23 registrar rotation and -- sorry, SHO rotation in general 24 surgery. Basically, you had to rotate through general 25 surgical specialties. Page 45	1 with different people and different skills and different 2 specialties; is that right? 3 A. There are definitely advantages. However, Cambridge -- 4 training in neurosurgery in Cambridge is a one-unit 5 training centre which is relatively unusual. There's 6 Cambridge, Southampton, Nottingham, where you do all 7 your training in that one centre, very few others. But 8 many training programmes you rotate. So, Sheffield, 9 Hull, Plymouth, Bristol, Birmingham, Stoke, Coventry are 10 linked. 11 Q. Is that because Cambridge is able, in one unit, to offer 12 all the various different things you'll need to become 13 able to do -- 14 A. It was. 15 Q. Whereas others -- 16 A. It didn't do functional surgery, but it did everything 17 else. But functional surgery was not really a core 18 requirement for training. 19 Q. Another matter I just wanted to raise with you. You 20 were, I think at one stage, the president of the British 21 Society of Neurosurgical Surgeons; is that right? 22 A. Yes. 23 Q. Could you tell me broadly what the function of that 24 organisation is? 25 A. Yes. So that organisation is celebrating its Page 47
1 Q. Could I just interject there. "SHO" is a senior house 2 officer? 3 A. Yes. 4 Q. Which was a junior director in training at the time? 5 A. Yes, I had been qualified about three years at this 6 point. 7 Q. Yes, and a registrar would be a more senior doctor in 8 training, is that right? 9 A. Yes, within a single specialty. 10 Q. Thank you. Please carry on. 11 A. And I applied for a job in the west of Scotland where, 12 you know, we lived in Glasgow and I applied for a job in 13 Winchester. And I got the Winchester job and obviously 14 Winchester is very close to Southampton so we had a lot 15 of links down there as well. So I spent a year doing 16 orthopaedic surgery and a year doing general surgery. 17 And at that point, I was applying for a registrar job 18 and my mentor in Southampton had become professor of 19 neurosurgery in Cambridge and he basically contacted me 20 when I'd got this FRCS England exam and invited me to go 21 up to Cambridge and that led to eight years spent in 22 Cambridge. 23 Q. I see. So is it fair to say, with that history, that 24 there are deemed to be advantages to moving around and 25 experiencing, in training in particular, different units Page 46	1 100th birthday later this year, so it's long 2 established, and it has a council of elected members. 3 There are about a dozen elected members. There are 4 officers of the society, president, president-elect, 5 treasurer, honorary secretary. And there are several 6 other members who are chairing different groups: 7 research, national training group, national selection 8 group. And so it oversees the community of 9 neurosurgeons in the United Kingdom and Ireland. It 10 organises conferences twice a year. The reason it does 11 it twice a year is so that every neurosurgeon in the UK 12 gets the opportunity, every year, to go to a conference. 13 We've heard about 1:2 rotas, 1:3 rotas. It does mean 14 everybody has the opportunity to get that training. And 15 at that conference, there's usually about two and a half 16 full days of education. And it's obviously a networking 17 thing as well. 18 Q. Is it similar to a Royal College but in the specific 19 area of neurosurgery? 20 A. Is it similar? I guess in a way it is. It doesn't have 21 the power of the Royal College but the people who know 22 most about neurosurgery are neurosurgeons and they can 23 think strategically about workforce planning, they can 24 think about the content of training, they can think 25 about audit and have set up national audit projects. So Page 48

12 (Pages 45 to 48)

1 there's been a lot of forward thinking and drive through 2 that society which I've been involved with for over 3 30 years now. 4 MR WIGFIELD: Could I just add to that? I am the honorary 5 secretary of the Society of British Neurosurgeons. I 6 just want to clarify, it is not regulatory body. And 7 although my colleague, Professor Whitfield, says it has 8 oversight of all aspects of neurosurgery, it brings all 9 elements of neurosurgery together but it does not 10 regulate all those sub-specialist areas, so it does not 11 have the ultimate oversight over the exam or what the 12 Royal College of Surgeons says about it. 13 Q. Understood. I think it may be -- we heard some evidence 14 from someone from the Royal College of Surgeons of 15 England who talked about specialty association. I think 16 it may be one of the specialty associations associated 17 with that body; is that correct? 18 MR WIGFIELD: That's correct. 19 Q. Thank you. Mr Wigfield, thank you for sitting so 20 patiently. I'm now moving on to you to ask you some 21 questions. The focus of your practice we've already 22 heard is spinal surgery, is that right? 23 A. That's correct. 24 Q. In your CV you mention that you say were appointed 25 a consultant neurosurgeon with a specialist interest in Page 49	1 it's a different sort of joint from a hip joint or 2 a knee joint. And it links vertebrae together and it 3 allows a degree of constrained movement between the 4 vertebrae. So it allows the vertebrae in the spinal 5 column to have some movement and it can be involved in 6 a lot of pathological processes that ultimately, it has 7 to undergo surgery or there is an option for surgery. 8 So, as a disc, the traditional image of it is of 9 a fibrous outer layer, a softer material in the inside. 10 That consistency changes as we age. So it's very soft 11 and jelly-like in an infant and gradually becomes more 12 gristle-like as one ages and it can become quite firm in 13 older age. 14 Q. And when a neurosurgeon is conducting one of what 15 I think are various different types of surgery involving 16 discs, what's the overall objective of a surgical 17 intervention like that? 18 A. So an intervention on the disc, it depends what has 19 happened that requires that surgery. So if it is 20 a discectomy, one is removing part of the disc and its 21 aim really is to decompress nervous tissue that's under 22 pressure. So one is not directly operating on the 23 nerve, one is operating on tissue pressing the nerve 24 that might be accounting for pain or disability. So the 25 aim is to remove part of that disc. Page 51
1 spinal surgery at the Walton Centre for Neurology and 2 Neurosurgery in Liverpool in 2007; is that correct? 3 A. That's correct. 4 Q. You've been a consultant, I think, then for 19 years? 5 A. That's correct. 6 Q. As we've already discussed, I think for a considerable 7 period your work covered a full range of adult 8 neurosurgery, is that right? 9 A. Through the on-call service. It would have to cover 10 a fuel role of adult neurosurgery, not functional 11 neurosurgery but things that would cover the 12 emergencies. 13 Q. There's one aspect of spinal surgery that I'd like to 14 bring out with you at this stage because it's something 15 that we've heard quite a lot about. I think you do 16 cover this in the report in some detail but for the 17 purposes of today, I'd like to cover in a general sense. 18 Could you tell us, please, what -- I think there are 19 various different procedures, but various spinal 20 procedures are involved in trying to do something with 21 spinal discs. Could you tell us what spinal discs are? 22 A. So the spinal disc is -- it's the intervertebral disc 23 between two bony vertebral bodies. And it's a joint, so 24 it's a fibrocartilage joint. Its technical name is 25 a symphysis, but it's made out of fibrocartilage. So Page 50	1 There are some surgical procedures where one might 2 want to achieve stabilisation of the spine, make the 3 spine rigid and to do that, it might be necessary to 4 remove much more of the disc, to try and take all the 5 disc out and then create some sort of fusion between the 6 bony vertebrae so that it knits together and links 7 together. One would either put an artificial device 8 called a cage -- they're called cages because they were 9 initially made out of a metal mesh really, packed with 10 bone graft and one will try and achieve a fusion between 11 the vertebrae. 12 Q. Could I interject at that stage because there's a few 13 aspects there I would like to tease out, if I possibly 14 could and then we'll continue the journey. 15 So when you're talking about a situation, or maybe 16 a common situation presenting to a neurosurgeon, someone 17 has pain and the pain is because, I think you said, 18 a tissue is impinging upon a nerve in the spine, is that 19 right? 20 A. Yes. 21 Q. And in the situation that we are talking about, the 22 tissue that you mention could be the disc, is that 23 right? 24 A. It could be the disc, yes. 25 Q. So for the sorts of surgeries we were talking about -- Page 52

1 you were talking about there, where you're going to do 2 something to the disc, it's because it's the disc that 3 is putting the pressure on the nerve; is that correct? 4 A. Yes, that is correct. 5 Q. And there are different things that you can do to try to 6 deal with that situation, depending on the presentation 7 of the patient, I'm assuming? 8 A. That's correct. 9 Q. And that might result in a variety of different things 10 but if one is talking about surgical interventions, 11 you've mentioned a discectomy or you've mentioned other 12 sorts of surgeries, the purpose of which would be to try 13 to make the spine more rigid to address the problem; is 14 that broadly correct? 15 A. That's broadly correct. There have been some 16 technologies to try and keep movement preserved in the 17 spine so there has been some work on disc replacement. 18 I did my doctorate research on disc replacements in the 19 neck but not disc replacements in the lumbar spine, but 20 that sort of work was going on as well. 21 Q. Right, so one of the things that's come up in our 22 gathering of evidence so far is to do with surgeries 23 involving discs, which I think are common, is that 24 right? 25 A. That's correct. Page 53	1 symptoms at a later stage and one also has to be 2 slightly cautious when one is making the diagnosis, does 3 one need an intervention at all? Because of the 4 appearance on a scan is -- is the appearance on the scan 5 actually responsible for the symptoms that the patient 6 is experiencing? So as we get older, we all have wear 7 and tear and degenerative changes and there will be lots 8 and lots of people that if we scanned them on an MRI 9 scanner, we would find disc prolapses and disc hernias, 10 things close to nerve roots, but those patients may have 11 no symptoms at all and we absolutely wouldn't be 12 operating on them just because of what the scan looked 13 like. 14 Q. So, again, a number of important concepts there, but you 15 mentioned the possibility that there was, at one stage, 16 perhaps a prevalence or a tendency to try to remove 17 large amounts of the disc in this sort of surgery. 18 I think I take it to be the case that that's not 19 a prevalent attitude towards this sort of surgery now, 20 is that right? 21 A. I think if one is just focused on a discectomy, not 22 considering any spinal instrumentation with metal screws 23 and rods, there's no deformity to correct, then one 24 would just be targeting a small area of disc or area of 25 compression. Page 55
1 Q. And in surgeries involving discs there often appears, 2 amongst patients who have provided evidence, to be 3 a perception that effectively what's being done is the 4 disc is in some way being removed or the disc is in some 5 way being removed substantially. Is it possible that 6 that could be happening in certain types of operation 7 and in which types of operation is one intervening and 8 dealing with a disc in a more minimally invasive way? 9 A. So I think surgical approaches to presentations with 10 disc prolapses has changed and evolved over several 11 decades and I believe that there was an approach of 12 trying to take out as much disc as possible, trying to 13 remove all the disc as one could do and then either 14 putting a device in between or allowing the bones to 15 fuse. We have increasing evidence that perhaps you only 16 have to do enough, to create some space around the nerve 17 root, remove a small amount of offending disc, sometimes 18 there's a small fragment of the disc that has come free 19 and that alone is accounting for the symptoms and just 20 removing that small element of the disc can be 21 sufficient to relieve the symptoms. 22 But of course, we leave most of the disc behind and 23 it is possible to get further age-related degenerative 24 changes or pathological processes that might cause some 25 more disc material to come out. So one could have more Page 54	1 Q. So would there be advantages to the potential outcome 2 for the patient in trying to have a minimally invasive 3 technique? What would the advantages be? 4 A. I think I'd unpick "minimally invasive" from the sort, 5 of you, know the minimum surgery required. So I think 6 what I have been talking about is the sort of minimum 7 surgery required. 8 Q. Yes. 9 A. Minimally invasive implies a very small incision, and 10 doing things through small corridors of access. 11 Q. Understood. 12 A. With suitable skills people can do very extensive 13 surgery through a minimally invasive approach. So they 14 don't equate -- and I think I put in the report that you 15 know, we talk about microdiscectomies. It doesn't mean 16 that it's a micro operation, it doesn't mean that it's 17 a mini operation. It comes from using an operating 18 microscope and it was -- that he is where the "micro" 19 bit in microdiscectomy -- because you can get a smaller 20 incision, it illuminates the wound, it magnifies things. 21 So you can do things in tighter spaces but it doesn't 22 minimalise or trivialise the operation. 23 Q. You mentioned, in your helpful explanation of this type 24 of surgery, that in advance of the surgery one would 25 tend to be using imaging to try to work out what's going Page 56

1 on and presumably make properly informed decisions about 2 what treatment options should be made available to the 3 patient, is that right? 4 A. That's correct. 5 Q. You also mentioned, which I think Professor Whitfield 6 did in a slightly different context, symptoms as well 7 being important. So if the person, for example, was 8 complaining about pain, you would want to know what's 9 the nature of that pain, the location of the pain, that 10 sort of thing. Would that be part of the pre-operative 11 assessment? 12 A. Yes, it is. 13 Q. I think what you also said is that sometimes the imaging 14 which one looks at does not easily tell you what it is 15 that's wrong and therefore doesn't offer a simple 16 solution as to what surgical intervention might be 17 appropriate; is that correct? 18 A. That's correct. So the imaging may not correlate with 19 the patient's symptoms, the anatomical location, the 20 distribution of symptoms. So the imaging might identify 21 something completely incidental. 22 Q. You mentioned MRI being a technology that would now be 23 used; is that correct? 24 A. That's correct. 25 Q. In the period that we're talking about, would it have Page 57	1 the patient; is that correct? 2 A. That is correct but primarily it's the fundamentals of 3 the history and the story is nearly always in the 4 history and then corroborative findings on examination 5 and appropriate investigations. So the MRI scan, for 6 example, might back up, confirm, or refute the 7 diagnosis. 8 THE CHAIR: Could I just ask what may be a very unscientific 9 question, Mr Wigfield, but you mentioned something 10 called "spinal pathology" as being what it is that these 11 scans, whether they be CT scans or MRI scans, are 12 designed to eliminate for you to, no doubt, decide on 13 a course of action. What exactly does that mean, what 14 are you looking for, what sort of things are shown up, 15 what do they look like? 16 MR WIGFIELD: So the imaging shows the spinal anatomy and 17 then variations that one sees on that anatomy that are 18 associated with disease becomes the pathology, and that 19 could range from wear and tear, degenerative changes 20 such as disc hernias, it could be tumours or oncological 21 conditions, there might be primary tumours of bone which 22 are quite rare, it could be metastatic tumours -- 23 THE CHAIR: Spread from somewhere else. 24 MR WIGFIELD: Yes, that spread from elsewhere. So there's 25 a range of things. It could be used for identifying Page 59
1 been MRI that would have been used or a different type 2 of imaging? 3 A. So between 1995 onwards, there would have been MRI. It 4 wouldn't have had the same quality and resolution of 5 modern MRI scanners, but it certainly was in practice, 6 people using MRI scans to identify spinal pathology or 7 intracranial pathology. 8 Q. Carry on. 9 A. And some units would have been relying on CT scans which 10 are very good at showing the bony anatomy and sometimes, 11 for example with an emergency disc protrusion in the 12 lumbar spine, a referring hospital might not have had -- 13 in 1995, a smaller district hospital, referring-in 14 hospital, might not have had an MRI scanner, they might 15 have only been concentrated in only the neurosurgical 16 unit. So the other team that's making the referral in 17 might have had to rely on other imaging. So they may 18 have taken a CT scan which wouldn't necessarily have 19 provided exact details but it could have given 20 an indication of what the pathology was. 21 Q. And in that process, whatever the scan is, one is 22 looking at the scan to try to interpret what is going on 23 to make a good decision to be able to offer options to 24 a patient about what could be done, not necessarily 25 having surgery but what the various options could be for Page 58	1 infection, abnormal blood vessels. So there's a whole 2 range that it could be identifying, so pathology is 3 vast. It's obviously anything that can be going wrong. 4 THE CHAIR: Right, thank you. 5 MR DAWSON: So if one carries through the journey I was 6 talking about where you have scanning, you have looked 7 at the history which tells you a lot of what you need to 8 know and you develop a plan as to what to do, one of the 9 issues that's come up in our investigations relating to 10 Mr Eljamel relates to something called wrong-site 11 surgery in spinal operations of this nature. I was 12 interested, if you could help us understand, in the 13 process of gathering the history, looking at other 14 available evidence, including radiology, how it happens 15 that the outcome of the surgery is that the operation 16 happens at the wrong level? 17 MR WIGFIELD: So there are a number of ways that surgery can 18 happen at the wrong level in the spine. So there are 19 multiple spinal vertebrae, seven in the cervical spine, 20 12 in the thoracic spine, typically five in the lumbar 21 spine, five sacral vertebrae fused together. And 22 obviously from the history, examination, imaging, one 23 wants to correlate that everything lines up. One could 24 identify, I'd say that probably -- it might have been 25 when the surgical checklist came in, there was a concept Page 60

1 of never events and operating on the wrong side of 2 a patient would be a never event. Operating on the 3 wrong body part would be a never event. So taking out 4 someone's liver rather than their spleen, would be 5 a never event. And at the time wrong-level spine 6 surgery was included. 7 Q. Could you just help us with at the time? 8 A. At the time? 9 Q. Time period? 10 A. Oh, so in the early 2000s. 11 Q. Thank you. 12 A. That was changed outside the time period in 2018, 13 wrong-level spine surgery was taken off the list of 14 never events because it was understood that there were 15 numerous mitigating factors why you couldn't always 16 guarantee the correct level in the spine. So for 17 example, if we consider lumbar spine, which would be the 18 commonest area that people might be operating on, what 19 one sees on an MRI scan might look different, 20 intraoperatively, to an x-ray image taken or an image 21 intensifier image. Maybe one can't quite clarify the 22 anatomy where the sacrum joins the lumbar vertebrae so 23 it's possible to miscount a level. Sometimes 24 patients -- or sometimes surgeons would rather count 25 down from the lowest rib, so if you have 12 ribs and you Page 61	1 a colleague to come and double-check, recheck are you on 2 the correct side of the patient, one would expect to 3 find the correct -- the appropriate pathology. 4 Q. Yes. So one goes in with a certain expectation as to 5 what one would find intraoperatively based on, for 6 example, the scanning and the symptomology that you've 7 described and the history, but it's possible that what 8 one is presented with when one opens the patient up is 9 not what one thinks. Does that mean that the disc 10 doesn't look the way that you would have expected it to 11 look if it was the one causing the problem? 12 A. If we were just focusing on the disc, for example, so it 13 might not look the way one would expect. It is possible 14 that's mitigated if the diagnostic scan is very, very 15 out of date that over time, that disc material might 16 have reabsorbed or the body might have reabsorbed it, 17 but if you don't find what you are honestly expecting to 18 find you have to question whether you are at the correct 19 level. 20 Q. And when you say "what you expect to find", that could 21 be various different things. It might be -- what you 22 expect to find might be that the disc is in a slightly 23 odd position or the disc is in some way not anatomically 24 placed where it should be, bulging out, or something 25 like that; is that the sort of thing you mean? Page 63
1 go from twelfth rib and then first lumbar, second, 2 third, fourth, fifth. And you think: well, I can work 3 out where these lumbar vertebrae are. But for example, 4 sometimes patients may only have 11 ribs and suddenly 5 you're out. And then there are variations in how the 6 lower lumbar vertebrae and first sacral vertebrae, how 7 they articulate or are they fused to each other. So it 8 is possible to miscount. It's less likely to happen in 9 the lumbar spine and the cervical spine. If one is 10 operating in the mid-thoracic spine -- 11 MR WHITFIELD: It's less likely in the cervical. 12 MR WIGFIELD: In the cervical spine, yes. Less likely in 13 the cervical spine and the lumbar spine and it's more 14 likely in the thoracic spine because it is harder to 15 accurately identify, reliably, in the thoracic spine. 16 Q. Right, and so what a wrong-level surgery is, is 17 conducting the sort of operation that we've been talking 18 about at the -- not at the level of the spine that the 19 surgeon had originally intended to operate on; is that 20 right? 21 MR WIGFIELD: That's correct and if one operated at the 22 wrong level and did not encounter the pathology one was 23 expecting to identify, then one would, you know, raise 24 a question, have a think, get more imaging, maybe 25 interoperative x-rays, have a double-check, ask Page 62	1 A. So that's the sort of thing, yes. 2 Q. Yes, so that -- you would have an expectation based on 3 the symptomology and the scan and when you open the 4 patient up, you might see something that looks different 5 and that should be, I think, a warning sign to you that 6 you may be at the wrong level; is that right? 7 A. That's correct. 8 Q. As far as -- another aspect that's come up of 9 significance to us is the question as to what happens 10 when you have had a discussion with a patient beforehand 11 and you've consented the patient and there's 12 an agreement as to what it is you're going to do. 13 Presumably in the scenario we're discussing, would be to 14 carry out, for example, a discectomy at a certain level 15 because that's what the patient understands from you is 16 the problem. What happens when the presentation is not 17 as you expect it to be in terms of what you feel you can 18 continue to do in the surgery? 19 A. So if one was expecting to undertake a discectomy, to 20 follow this example, and one approached the spine, did 21 the exposure, didn't find a disc, then one wouldn't do 22 a discectomy at what looks like a normal disc. One 23 wouldn't just do a discectomy because that's what we 24 said we were going to do, even though it's clearly not 25 causing any compression and isn't the target. One could Page 64

1 get further x-rays, double-check, get a colleague. One 2 might realise, at that stage, that one was at the wrong 3 level in the spine and, let's say for example, one was 4 one level too low, you could progress up one level and 5 do the exposure and ideally find the offending pathology 6 of the disc and then do the discectomy at that level. 7 And it would then be reasonable to have a conversation 8 with the patient that although we opened up the level 9 below, we didn't violate the disc, haven't done any 10 damage to that disc at all, we've preserved that, we 11 have done the operation at the -- we have ultimately 12 done the operation at the intended level. 13 Q. And would that possibility, which obviously happens 14 sometimes, need -- require, in accordance with 15 responsible practice, be discussed with the patient? 16 You'd say something like: what we are trying to do here 17 is we're trying to address the pain and we are -- 18 I can't say, at the moment, exactly what I will find 19 when you're opened up in the operating theatre, but what 20 I intend to do is to undertake an operation of this 21 nature based on what I find when I get in there. Is 22 that the sort of level of conversation that happens to 23 cover that eventuality. Because there would be little 24 point, I would imagine, in going through with a surgery, 25 not finding something at an exact level that had been Page 65	1 operations in this general area, if I could put it that 2 way, where there was an expectation that a certain 3 surgery would be done but, in fact, perhaps another 4 doctor has done a scan later on and it suggests there 5 has been no intervention at all, the phrase that's been 6 used is a "ghost surgery". In what sort of 7 circumstances could that come up and if that did happen, 8 ie there wasn't the intervention that the patient was 9 expecting, what would the responsible surgeon have to 10 say to the patient about what had happened in the 11 aftermath of the surgery? 12 A. So just to clarify, are you referring to the idea that 13 a patient has undergone surgery but the surgery has not 14 proceeded and the wound has been closed? Is that 15 what -- 16 Q. That is precisely the scenario, yes. And then it has 17 been discovered by some means later that although the 18 patient's expectation was that the operation had been 19 conducted as has been agreed, that in fact, it would 20 appear on imaging or something like that, that the 21 intervention had not occurred. 22 A. So one would expect the initial operating surgeon to 23 have had some duty of candour and discussion with the 24 patient as to why the procedure hadn't proceeded as 25 intended and I can think, for example, if a patient was Page 67
1 discussed and then closing the patient up and saying: we 2 didn't do anything else because there was an anomaly in 3 what we found. 4 A. So I think it partly depends on the -- with consent. So 5 it would be very typical practice to, when consenting to 6 a patient, to say there is the possibility of wrong 7 level surgery. There is the possibility we don't find 8 what we're going to find. And I think there is 9 a judgment as to how much surgery do you need to do to 10 try and find, let's say, offending pathology in terms of 11 the discs. 12 Now, there could be consequences from doing more 13 extensive surgery that one results in, potentially let's 14 say, destabilising the spine or you might put someone in 15 a scenario they need more extensive surgery than has 16 initially been planned. It would be rare to proceed to 17 something that the patient's not been consented to. But 18 it might be, for example, if one has to remove so much 19 of the anatomy of the spine that it becomes unstable, 20 then one might have to consider an additional procedure. 21 Q. Yes, because that would be outwith the bounds what have 22 the patient had consented to? 23 A. That's right. 24 Q. What about almost the opposite scenario where we've 25 heard about the possibility that there are some Page 66	1 anaesthetised and one was starting surgery and then 2 became, let's say, physiologically unstable from 3 an anaesthetic perspective, or had cardiac arrhythmias 4 or something that, from that perspective that we should 5 abandon this surgery, then it would be reasonable to 6 abandon the surgery. But one would expect 7 a conversation with the patient and their relatives 8 afterwards as to why it was abandoned and why it didn't 9 go ahead. There may be an interoperative incident where 10 one is encountering, for example, very rapid bleeding 11 before one actually gets down to where one wants to do 12 the surgery. One might, for example, be driven back. 13 But again, there would always be a post-operative 14 conversation as to why the surgery has not occurred. 15 I think it would certainly not be normal practice to 16 undertake an operation, not do the operation, close the 17 wound, not tell the patient about it, and for someone to 18 find out later that an operation hadn't been undertaken. 19 Q. Thank you. 20 A. There's a slight caveat, which may not be relevant to 21 the time period, is that there's an increasing use of 22 what we call endoscopic spine surgery which is spine 23 surgery done through truly minimally invasive, very, 24 very small sort of 6/7mm skin incisions and it is 25 possible for some surgeons to remove disc material Page 68

1 through an endoscope and radiologically, you really 2 can't see the surgical track or what's been done, but 3 one would usually expect to see offending material, the 4 disc material removed. 5 Q. Thank you. Was there an aspect of the earlier 6 conversation, Professor Whitfield, that you wanted to 7 add? I think it was something to do with imaging, 8 perhaps? 9 PROFESSOR WHITFIELD: It was. In the mid-1990s, we were 10 often doing lumbar disc surgery based on CT scans in the 11 on-call setting. It was quite difficult to get an MRI 12 scan even in a big hospital like Cambridge, to get 13 an MRI scan out -- 14 Q. Would an MRI scanner, at that time, have been in every 15 neurosurgical unit? 16 A. In the mid-'90s, yes. They came out in about '86, '87. 17 Q. Right, but the radiologists and the various other -- 18 A. Running it at night wasn't a uniform thing. 19 Q. Yes. So in the elective setting during the day, one 20 would have used an MRI scan, but -- 21 A. For most patients, not all, to be honest. 22 MR REDFERN: I think the mid-'90s -- we got ours in Swansea 23 in '94, '95. I had certainly been there two or 24 three years before we got to an MRI scanner. We had to 25 get volunteers to come and -- Page 69	1 please, Mr Wigfield? 2 MR WIGFIELD: So the aim of pre-operative marking is to 3 identify, with the patient before they're anaesthetised 4 the side of their symptoms, the side that they 5 understand and the surgeon understands is going to be 6 the target for surgery and to place an unambiguous mark 7 on the skin, so that it's visible, it doesn't get washed 8 off with any surgical spirit and it's to correctly 9 identify at least the side and the location that one is 10 going to be undertaking surgery. 11 In relation to spinal surgery it's quite important 12 if one is considering a handwritten note or indication 13 and it's been abbreviated, say, for "C spine", "C" being 14 cervical, but it could be misinterpreted as an L, which 15 might mean lumbar spine and you would want to confer 16 with the patient and your own notes and recollections 17 that you're operating on the neck, not the lumbar spine, 18 it's on the left, it's not the right and you want to 19 mark that with an indelible marker. 20 But that has evolved in more recent years and in the 21 last couple of decades, but I don't think there was any 22 standardised legislation or rules or even practice 23 saying: this must be done. 24 Q. Okay. In paragraph 39.1, you say: 25 "There was no standardised practice for Page 71
1 Q. I think, from a combination of what you're saying, the 2 position would be that there may be lots of hospitals 3 that don't have MRI scanners, but that's not the same as 4 saying that's the case for hospitals with neurosurgical 5 units. Neurosurgical units generally would have had one 6 in the period we're looking at; is that correct? 7 MR WIGFIELD: That is correct, would not necessarily be 8 running 24 hours a day. 9 MR DAWSON: Understood, thank you. 10 Sir, if that's a convenient moment. 11 THE CHAIR: Gentlemen, we'll take a break now and aim to 12 resume again in 15 minutes' time, thank you. Ms Miller 13 will show you to the witness room. 14 (11.52 am) 15 (A short break) 16 (12.09 pm) 17 THE CHAIR: Yes. 18 MR DAWSON: Thank you, sir. If I could pick up where I left 19 off with Mr Wigfield, just with some other questions in 20 relation to matters that are addressed in your sections 21 of the report about spinal surgery, that also appear to 22 be gaining some significance in our investigations. 23 You mention in your report, if we could look at 24 paragraph 39.1. You were asked a question about 25 pre-operative marking. Could you tell us what that is, Page 70	1 pre-operative marking in the United Kingdom prior to 2 1995. During the relevant period of 1995 -- 2015 there 3 was an increase in awareness of possibilities of wrong 4 patient, wrong site, wrong side and specifically 5 relevant to spinal surgery given multiple similar 6 structures of vertebrae and discs, wrong level surgery." 7 You've explained a little bit about how that might 8 happen already, but you mention the increasing awareness 9 of that. Given what you've said and given the potential 10 that things could be misinterpreted, misread, and the 11 potentially serious consequences, it does perhaps seem 12 to be something that would be a relatively easy thing to 13 do to prevent a potentially quite serious and 14 unnecessary negative outcome; would that be fair? 15 A. Yes. 16 Q. And the increasing awareness would be -- the increasing 17 awareness of that, that one could doing is quite simple 18 just so that everyone is clear as to where we're going 19 to be doing this operation, would it have been something 20 you would have expected people to do over this period to 21 avoid the negative outcomes that I'm referring to? 22 A. Certainly in my training, which was during this period, 23 yes, we would have been marking patients, so I think 24 that would have been a reasonable expectation. 25 Q. Another aspect which you mentioned when we were Page 72

1 discussing this before but I think just in passing, we 2 talked about imaging and I think you said that during 3 the course of a procedure, when we were talking about 4 the possibility of wrong-site surgery and there might be 5 a pathology that's not quite what one expected, I think 6 you referred to intraoperative x-rays; is that right? 7 A. Yes. 8 Q. What would be the purpose of getting an intraoperative 9 x-ray? 10 A. I would say there would be two stages to 11 an intraoperative x-ray. So first, the patient would be 12 asleep so they're officially part of the operation, 13 they're anaesthetised, and one would approximately 14 localise where one is going to be operating on the 15 spine. And you can imagine if a patient's relatively 16 large, got a lot of body fat, it might not be easy to 17 accurately identify where, for example in the lumbar 18 spine, one is intending to operate. So one might put 19 a marker or hold a rod up against the patient or put 20 a needle into the approximate area, take an x-ray to get 21 a rough idea that one is in the right field for surgery, 22 and one might adjust, for example a needle, several 23 times to line up to where one anticipates surgery is 24 going to undertake. 25 And then the second stage is really once the Page 73	1 difficult that one could operate on a wrong site, but in 2 that particular anatomical situation, what you're 3 telling us I think is that it is a risk which is greater 4 than one perhaps a layperson might expect? 5 A. It is a greater risk than one might expect. So if one 6 is saying -- historically, people will have heard of 7 cases of, you know the tragedy of the wrong kidney being 8 taken out, but there are only two and there is one on 9 the left and one on the right. But if you start looking 10 at vertebrae, if you include the sacral vertebrae, you 11 have 29 vertebrae and a lot of them look quite similar 12 in various areas. And as I alluded to earlier on, in 13 the thoracic spine, it gets particularly difficult. 14 Q. As far as the intraoperative, then, x-rays are 15 concerned, you mentioned, I think, in your report "image 16 intensifier fluoroscopy". Did you suggest that that was 17 something that came in a bit later? 18 A. Yes. So certainly when I started my neurosurgical 19 training, not even as a registrar level, but as a senior 20 house officer, so a very junior doctor, the level check 21 I did was very often taken with a portable x-ray machine 22 and an x-ray plate put aside the patient and an x-ray 23 would be taken and then that would have to go to the 24 radiology department and it would have to be developed 25 and somebody would come back with the x-ray and put it Page 75
1 surgical exposure, the retractors are in place, the 2 muscle has been moved to the side and one is now on to 3 the spine itself, the bony vertebrae, one would want to 4 take another x-ray, again, with an instrument attached 5 to or localised next to a recognisable anatomical 6 landmark that one can make reference to, from another 7 anatomical landmark if necessary, and take a check 8 image, either with an image intensifier, or an x-ray in 9 the earlier days, to confirm that one is where one 10 thinks one should be. 11 So with the best possible faith, one is operating 12 where one intended, at the level one intended and one is 13 has not drifted off. If one just took it from the first 14 initial sort of pre-incision x-ray where one would put 15 a needle in, it would be very easy, very easy indeed to 16 drift up one or two levels, particularly if a patient 17 a quite large, you can imagine a small change in angle 18 up at the level of the skin could result in someone 19 being several centimetres off at the depth of the spine. 20 Q. And just to be clear, as I understand it from what 21 you've been telling us, the need to check these things 22 is because one is working in a space where the various 23 different levels all look the same; is that right? 24 A. They could look very similar, yes. 25 Q. So in light of that, it might, to a layperson, seem Page 74	1 up on an x-ray display box and you might say: oh, that's 2 not the right level yet, we'll do another x-ray and the 3 whole process would be repeated. And it could take more 4 than many minutes, many tens of minutes, to end up in 5 the right sort of place. Now, the image intensifier in 6 fluoroscopy allowed a portable machine, it's slightly 7 different technology but produces a similar image to 8 an x-ray but produces it in realtime, so that speeds up 9 the process of gaining those images. 10 Q. Okay and in the period -- the relevant period we're 11 looking at here, it would be the x-ray period, would it? 12 A. So at the start it would have been x-ray, but I think 13 certainly towards the late 1990s, early 2000s, the image 14 intensifier would have been much more commonplace 15 but possibly 1995, 1996, it might have been just 16 an x-ray. 17 Q. I think, if I remember correctly, we were looking at 18 a document the other day in which there had been 19 investigation into issues that had arisen in relation to 20 a particular surgery and one of the outcomes that was 21 mentioned was the need to get -- I think it says 22 "an image intensifier", but I think it's what you were 23 talking about, in the unit, which suggested that perhaps 24 they didn't have it at that point. Could I ask 25 a slightly more general question arising from that Page 76

1 rather than the specifics of that situation, which is -- 2 we talked about MRIs, but as regards the availability of 3 certain equipment to be able to do things, I think 4 Mr Redfern told us earlier when the MRI unit arrived in 5 his unit in Swansea, if there is a situation where 6 a neurosurgeon thinks he requires certain equipment to 7 be able to deliver the best service, how does one go 8 about acquiring that at a given time? For example, if 9 you learn about some device or something that you could 10 use in surgery, by speaking to colleagues or at 11 a conference or something, how would you go about 12 actually procuring that so as to be able to benefit the 13 patients? 14 A. So typically, in today's environment and in the 15 mid-2000s onwards, one would have been creating 16 a business case. So one would talk to one's specialty 17 lead, department manager, the administrative managerial 18 side and one would try to create a business case. And 19 you would put forward the advantages of the technology, 20 the limitation of the current technology, one would 21 outline risks and potential benefits, what the 22 mitigation factors are and whether there was some way of 23 paying for the piece of technology to be brought into 24 the operating department or into the hospital. 25 Going back in time, very often these things were Page 77	1 Q. Thank you. One other aspect of the evidence you 2 provided I'd like to explore with you is at 3 paragraph 12.12 of the report, if we can go to that, 4 please. This was in the context of you having been 5 asked a question about any key developments relating to 6 spinal surgery in the period in which the Inquiry is 7 interested. And you have brought our attention, at this 8 paragraph, to something called "yellow flags" which 9 I think you've helpfully derived from some documentation 10 which exists within NHS Scotland. Could you tell us 11 what this is about? 12 A. So the yellow flags were really characteristics -- 13 I would say, largely characteristics of a patient or 14 their carers, but predominantly of patients, that might 15 be indicators of that the patient may not do as well 16 from whatever the intervention was, but predominantly, 17 say, spinal surgery as one might hope. And they're not 18 sort of related to direct, anatomical problems, 19 structural, physiological problems, but as the heading 20 says, they are psychosocial risk factors. 21 So if a patient believes that this is a highly risky 22 operation and they're unlikely to do well, they may not 23 do well. If they have little faith in their surgeon, 24 they may not do well. If they've had extended periods 25 of time off work and they need to get back to the Page 79
1 done on charitable donations and people would 2 historically do things like sponsored runs and pushing 3 hospital beds over a marathon distance and raising money 4 and you'd get a charitable purchase of a piece of 5 equipment. And that sounds very noble until the 6 equipment is broken and then you need a service contract 7 or it's outdated and the technology has been updated and 8 you now need a new one and there's no more charitable 9 funds for it. 10 But essentially, it comes down to a business case 11 and currently, one would ideally run that through your 12 hospital finance teams because they have to budget the 13 cost of it, the amortisation, the depreciation of it, 14 the renewal costs, the service charges, but one could 15 make a persuasive case. I think it's pretty rare that 16 any hospital is so flush with cash that they can just 17 write the cheque and buy it, but a persuasive business 18 case is usually what's required. 19 And some pieces of equipment are much more expensive 20 than others. So some items might be £1 million. Much, 21 much harder to get that into your department. Unless 22 somebody has really seen that the risk, the reputational 23 risk to the service, the risk to patients is so great 24 and the advantage so obviously outweighs it, that one 25 really ought to be purchasing this item. Page 78	1 workplace, they may not do so well. If return to work 2 cannot be phased, for example, and they can't get 3 a gradual return to work, there's an element of fear 4 that they don't go back to work because they can't 5 achieve it in a graduated way. 6 So there's a variety of psychosocial factors which 7 I think surgeons are now increasingly aware. It doesn't 8 mean that one wouldn't operate but one might understand 9 why an outcome may not be as good as one would hope for, 10 or expect. 11 Q. I see. And this, I think, is taken from a very recent 12 publication. Would these have been the sorts of things 13 that people would have taken -- a responsible surgeon 14 would be thinking about when deciding what to tell 15 a patient about the alternatives to treatment available, 16 in the period that we're interested in? 17 A. So I'd say between 1995 and 2005, almost certainly not. 18 Increasingly so, from 2005 onwards. And, as I said 19 before, it's not that it would dissuade someone from 20 undertaking an operation or offering an operation, but 21 one might think of other alternative treatments. So 22 I think it's very relevant for trying to address 23 patients' expectations. So spending a bit of time not 24 just talking about what's been -- what's the 25 presentation, what's the history, what's the Page 80

1 examination, what does the scan show, but spending some 2 time finding out about employment opportunities, 3 opportunities to modify one's job, what are the 4 consequences if one is off work for several weeks 5 or months recovering. I think these things are quite 6 important and increasingly, surgeons are paying 7 attention to that. But I think it may not have been, 8 you know, front and foremost of people's minds in the 9 1990s and early 2000s. 10 Q. Would it be fair to say that the approach to determining 11 what reasonable surgical options or non-surgical options 12 should be offered to a patient would be more of a sort 13 of standardised approach and less individualised, in the 14 period we're looking at? 15 A. I think it was certainly less individualised. So, as 16 I say, contemporary practice would be to tailor -- to 17 a certain extent, tailor an operation to patient 18 expectations, obviously within the limits of what can 19 realistically be delivered, but to take into account 20 other factors. Whereas, I think in the early period 21 that's relevant here we're thinking of surgeons might 22 offer one option. That's the surgery. 23 Q. Yes. 24 A. Less -- and perhaps less -- less attention to those 25 other psychosocial elements that are important. You Page 81	1 A. Well, absolutely, they're allowed to choose in what they 2 want to happen and that's easy to say to choose not to 3 have something done. I don't think a patient can choose 4 to make a surgeon do something that the surgeon does not 5 want to do or believe they can do or is not qualified to 6 do. There may be other surgeons that can do that and 7 it's reasonable for the patient to seek that opinion. 8 Q. Indeed. I wonder, Mr Redfern, whether you have any 9 reflections on that area more from the era, in terms of 10 decision-making around what surgeries might be offered 11 to an individual patient and whether the practice over 12 the period we're particularly interested in would be, as 13 Mr Wigfield has suggested, in the area of: well, that's 14 the surgery for this problem and there being less 15 consideration of the individualised circumstances, 16 attitudes or views of the patient? 17 MR REDFERN: I think we were very much of the time -- at 18 that time, that the patients were involved in the 19 decision-making process. The age of paternalism had 20 gone. So patients were involved, we would discuss what 21 the risks of a particular procedure were, what the 22 benefits were, what the alternative -- I mean, 23 I can't say whether I would have known that -- 24 I can't say now whether I can recall whether that was by 25 statute, but that was what the practice was, that you Page 83
1 know, these are things that are important to patients. 2 So the context of -- we call them sort of yellow flags 3 but, you know, the precursor to that were red flags. So 4 red flags are the sort of clinical emergency sort of 5 signs, things for clinicians to look out for, real 6 warning symptoms. And I want to make clear it's not 7 a gradual -- it's not a gradation, it's not a traffic 8 light system of green, yellow and red signs, degrees of 9 severity or urgency, it's just a constellation of 10 different factors that could influence how -- you know, 11 the outcomes from patients. 12 And I think a lot of the studies that led up to it 13 were assessments of patient outcome measures, looking at 14 various tools to say: well, are you back at work, can 15 you walk up a flight of stairs, how do you manage your 16 pain, what sort of painkillers are you still taking? 17 And trying to correlate that with people's activities, 18 their employment, sometimes it's educational status, it 19 might be understanding of the whole process that they've 20 been through could influence things. 21 Q. And indeed, just a patient's own preferences -- 22 A. Indeed. 23 Q. -- in the sense that, irrespective of those external 24 factors, a patient is allowed to choose what they want 25 to happen to their own body; isn't that right? Page 82	1 would have a frank discussion about what the risks of 2 a procedure were, what the benefits were, what the aims 3 of it were and what the risk, in terms of, say for 4 a straightforward lumbar discectomy, for radicular pain, 5 root pain referred down the leg, sciatica in common 6 parlance. About 15% of patients who have that 7 operation, you know would get a recurrent disc at the 8 same or an adjacent level. So you would warn that even 9 with a good result, there was still the potential for 10 further trouble. 11 So that discussion would be had in broad terms. But 12 the patient would be actively involved in the 13 decision-making process. 14 Q. So you would've expected that to have been something 15 done by a responsible surgeon over the period we're 16 looking at, yes? 17 A. It would have been routine. I did pass a little note 18 down while they were talking. I didn't have these 19 yellow flags in the time of my -- at the time in 20 question, but we did have things called Waddell signs. 21 These were actual physical warning signs to us as 22 clinicians that there may be psychological or functional 23 elements in the patient's presentation. Again, as 24 Crispin's just said, that wouldn't necessarily mean that 25 you wouldn't offer surgery, but it would be just a bit Page 84

1 of a warning sign to the surgeon that you need to be 2 careful to select -- about the patient selection that if 3 there was some doubt about it, you might try and find 4 a less invasive method. 5 The things I'm talking about with these Waddell 6 signs were, for example, people that had inappropriate 7 behaviour, excessive grimacing or language which was 8 overly flowery in terms of their description of their 9 symptoms. And there were a number of these. One 10 particular sign, if you tap on the patient's head they'd 11 wince. It cannot possibly cause any disruption in the 12 lumbar region to tap on someone's head, but it was 13 a well-recognised sign that -- so we would use those 14 sort of markers as a flag for trying to decide if the 15 patient had some of these factors which are referred to 16 in these yellow flags here, but it was another means of 17 approaching the same general problem. 18 Q. I see. As far as the practical realities of taking 19 a patient's consent, explaining these processes, making 20 these decisions, making these assessments and judgments 21 were concerned, in neurosurgery, as we've seen, the 22 situations that are presented often are quite serious 23 and of course, in any sort of surgery, one is -- 24 a patient is giving oneself over, effectively, to the 25 surgeon and the surgeon is conducting an intervention in Page 85	1 together with the patient and that was the consultant in 2 charge of that patient. 3 Q. Would it therefore be important, if I take it into 4 a situation where -- we've talked already in different 5 context about the process that would be gone through 6 from a -- you talked about the way in which a patient 7 might present in your unit, Mr Wigfield talked about the 8 sorts of investigations that might be done to work out 9 what was going on. And once one gets to this 10 decision-making process, would it be important for there 11 to be a direct consultation with a consultant to discuss 12 the options and the various potential risks of the 13 operation? 14 A. It wouldn't always be the case, I think, that the 15 consultant was the person who had that discussion, but 16 if it was going to be delegated, it would be delegated 17 to an individual, in other words a trainee who was 18 sufficiently experienced to be able to have that, and it 19 would be on the understanding that the consultant would 20 have had some contact with the patient to know that what 21 was being delegated was to someone that was able to have 22 that discussion and the reason why they were going to 23 have it. 24 Q. I see. 25 A. But to let a -- to let a patient come through the -- Page 87
1 someone's body that would, in other circumstances, be 2 deemed to be an assault. In light of that, what 3 particular importance should have been attached by 4 a surgeon to having individual -- direct contact with 5 a patient before surgery took place? I don't 6 necessarily mean on the day of surgery, but at any 7 period before surgery took place? 8 A. I mean in general terms, the contract between a patient 9 and the surgeon is one of -- is one of trust. That's -- 10 and the purpose is to try and improve the patient's 11 symptoms and as you say, it mustn't be an assault, it 12 must be an informed process with the patient having -- 13 ultimately, having the final say in -- if something is 14 going to go ahead, giving their consent to it. So in 15 general terms, that's what it is. But, yes, the surgeon 16 must have contact with the -- with that individual 17 patient beforehand. 18 Some of the process could be undertaken by a third 19 party, for example, a nurse practitioner or the 20 equivalent, it wouldn't have been nurse practitioners in 21 the early stage, but other staff would have been 22 involved in taking bloods and doing assessments, if you 23 like. But in terms of the actual decision-making 24 process, the person who was ultimately responsible for 25 that was the person whose name were on the notes Page 86	1 through that process without the surgeon who -- I have 2 used the term -- in medical practice, I think it may be 3 a legal word -- but who is "vicariously liable" for that 4 patient, then the consultant should know who is doing 5 what on his or her behalf. 6 Q. So I think what you're saying is there could be 7 delegation of that responsibility? 8 A. Yes. 9 Q. But it would be in circumstances where the consultant 10 had assured him or herself that the patient understood 11 the reason for that delegation, ie this is a person who 12 is going to be able to explain it to you fully? 13 A. Yes. 14 Q. And the consultant would have to satisfy themselves that 15 the patient was content with that? 16 A. Yes. 17 Q. I understand. 18 A. An example might be, in the emergency situation -- we've 19 talked about when we were on-call. You might get 20 a phone call from a senior trainee at 2 o'clock in the 21 morning to say that there is a patient in the casualty 22 that's been in a road accident and has an acute clot 23 between -- on the surface of the brain, a subdural -- 24 and that they are in a powerless neurological state. 25 You would know, from the way -- from your experience of Page 88

1 that trainee if they were capable of dealing with such 2 a scenario as they would describe and you would get 3 sufficient information from that. Under those 4 circumstances, then that would be an exception to what 5 I have just said. You wouldn't have been able to have 6 a conversation. But that's an emergency situation and 7 you can delegate on the basis that -- we assess our 8 trainees and we know what they're capable of. That 9 would be a reasonable process. 10 On the other hand, if someone comes in -- those 11 cases that you've been discussing previously, about 12 someone with back pain and leg pain, then those are 13 more -- those cases are far more amenable to you being 14 actively involved in the delegation. And you -- I don't 15 think I would ever have let people go through my service 16 without me being involved in the decision-making process 17 about any patient. Even though I might have delegated 18 the consenting process and the procedure itself to 19 a trained -- a responsible and appropriate trainee, 20 I would have been aware of that and would have discussed 21 with the patient, at least in some form or other, their 22 management. 23 Q. The reason for that, I think from what you said, is 24 because the consultant retains ultimate responsibility 25 for everything that happens to the patient; is that Page 89	1 Q. We've been looking at some systemic evidence, which 2 I'm not going to ask you about directly, but to do with 3 systems that exist in order to try to address any issues 4 that arise in that relationship, so if there are 5 tensions or difficulties, mechanisms which should exist 6 in systems, for example, for trainees to be able to 7 raise issues with the consultant or indeed, the other 8 way round. Is the importance of that relationship in 9 the delivery of the service to the patient the reason 10 why those services need to exist and need to function 11 well? 12 A. Yes, I mean, you can't -- you could not run 13 a neurosurgical service -- we're here to talk about 14 neurosurgery, but other surgical specialties I'm sure 15 would reiterate what I'm saying -- you can't run 16 a complex surgical specialty without reliance on other 17 staff. Ultimately, there has to be somebody who is 18 overseeing all that process and the way that it's set up 19 in the NHS is that that person is the consultant who is 20 responsible for that individual patient. 21 Part of that responsibility is not just to the 22 individual patient, but to the service as a whole, to 23 make sure that those staff interact well with each other 24 so that they can -- there is a degree of trust and 25 a degree of support and a degree of understanding that Page 91
1 right? 2 A. Yes. 3 Q. And it sounds, from what you're saying -- there's 4 another aspect that I'd just like to focus on there -- 5 it sounds like it's extremely important in 6 a neurosurgical unit, perhaps in particular, perhaps one 7 where a consultant is under a lot of pressure, as you 8 have pointed out, that there be a strong relationship 9 between the consultant and the trainees, is that right? 10 A. Yes. 11 Q. Because it sounds like there are situations where it 12 would be important to be able to make judgments at 13 a distance about what a trainee could reasonably be 14 expected to do and that involves a good knowledge of 15 that trainee's individual capabilities? 16 A. It's part of their process of learning because remember, 17 they're going to be the generation that are going to 18 have to take on the next set of trainees. So you need 19 to build a rapport for the trainee be able to observe 20 what they're able to do and to have an understanding, 21 more importantly, I think, than what the trainee is able 22 to do, what the trainee is not able to do and where you 23 need to offer more assistance. 24 Q. Understood. 25 A. So it's a two way process. Page 90	1 they can deliver safe care to patients. 2 Q. What you've told us there, perhaps looks at it from the 3 point of view of the consultant making judgments about 4 the trainee, but it needs to work the other way, doesn't 5 it, as well? It's important that the trainee feels 6 confidence in the consultant; isn't that right? 7 A. Of course, yes. 8 Q. And why is that? 9 A. Because the trainee is -- it's like a child that's 10 growing -- I mean, it's obviously far more than a child 11 that's growing but the analogy holds. They're trying to 12 build confidence in what they are doing. They're trying 13 to find -- pick their way through what's a delicate path 14 and the stakes are high if you get things wrong. 15 Q. Yes. 16 A. And so they need to be supported, by being reassured 17 that what they're doing is appropriate and correct, and 18 that the concerns that they have about their doubts, 19 about their own ability, are correct in as much as we 20 all have doubts. And they need to be reassured and 21 processes put in place to try and address those doubts 22 by -- just by experience. I'm not saying it's a fault 23 of the trainee, that's just the way things are. And 24 those trainees need to trust the consultants to give 25 them good guidance, "mentorship" is another word, to Page 92

1 help them in their development. 2 Q. Perhaps "support" is the word? 3 A. Support, support. Yes, "mentorship" is another word. 4 Q. This may be a very practical question but it's one of 5 some significance to us, you may all have experience or 6 a view to offer on this. When one is a consultant and 7 one gets new trainees, if you like, is one able to 8 choose what trainees one has attached to the 9 consultant's work? 10 A. At the time -- the situation has changed. So I'm going 11 to let them -- the contemporary consultants tell you 12 what happens now. But at the time in question, the 13 answer was "yes and no". The old firm, which we've 14 referred to in our report of the consultant and the 15 registrar and the SHO, that was a very 16 apprenticeship-type model, which my generation yearns 17 for and I suspect they too might to some extent. 18 Q. So would that gravitate towards the consultant being 19 able to choose the individual or not being able to 20 choose? 21 A. You couldn't actually choose. I mean, the unit would 22 appoint somebody and then they would rotate through. So 23 you wouldn't go there and say: right, this is going to 24 be my trainee for two years. They would deliberately 25 rotate through, for the reasons that were referred to Page 93	1 they were relatively junior trainee surgeons, very 2 similar to what you had in Swansea. I'm sure that was the 3 situation. And Aberdeen had a reciprocal arrangement 4 with Edinburgh. 5 Q. So, the Dundee trainees would be more junior? 6 A. Correct. 7 Q. Understood. 8 A. And the more senior trainees would be in Edinburgh once 9 they'd honed their skills in Dundee. 10 Q. Understood. 11 A. I think Dundee probably also had some of these locally 12 employed doctors which we've referred to, at registrar 13 level as well. And the advantage of the trainee going 14 to a small unit like that with three consultants is this 15 firm structure was not so rigid. So Dundee wouldn't 16 choose the trainee, the trainee would be allocated by 17 the training programme director. But when they get 18 there, they would be working for all three consultants 19 and that would probably mean they got into the operating 20 theatre most days so that they had really quite a rapid 21 gain in experience in that first 12 months and then 22 moved to Edinburgh -- sorry, then moved back to Glasgow 23 and then another junior trainee the next year would be 24 appointed. And I think that's how things were in 25 Dundee. Page 95
1 before, about going to different specialties to try -- 2 you'd spend six months on one firm, six months, other 3 firm and that firm might have a particular centre in 4 skull base tumours, the next firm might have a more 5 particular interest in, you know, complex spinal 6 conditions, another one may be in pain and the like. So 7 you would pick up there. You would still be involved in 8 the day-to-day running of on-call, looking after the 9 whole of the range of patients on the unit, but you 10 would be attached to a particular consultant for that 11 time. And the consultant wouldn't actually be able to 12 choose, there would be a rotation through. 13 That's how it used to be and that's how it was at 14 the time in question, that there was a rotation like 15 that. How it is now with EWTD and the numbers and 16 sometimes, you wouldn't -- it was coming in towards the 17 end of my career that you wouldn't know which SHO was 18 going to be working with you on any particular day, but 19 now -- 20 Q. Perhaps, Professor Whitfield, you can tell us if the 21 situation has changed? 22 PROFESSOR WHITFIELD: Yes, I could. I think the situation 23 in Dundee -- back then, I think Dundee was in a rotation 24 with Glasgow and I think trainees from Glasgow went to 25 Dundee early on in their registrar training. So I think Page 94	1 Q. Right, I wonder -- a hypothetical question, why -- as 2 you have answered a number of the questions, 3 Professor Whitfield, on this training side of things, 4 why might a consultant wish to have a higher level 5 trainee working under him or her? 6 A. It's a two-edge sword, but the sort of, if you like, the 7 benefit is you can delegate more work so that you are 8 less involved on the coalface and that might give you 9 more time for other activities, such as research. 10 Usually activities based within the parent hospital 11 rather than private practice because you've got to be 12 around and available, so you may be able to be in your 13 office doing an administrative work, research-type work, 14 writing a book, activities like this. 15 Q. It could also include things like medicolegal work, 16 possibly? 17 A. Possibly. I wouldn't have thought you'd be seeing your 18 patients in the NHS hospital for your medicolegal work 19 but you could perhaps be doing some report writing, yes. 20 Q. Well, you mentioned the private work, would it give you 21 more time to undertake private work? 22 A. I think that's a tricky one because you still have 23 a duty to be available. So if you're delegating or 24 you're entrusting your trainee to do surgery, you've 25 really still got to be around. Page 96

1 Q. So that, for example -- well, it could apply in any 2 situation but it might apply in particular in an on-call 3 situation, because my understanding -- please correct me 4 if I'm wrong -- is that if you're the consultant, it's 5 a consultant-led service as you've told us already, the 6 consultant is ultimately responsible and if that 7 consultant is on-call, that consultant needs to be 8 available even though the surgeon who is actually in the 9 hospital may be a more junior person, is that right? 10 A. That's correct. 11 Q. So the consultant needs to be contactable at all times? 12 A. That's correct. 13 Q. Yes. So theoretically, it shouldn't be the case that 14 having a more senior person makes any difference because 15 you should be available all the time; isn't that right? 16 A. Yes. 17 Q. I understand. One particular aspect in relation to 18 something you said earlier, Mr Redfern, and I want to 19 pick up on is something very particular. I wonder if 20 you could explain -- you mentioned, using the lay term 21 "sciatica", you gave a more accurate description as to 22 what a neurosurgeon would describe that as. Could you 23 explain how it is that if someone is seeing 24 a neurosurgeon in relation to a potential spinal 25 surgery, that it might be the case that it could be in Page 97	1 a foramen and as it's doing so, it's vulnerable to being 2 compressed. 3 People that experience sciatica, they may be 4 fortunate and have a scan -- an MRI scan done fairly 5 soon after the onset of the symptom -- the symptom tends 6 to come on fairly suddenly but it can be more gradual -- 7 and if they have that scan done fairly rapidly, you may 8 see a big bulge pushing against a nerve root and the 9 nerve root which is going to a particular part of the 10 leg. 11 Q. Rather than getting into the details of that, what 12 I'm trying to illustrate for wider purposes of 13 understanding what we're doing here. That's a helpful 14 description, but what I'm trying to illustrate is the 15 fact that neurosurgery deals with nerves; isn't that 16 right? 17 A. Yes. 18 Q. So this is an example of a situation where -- we were 19 talking with Mr Wigfield about spinal surgery, but that 20 might be a situation where, in fact, what you're trying 21 to do is relieve pain in a different part of the body; 22 is that right, Mr Wigfield? 23 MR WIGFIELD: Well, you might be trying to relieve pain that 24 is experienced or, as we say, radiates, so it's 25 a particular pain elsewhere. So down the leg, but the Page 99
1 connection with pain experienced at a different part of 2 the body than the spine? 3 MR REDFERN: I mean, the relevant part in terms of 4 a surgical indication is -- for the lumbar spine is the 5 leg. So there is a perception that back pain, which 6 is -- covers a multitude of different things and which 7 generally we've referred to as being in the lower lumbar 8 spine, that's back pain but of course it can refer to 9 the thoracic region, but the back pain may be amenable 10 to surgical treatment for the -- to all intents and 11 purposes, that isn't the case, back pain is not 12 an indication for -- in the main, for surgical treatment 13 and it's doomed to failure. 14 Surgery for lumbar disc disease is not going to 15 help -- generally, is not going to help back pain 16 although some people who have back pain and leg pain, if 17 their leg pain is relieved then the back pain, due to 18 the associated spasm, may reduce as a secondary 19 phenomenon. 20 So the pain that I referred to as sciatica is 21 referred pain down the leg. Crispin referred to the 22 disc pushing on the nerve root. We don't have a diagram 23 up here, but where the disc bulges out, the nerve -- 24 that's close to where the nerve is exiting or leaving 25 the spine, and passing through a little hole we call Page 98	1 operation -- the offending pathology might be located in 2 the spine. I'd just like to qualify things a little bit 3 in that people can get very obsessed with the spine and 4 the MRI scan and that's the answer to the problem, 5 depending on what people might see, but those nerves 6 that exit the lumbar spine, they then enter the pelvis 7 and they cross over a bit like a railway junction and 8 you have those nerves are within the pelvis. And 9 irritation from other pathologies within the pelvis 10 could cause similar symptoms. So I've seen a scan 11 literally just two days ago of a patient where the focus 12 is all about their spine and the previous spine surgery 13 and the degenerative changes on the spine, but what 14 no one has identified yet because the scan has not been 15 formally reported because it's hot off the press this 16 patient has a very large, pelvic, gynaecological cyst 17 that is almost certainly accounting for their symptoms 18 and can give them back pain and leg pain and weakness. 19 And that patient doesn't need to see a neurosurgeon; 20 they need to see a gynaecologist. So that report will 21 be very important when it comes out from the 22 radiologist, but we can do something proactively. 23 Q. Are you, there, trying to point out that it's important, 24 when you're a neurosurgeon or in any medical field, not 25 to assume that when you see something on a MRI scan with Page 100

1 a disc bulge or something like that and you have what 2 might appear to be pain that could be associated with 3 that being the cause, not to exclude the possibility 4 that there might not be something else which isn't 5 limited to what the neurosurgeon deals with? 6 A. Yes. So it's important to have your wide-angle lens and 7 your telephoto zoom lens, as it were. 8 Q. Yes. Anybody else coming in there? No. Thank you. 9 I wonder if, Professor Whitfield, if I might ask you 10 some questions related more to the intracranial side, as 11 I have done with Mr Wigfield in relation to the spinal 12 side. But before doing so, there's a few just general 13 questions -- 14 MR REDFERN: I do apologise. As you're moving on, I did 15 want to emphasise something which I think may be helpful 16 to you. 17 Q. Absolutely, please go ahead. 18 A. When I was giving my rather long-winded explanation as 19 to the pathophysiology of this disease, what I wanted to 20 say was that patient that came in acutely and had the 21 MRI scan, the scan may show what's a pathology that 22 correlates with the sciatica. That, of itself, is not 23 an indication for surgical treatment because about 70% 24 of those patients that have an acute lumbar disc with 25 MRI scans which correlate with the clinical features, Page 101	1 Q. Thank you. Is that consistent, Mr Wigfield -- 2 MR WIGFIELD: Yes, it is. 3 Q. -- with what you were counselling against, if you like? 4 A. Yes. 5 Q. Thank you. So, Professor Whitfield, I want to get on to 6 ask you some questions about the intracranial side, but 7 before doing so, I'd like to ask you a few very general 8 questions about words that one encounters -- we 9 encountered some of them here -- just to understand what 10 they are. One of the things that you at some different 11 times people have mentioned is something called skull 12 base surgery. I wonder if you could tell us what that 13 is, but in particular reflecting whether that is 14 a particular specialty that someone might have or that's 15 something which exists within a wider range of 16 intracranial surgical specialty? 17 PROFESSOR WHITFIELD: Sure. So the brain is enclosed within 18 the skull and the skull has got a vault, which is 19 sometimes called the calvaria and it has got a floor 20 which the brain pretty much rests on and that floor is 21 called the skull base and because the face is in the 22 way, it's quite difficult to access. 23 So we have anterior skull base, so this is the front 24 half of that floor of the skull and we see some tumours 25 around there, meningiomas are quite common tumours in Page 103
1 70% of those patients will settle down with no treatment 2 at all. So it does not follow, in the same way that it 3 doesn't follow that the patient with a mass in their 4 pelvis necessarily needs a spinal operation, it doesn't 5 mean even if there is a pathology demonstrated on the 6 MRI scan which correlates with the symptoms, that 7 surgery is the answer. It may be that a conservative 8 approach is. There are more things that will define 9 whether you will operate acutely or not, one of them 10 might be, for example, the patient has neurological 11 deficit, foot drop, weakness. But if it's just pain, 12 then the treatment may be far more appropriate just to 13 wait and see because most of those patients will settle 14 down. 15 Furthermore, there may also be cases where you can 16 see a pathology at that level -- at a particular level 17 in the spine and yet again, there is another explanation 18 for the patient's pain. For example, it could be coming 19 from one of the joints in the back rather than from the 20 disc. So it should not be a knee-jerk reaction that 21 because there's a radiological change on an MRI scan, 22 that that means that the patient must have a surgical 23 operation. More often than not, they shouldn't have 24 an operation. I just wanted to emphasise that, that 25 there needs to be judgment. Page 102	1 that area, pituitary gland tumours in the anterior skull 2 base and certainly, in the relevant period, specialism 3 in pituitary surgery was the norm. The meningiomas in 4 the anterior skull base, most cranial surgeons would 5 undertake. It wasn't particularly specialised. 6 The lateral skull base is around a bone -- the 7 temporal bone is in this area here by the ear and the 8 temporal bone has a pyramidal projection inwards called 9 the petrous bone and the petrous bone is rock hard and 10 it contains the nerves of hearing and balance. And you 11 can get tumours arising particularly from the balance 12 nerve called a vestibular schwannoma. It often gets 13 called an acoustic neuroma but it is actually, 14 technically a vestibular schwannoma but it typically 15 presents with hearing loss in one ear. And that is 16 definitely an area of specialism and throughout the 17 whole relevant period that would be an area of 18 specialism. And those tumours, generally they're 19 approached from behind the ear, sometimes through the 20 bone of the ear itself, often -- usually in a team basis 21 with an ENT surgeon. 22 The first five years of the relevant period quite 23 a lot of those tumours would be operated on solely by 24 a neurosurgeon from the more posterior approach. 25 Q. Right. So I think what you're telling us -- I should Page 104

1 say for the benefit of those who will be able to have 2 a look at the report, I think all of the terms that you 3 have used there are defined with a great deal more 4 precision. I won't go through them all but there are 5 definitions there and that's all part of the evidence 6 that the Chair and everyone will have available to them. 7 I think what you are saying is that there are, in 8 this area, where one a looking at tumours and the 9 excision or treatment of tumours, there are certain 10 tumours that would be able to be managed because of 11 their position and type and complexity by a general 12 intracranial surgeon and there are others because of 13 their complexity, perhaps rarity, you would need to have 14 someone particularly specialist to deal with them, is 15 that right? 16 A. That's right. 17 Q. And is -- the decision-making, Mr Redfern talked earlier 18 on about the importance within the context of the type 19 of hospital he worked in but in a general sense this 20 must apply across the board, it's an important part of 21 a neurosurgeon's job to be able to make a good judgment 22 as to whether this is something that you can handle, if 23 you like, or this is something that would require 24 a particular specialist to get involved in; is that 25 correct? Page 105	1 was developed in animal models. But basically, if you 2 can imagine you've got your brain like a football and 3 somewhere in that football there is a tumour which is 4 the size of a marble. And you need to work out, as 5 a surgeon, how can I get to this marble which is in 6 a fixed position inside this football? And the 7 stereotactical concept uses three planes; the front-back 8 plane, the left-right plane, and the up-and-down plane. 9 And you can attach a frame to the patient's head and you 10 can then take scans and you can work out, from the 11 frame, how far backwards, forwards, left, right, and up 12 and down from the exact centre of that frame your marble 13 is. And you can get coordinates and it will tell you 14 how many millimetres, left/right, front/back or up and 15 down to target. And that enables you to essentially put 16 a needle accurately -- and by "accurately", I'm talking 17 about around about a 1mm accuracy -- into that marble 18 and that's the principle behind the destructive 19 lesioning type surgery we mentioned earlier for 20 Parkinson's, of getting your probe into the correct 21 place. 22 Q. Right. So is the stereotactic surgery all of what 23 you've described there or just the process of locating 24 the marble in the football? 25 A. It's the process of locating it. Things have moved on Page 107
1 A. It is. Clinical judgment is really important but 2 there's another white elephant in the room perhaps, in 3 that Dundee was a small unit. I think around the 4 relevant period there were discussions about the 5 unification of neurosurgery in one central unit in 6 Scotland. So this would make the smaller units worry 7 about their existence and that could potentially have 8 caused a reluctance to cross-refer patients to Edinburgh 9 or Glasgow. 10 Q. Would the motivation behind that be to try to show: no, 11 we can still deal with everything here; it's still 12 a great service that we're offering? 13 A. Yes. 14 Q. Thank you. Again, that relates to what Mr Redfern 15 I think told us earlier about the limits and knowing 16 when to refer but you're saying if there is a threat 17 like that, that judgment may be impinged upon by that 18 additional factor which wouldn't normally exist, is 19 that -- 20 A. It may influence it. 21 Q. Right, thank you. Another phrase that one sees in the 22 material that you've provided is "stereotactic surgery", 23 I wonder if you could tell us what that is? 24 A. Yes, so stereotactic surgery has been around -- well, 25 over 100 years ago the concept of stereotactic surgery Page 106	1 a bit, so you can actually now do it with almost as much 2 accuracy, perhaps not for some targets, but without 3 using a frame. And in the operating theatre, you have 4 cameras that look at the patient's head, the camera and 5 the computer knows the patient's 3D MRI interpretation 6 and it can tell you where your instrument is in relation 7 to the pre-op scans. That's called "frameless" and that 8 was -- it first came out in about 1993/4 and it's the 9 workhorse of neurosurgery. We use it for almost every 10 operation nowadays. 11 Q. Right, and so this -- your stereotactic surgery, the 12 frameless surgery, this was all the sort of thing that 13 was being used over the period that we're talking about? 14 A. Oh definitely, yeah. 15 Q. Okay, thank you. 16 A. The frameless in Dundee probably came in around -- it 17 came in, in Aberdeen when I moved there in 2000 and 18 Dundee probably was in a similar sort of time era. 19 Q. Right, and when you say "came in", was it -- 20 A. Someone will have introduced it. 21 Q. So does it involve equipment becoming available as well 22 as someone being able to offer it as a service? 23 A. Even back then, it was over £100,000 worth of equipment. 24 Q. Yes, and we had a conversation about that earlier with 25 Mr Wigfield. One other phrase one sees that we may have Page 108

1 touched upon in other answers is "neuro-oncology". What 2 is that? 3 A. That essentially is brain tumours. And brain tumours 4 are divided into tumours growing from within the brain 5 substance, we call those intrinsic tumours and tumours 6 growing from structures around the brain such as 7 a vestibular schwannoma I mentioned earlier, and the 8 meningioma which grows from the lining of the skull. 9 The intrinsic tumours are commonly called gliomas and 10 they're commonly given grades of severity, with grade 1 11 being the most benign-like. I use that term carefully. 12 And grade 4 being a rapidly aggressive malignant tumour. 13 Grades 1 and 2 traditionally were considered to be at 14 the benign end of the spectrum but it's well-recognised 15 that they can transform into a more aggressive type. So 16 it's not like a benign tumour of the skin which once 17 it's gone, it's gone, you've got to apply long-term 18 follow-up to these patients. 19 Q. And probably some questions I'll ask you in this 20 section -- and we'll break shortly for lunch, but after 21 lunch, which have a wider implication across all of the 22 neurosurgery, but I'm asking them to you in this sense 23 and if others wish to contribute to other particular 24 aspects, feel free to do so. 25 When a patient is undergoing neurosurgery, if we Page 109	1 I understand it -- please correct me, you know much 2 better than me -- that the awake surgery enables the 3 surgical team to be able to monitor the function of the 4 patient which might give an indication as to whether the 5 brain tissue is being impinged upon in a way that wasn't 6 intended; is that correct? 7 A. What it does, it minimises unwanted collateral damage 8 and that damage could cause loss of function. 9 Q. Right. As I understand it -- again, please correct me 10 if I have got the wrong end of the stick here -- what 11 one can focus on, in terms of the particular 12 neurological function, is the type of function that is 13 controlled by the area of the brain where one is. So if 14 one is in a part of the brain to do with speech, if the 15 speech starts to become slurred or something, that might 16 indicate there's peripheral damage occurring which one 17 would wish to stop would that be accurate? 18 A. That is accurate. 19 Q. Right, and just in terms of -- as you've told us 20 helpfully this might have been offered in Dundee at the 21 time? 22 A. Do you know, I'm sitting here thinking it must have been 23 because there was a functional practice for Parkinson's 24 Disease and I have talked about how you can target the 25 little target, the marble, with the probe, but Page 111
1 have it just in the intracranial sphere just now, is the 2 patient always anaesthetised? 3 A. No, in the relevant period most patients would be 4 anaesthetised. 5 Q. And the anaesthetic would be a -- 6 A. General anaesthetic, so they'd be asleep. But in the 7 last 15 years or thereabouts we've started doing 8 procedures where we wake patients up during the 9 procedure and nowadays we don't put a tube down their 10 throat at the beginning. They're heavily sedated with 11 something that reversing quite rapidly, so we can wake 12 up and have a conversation and check their neurosurgical 13 function. That's actually not a new concept. It was 14 practised in the 1940s and 50s before anaesthesia was 15 quite advanced. I don't honestly know if awake surgery 16 was done in Dundee in the relevant period. 17 Q. Yes, that's precisely what I was going to ask you. But 18 it might have been because it was around at that time? 19 A. It might have been, yes. 20 Q. And as I understand it, you mentioned neurological 21 function, the advantage of that is that if, for example, 22 one is trying to excise a tumour or something like that, 23 what one is trying to do is to take away a certain 24 amount of tissue but there's considerable risk that one 25 might impinge upon brain tissue unintentionally, and as Page 110	1 I'm pretty sure some functional surgeons were also doing 2 what was called -- so that's an anatomical location -- 3 were doing physiological stimulation to see what effect 4 sending a little electric current down the probe had. 5 So I'm pretty sure patients would have been woken up for 6 that type of procedure. Bob might have a bit more from 7 your experience in Liverpool on that. 8 MR REDFERN: Yes, I actually wrote a paper and I did my 9 history on the history of stereotactic surgery and what 10 has just been said is absolutely right. You did 11 anatomical localisation which was using the external 12 frame but using internal landmarks related to that frame 13 with ventriculography, and then you did physiological 14 targeting which involved stimulation and you'd see if 15 the patient got a twitch. Because some of the lesions 16 were very close to -- it's technical, but a structure 17 called the internal capsule. Some of the targets for 18 thalamotomy for Parkinson's are right adjacent to that 19 internal capsule. And you could predict from atlases 20 the percentage chance that you -- with a particular 21 point related to your internal landmarks on the scan -- 22 on the radiology, not a scan were within the thalamus, 23 but that only gave you an anatomical probability, you 24 had to be certain, physiologically, which meant that 25 they had to be awake to be stimulated. So yes, that was Page 112

1 certainly the case. 2 Q. And am I correct in understanding that the importance of 3 trying to locate a tumour, locating the marble in the 4 football if you like, is to ensure that one is 5 conducting an operation in the right area, is that 6 right? 7 A. Yes. 8 Q. And are these techniques associated with a desire to try 9 to use surgery which is as minimally invasive to the 10 patient as possible? So you're talking about probes 11 being sent in from outside, it would make it more 12 difficult to understand where the marble is in a surgery 13 like that, so one has to have a mechanism to locate 14 where the probe has to go; have I got that right? 15 PROFESSOR WHITFIELD: You have. Some tumours, intrinsic 16 tumours, so these are the brain tumours, during the 17 first part of the relevant period, if you had a frontal 18 intrinsic tumour, quite a lot of surgeons would do what 19 is called a frontal lobectomy so they'd actually remove 20 quite a big piece of brain rather than just the tumour. 21 So the precision for that sort of surgery was not so 22 intense. 23 Q. Right, and in order to access that big bit of brain, one 24 might be taking out, would one have to effectively 25 access the brain in a different fashion? Page 113	1 look at the scans and you would go in with your own 3D 2 model you've created as a surgeon in your brain, and you 3 would make a bigger window of access to be sure you can 4 find the tumour. It can be a bit like looking for 5 a needle in a haystack, particularly with small tumours. 6 Q. I was going to ask in relation to this, when you're 7 presumably trying to excise the tumour, take the tumour 8 away, is that the principle of what you're trying to do? 9 A. Yes. 10 Q. And you mentioned a probe being used. What is that, 11 what's the function of that? 12 A. Okay, the probe would be for either for damaging the 13 brain in a Parkinson's type situation. 14 Q. Understood. 15 A. Or it has a hole in the end and you could take a sample 16 of the tumour, called a biopsy. 17 Q. But as far as the process that you would undertake to 18 remove the tumour itself, how does that work -- 19 A. We would not use a probe for that. 20 Q. Yes. How would you do that? 21 A. Okay, so you would go in, you would see the convolutions 22 of the brain on the surface. You make a decision 23 whether you go through the apex of a convolution, or you 24 go through the valley next. And that differs from one 25 patient to another, one tumour to another, it doesn't Page 115
1 A. Not really. It's pretty much the same way. There's two 2 ways. The head -- or the skull isn't designed for easy 3 access and we can make burr holes, which is essentially 4 a hole the size of a fingernail, about 10, 11mm across, 5 and that's a useful size for putting a probe into the 6 brain, putting a tube into the fluid spaces, or washing 7 out a liquid haematoma on the surface of the brain. 8 The bigger operation is to make a window in the 9 skull where you usually make anything from one to four 10 burr holes, dot-to-dot, connect them up with a kind of 11 Gigli saw type of apparatus, jigsaw type of apparatus, 12 lift the bone out, do your operation, put the bone back 13 in at the end and hold it together with little 14 Meccano-like plates. That's called a craniotomy. And 15 so for the bigger operations, you do a bigger hole, but 16 it's the same principle. 17 Q. And would I be right in thinking one would always prefer 18 to try to do the smallest incision one can, or make the 19 smallest hole one can and it would only be in 20 circumstances where it was necessary to take away 21 a larger part of the skull, that one would do, the 22 craniotomy? 23 A. Yes, although back in the 1990s the precise equipment 24 that we've talked about, the stereotactic frame, would 25 not be used for accessing most brain tumours. You would Page 114	1 really matter. You work out, using the scans, how deep 2 in you're expecting to find the tumour and you carefully 3 split the brain. We don't normally use a knife, we use 4 a sort of coagulation instrument, a little thin tube 5 called a sucker, and the nerve fibres kind of split 6 apart a bit like a jelly or a blancmange splitting. 7 Until you've seen it, it's a difficult concept to put 8 across. And then you will -- then, hopefully, you will 9 get to the tumour and you'll recognise the tissue 10 doesn't look like normal brain. 11 So the normal brain surface has a yellow-ish look. 12 The actual cortex where the nerve cells is, is grey, and 13 then the nerve fibres are beneath that and they're 14 actually quite white, really quite a bright white, 15 yellowy white colour. And most tumours are grey or 16 pink, they look different, and you'd recognise the 17 pathology. 18 Different people then, how they resect a tumour 19 differ. My preference is to try to develop, under the 20 microscope -- so it's not like a little lab microscope, 21 this is a great big machine. I'm usually standing, 22 sometimes I will sit, I'm looking down like a pair of 23 binoculars working underneath and the microscope, it 24 gives me some magnification but what it really gives me 25 is illumination. Nothing gets in the way. My head is Page 116

1 not in the way of the theatre light, so I can see 2 superbly well. And then you're separating the surface 3 of the tumour from the brain. And it's a bit akin to 4 a baked potato. So, you go around the outside of the 5 baked potato as far as you comfortably can, then you 6 open up the tumour -- the baked potato -- and you use 7 a suction type instrument. Nowadays, we use one that 8 also emits ultrasound beams, so it shatters the tissue 9 and suctions it. And you core out some of that baked 10 potato and then the baked potato, you can fold in a bit 11 more and go a bit further around, a bit further around. 12 And you do that until you've taken out the tumour. And 13 that might take you an hour, it might take you 14 six hours, depending on what's near you, what dangerous 15 structures. 16 You should always have a kind of a risk strategy of 17 what structures am I near, what blood vessels am I near, 18 how am I going to avoid them. And nowadays, which 19 wasn't the case then but, you know, looking forward, in 20 the last couple of years we've had the capacity with MRI 21 scans to draw the nerve fibre tracks around the tumour. 22 So if I know vision is near that tumour, using the MRI 23 scans, I can see whether it's on the deep side or on the 24 near side and choose a corridor of access, a route to 25 the tumour, that minimises the chance of me causing Page 117	1 keep matters regular, we do ask you don't discuss 2 evidence outwith your number while on that break. And 3 as I say, we'll aim to start again at 2.15. 4 MR WHITFIELD: Thank you. 5 MR WIGFIELD: Thank you. 6 MR REDFERN: Thank you. 7 (1.20 pm) 8 (The short adjournment) 9 (2.23 pm) 10 THE CHAIR: Good afternoon. Mr Dawson, when you're ready. 11 MR DAWSON: Thank you, sir. I will return, 12 Professor Whitfield, to the questions I was asking you 13 about the intracranial side of things. Before I do so, 14 there's one aspect I'll go to the expert on spinal 15 surgery about. 16 I think we touched on this -- you mentioned it, 17 I think, very briefly and I meant to follow it up with 18 you. We were talking largely about disc decompression 19 and one thing I think you mentioned -- I think, in 20 particular, you have a particular interest in this is 21 cervical disc replacement; is that right? 22 MR WIGFIELD: Yes, that's correct. 23 Q. Were you involved in a project about it or something 24 like that? 25 A. So I did a lot of my doctorate research on development Page 119
1 collateral damage to those important nerve tracks. 2 Q. Okay. So the process we described earlier with the 3 probe, is that diagnostic to try and work out what's 4 going on? 5 A. The biopsy is diagnostic but we don't do a biopsy in big 6 tumours, we go straight to the tumour and resect it. 7 But if we have a small tumour that's deep and we think 8 the risk of collateral damage is high, we would simply 9 do a biopsy, take a sample. 10 Q. In order to ...? 11 A. In order to then guide the next phase of care which will 12 probably be radiotherapy and chemotherapy if it's 13 a malignant tumour and no resection. 14 Q. So you wouldn't do a resection in that type of 15 situation? 16 A. Not normally. We make a decision, nowadays at an MDT, 17 a multidisciplinary team meeting, as to whether or not 18 to try and resect or whether to do a biopsy. And 19 resection may be incomplete. 20 MR DAWSON: Understood, thank you. 21 Sir, that would be a convenient moment. 22 THE CHAIR: All right, gentlemen, we're going to break now 23 for lunch and we'll aim to start again at 2.15. It's 24 a slightly longer break than before. Because the three 25 of you are in the middle of giving your evidence, to Page 118	1 of a disc replacement and the biomechanics, how the body 2 responds when a disc replacement, specifically for the 3 neck vertebrae, is in place. 4 Q. Yes. Well, there's a more general question I was going 5 to ask you in this context I think has arisen out of the 6 discussions we had earlier about spinal surgery, which 7 is you mentioned, in relation to our discussions about 8 wrong-site surgery, that there are anatomical reasons 9 why it's possible that one might think one is operating 10 at a certain part of the spine but is in fact not. And 11 I think in the context of those discussions, you 12 mentioned, I think, at one stage Professor Whitfield 13 interjected to say something along these lines, that 14 certain aspects of spinal surgery would be different 15 depending which level of the spine one was working at, 16 if I can put it that way. 17 Are there, in broad terms, very significant 18 differences depending on which part of the spine the 19 operation is going on in, and if so, what are those 20 broader differences? 21 A. Can you just clarify, what sort of surgery are we 22 referring to here? 23 Q. Well, if it pertains -- if the answer would be relevant 24 only to certain types of surgery, then please say so, 25 but I'm interested in the general area of the disc Page 120

1 decompression, or disc-type operations. But if there's 2 a broader answer, I would be interested to know that 3 too. 4 A. Well, if we focus first on lumbar spine decompressions 5 and discectomies, they would very traditionally 6 typically be approached through the posterior spine, 7 from the back towards the front. So it's a posterior 8 approach, navigating past the nerves and the lining 9 around those nerves, the dural or the thecal sac, around 10 the lumbar spine to access the disc. It's quite unusual 11 to have to do any anterior surgery on the lumbar spine, 12 coming from the front, though that can be done by 13 surgeons trained in suitable complex spine or 14 reconstructive procedures, but there are operations when 15 people do take the discs out from the front spine, 16 anterior lumbar discectomy. And that's typically 17 combined with instrumentation stabilisation to the 18 spine. It is a very different approach because you're 19 coming through the abdomen and moving past pelvic 20 contents and you have very large blood vessels or 21 aortic, iliac veins, iliac arteries. So the anatomy is 22 very different, it's not a common operation. 23 If one moves up to the cervical spine and thinks of 24 discectomies, that's very typically done from the front 25 of the neck. It's different -- access, yes, there are Page 121	1 Q. Right. So do I take it to mean then that the 2 differences -- there are perhaps anatomical differences 3 in the ability to count, based on landmarks, you said, 4 which would be different in different areas of the 5 spine; is that correct? 6 A. That's correct. 7 Q. And I think the difference that you're trying to 8 highlight is, based on it being done in different parts 9 of the spine, there might be different routes of entry 10 for the surgeon which would bring with them different 11 complications, is that right? 12 A. Yes. 13 Q. Thank you very much, that's very helpful. And on the 14 subject of disc replacement, I suppose what 15 I'm interested in trying to find out is in what sort of 16 circumstances one would contemplate doing a disc 17 replacement as opposed to other operations, 18 decompression we've talked about, fusion, something like 19 that? 20 A. So I'd say there's still quite a lot of debate, not 21 heated controversy but still a lot of debate about when 22 one would undertake a disc replacement in particularly 23 cervical spine. So the theoretical benefit is to 24 preserve motion at that level in the spine, so that 25 might be more normal if you still have a more mobile Page 123
1 different vascular structures in the way, but it is much 2 more accessible and I'd say a very routine operation for 3 a lot of neurosurgeons and spinal surgeons coming from 4 the front of the neck. And for those operations it's 5 usually fairly straightforward to be at the correct 6 level because of the intraoperative check x-ray that one 7 would take and there are relevant bony landmarks that 8 you can count down the vertebrae and you've only got 9 seven cervical vertebrae to count through, so you're 10 unlikely to lose count. 11 Slightly different if you do a posterior cervical 12 spine or neck operation, in that the anatomy of those -- 13 what you can see of the anatomy often overlaps, one 14 level overlaps the next level, which overlaps the next 15 level. So that may be more prone to ending up at the 16 right level. So one still has to be very careful about 17 counting and identifying levels, but an anterior 18 approach to the cervical spine very common, something 19 that all of us would do. 20 An anterior approach to the lumbar spine even 21 I don't do because that's concentrated in expertise in 22 a very few people. So in our unit -- or in my unit in 23 Bristol we've consolidated that expertise in about two 24 surgeons who do that and I'm not part of that group but 25 I have an understanding of why it's done. Page 122	1 neck. Some of the arguments behind that would be 2 historically, if one had undertaken a traditional fusion 3 of the vertebrae then the remaining mobile vertebrae and 4 discs have to take up the range of movement and they can 5 get wear and tear and radiologically, one may see 6 advanced or more accelerated changes of wear and tear. 7 So there's a theoretical benefit, if you could preserve 8 movement then you don't get the next level wearing out 9 so fast. And I think some of the controversy and debate 10 really stems from the evidence behind that. 11 So certainly when I was doing my research, there was 12 a feeling people were operating on one level and then 13 a couple of years later having to come in and operate on 14 the next level and then a couple years after that, 15 operate on the third level. But that's not necessarily 16 borne out always in people's practice. And the idea of 17 preserving motion with a disc replacement is quite 18 appealing, but I think it's unproven that it makes 19 a very long-term difference in patient outcome. 20 Probably the biggest predictor of adjacent level 21 degenerative change is pre-existing adjacent level 22 degenerative change, so if that's already started, my 23 view is that a disc replacement doesn't really change 24 the natural history of it. 25 But there certainly has been an enthusiasm and Page 124

1 I would have been part of that enthusiastic crowd late 2 '90s, early 2000s, mid-2000s onwards, where a disc 3 replacement theory is quite an interesting concept. It 4 might be technically more challenging to accurately 5 place one, not in terms of getting the wrong level, but 6 to locate it perfectly in the disc space so that 7 functions biomechanically in the right sort of way and 8 doesn't produce any abnormal movement or unintended 9 consequences. 10 Q. I'm not sure whether it applies here but I'll try and 11 insert these questions here. You say there was a sort 12 of fad for it for a particular period. Is that -- would 13 that then be classed as something that was sort of 14 cutting edge, or new, or novel, that only certain people 15 were doing or was it something generally tried by some 16 people? 17 A. So I think it was new, it was novel, it was more cutting 18 edge in the yeah, turn of the century. And there were 19 not many devices around that were being investigated. 20 I think there was quite a large expanse in the 21 manufactures and the number of devices that were 22 developed. And I would say currently not a strange, 23 esoteric operation. So there will be a lot of people in 24 the United Kingdom who will be offered cervical disc 25 replacements versus a traditional fusion operation, for Page 125	1 alternative option. One would probably have to explain 2 if there was a change in the surgical approach or 3 technique or whether there were any additional hazards 4 or potential complications down the line that one might 5 have to look out for. 6 One might have to have a discussion about different 7 anatomical approaches, different techniques, how big the 8 wound was going to be, how long the operation might be, 9 whether that would make a material difference to the 10 patient, if they had to be under anaesthesia for longer. 11 One would also have a discussion about why a particular 12 technique would be recommended. 13 Q. Are there always extra risks inherent in using devices 14 or screws or whatever that you wouldn't have in other 15 surgery? 16 A. Well, there are always risks with effectively foreign 17 material that gets implanted, artificial material. It's 18 not biological, doesn't integrate with the bone, will it 19 have a long-term consequence in the body, is it more 20 susceptible to be a longer-term source of infection 21 because if it gets colonised by bacteria and gets 22 infected, it doesn't have its own blood supply to fight 23 that infection. Mechanical devices like screws and 24 rods, they can fail, they can break over time. 25 So if one is attempting to attempt a fusion and Page 127
1 example, after a cervical discectomy. Whether it makes 2 a long-term difference is quite debatable. I think 3 short-term there are certainly reports that patients 4 feel they have a good range of movement still. If they 5 have less post-operative pain, they may theoretically 6 get back to work a bit sooner. But it's certainly not 7 an outlandish concept now. 8 Q. Thank you. There are two more general concepts that 9 I'd like to explore, not necessarily just related to the 10 types of operations we've been talking about in the 11 spine, but more generally, so the others may have 12 a contribution to make as well. The first is -- these 13 are both matters of relevance to the sorts of things 14 that we're looking at in this Inquiry. The first 15 relates to circumstances in which one is using 16 particular devices, such as the ones that you've 17 mentioned in any aspect of neurosurgery. Are there 18 particular considerations related to technique and 19 consent, relating to operations involving devices as 20 opposed to ones that do not? 21 A. So if -- certainly, if one is undertaking an operation 22 where there is going to be an implant, a device, 23 a screw, a rod, a disc replacement, that would certainly 24 be addressed with the patient. One would have to 25 explain the reasons for that versus any other Page 126	1 you're putting screws and rods in, the idea is to get to 2 a point of fusion quicker, but you can't forget that you 3 need biological fusion, so you need bone graft to 4 solidly take and form a proper fusion. So the implant 5 in itself is not enough. There would be concerns 6 whether the implant gets loose, what it could do to the 7 surrounding bone. If loosens out of the bone, could it 8 cause problems to neurological structures. There would 9 be risks about how one inserts the device and the 10 hazards of -- is there a hazard to -- for example, the 11 spinal cord, if one is putting a screw into a vertebra, 12 navigating a few millimetres away from a spinal cord. 13 So there are different risks that would have to be 14 discussed, but there might also be advantages that you 15 want to explain it to a patient as to why you might have 16 a different techniques. So in terms of spinal screws 17 and rods, it can provide stability to the spine where 18 one has been operating which might allow you to do 19 a more extensive decompression or operation or have 20 better access to a tumour, for example, because you've 21 taken more of the natural vertebrae away, but therefore 22 left the spine a bit vulnerable to instability. So 23 there may be good justification for why one would use 24 an approach but I think that should be discussed 25 carefully with the patient. Page 128

1 Q. Thank you. And Professor Whitfield, are there any 2 particular ramifications of that sort of thing with 3 regard to intracranial surgery, or do the same 4 considerations apply? 5 PROFESSOR WHITFIELD: Intracranially the main concern is 6 infection actually and an infected implant -- so that 7 might be a titanium implant for a craniotomy, where 8 a piece of bone has been removed for some reason, or 9 a shunt which is a drainage system. So these sorts of 10 hardware, the commonest complication is infection. And 11 if you get an infected implant, you have to remove it, 12 basically. Antibiotics won't resolve it. 13 Q. Thank you. If I could go back to Mr Wigfield, again, 14 another general topic arising are out of this area is 15 what particular considerations apply -- similar sorts of 16 considerations when one is using what might be deemed to 17 be a novel or even experimental process in neurosurgery? 18 MR WIGFIELD: So I think you have to decide is it a novel 19 device or is it a novel technique in your hospital? So 20 it might be well established technology, well 21 established techniques in the country or the world, but 22 one might find you are the first surgeon in your 23 particular unit undertaking the procedure. And I think 24 it would be reasonable, certainly important to explain 25 to patients that this is established technology but Page 129	1 A. That's correct and I think the use of novel devices or 2 in experimental situations or researches or trials has 3 probably changed quite a bit over the last two decades 4 or so. And it would be reasonable to say there's now, 5 much, much more demand for manufacturers of devices to 6 insist on getting longer-term outcome data as in sort of 7 what's happening five years down the line or maybe 8 ten years down the line, rather than just the minimal 9 two years down the line. I think that was not 10 necessarily the case in the sort of early or mid-1990s, 11 where devices had to be proved it had been made to 12 a certain standards, that it was sterile, that it could 13 withstand the forces that were going to be put upon it. 14 And there's probably much more liberty then in how it 15 was used. 16 Q. Okay, because one area that we've come across in the 17 Inquiry pertaining to situations where devices are used, 18 and/or where there's novelty, when things go wrong, for 19 a lot of the reasons you've discussed, a device not 20 being biological, the fear they have in some way been 21 experimented on, can result in people having 22 considerable suspicions as to whether, in fact, the 23 novelty and/or the device have been the reason why 24 something has gone wrong in their case. That 25 presumably, is why you've said that there needs to be Page 131
1 you're one of the earliest patients that we're using 2 this device on, you would want to reassure them that 3 you've been appropriately trained or that there are 4 appropriate safeguards in place. 5 There's a different concept whether it's completely 6 novel: we've never done this before, we think it might 7 be a good idea and we're going to make this up as we go 8 along. And that's again, different from an experiment 9 where it really ought to be part of a trial and have 10 a research ethics committee and then you have to explain 11 to patients that: we are keen to do this trial, there is 12 a research protocol for it. You would probably 13 randomise to one arm of the trial, or it might be 14 an observational study: we are going to see how you get 15 on. But patients would have to be informed about what's 16 the reasonable alternative and not compelled to take 17 part in that. So there is a difference whether 18 something is novel or experimental and one might have to 19 fine-tune the interpretation of that. 20 Q. I suppose those two things we have discussed in general 21 terms may collide, if you like, because it could be 22 novelty because you're using a different device and then 23 that would add extra complexity because both of these 24 aspects do seem to add complex to decision-making? Is 25 that right? Page 130	1 considerable clarity with people as to what the proposal 2 is, how novel it is, what experience in training you 3 have, so that one can be satisfied in these situations 4 that the patient understands and consents to all the 5 different components of it; would that be fair? 6 A. That's absolutely right. 7 Q. Thank you, that's very helpful. Again, 8 Professor Whitfield, is there anything to add to that 9 from an intracranial perspective? 10 PROFESSOR WHITFIELD: No, I think as a clinician you want to 11 know the device is licensed for the use you're utilising 12 it for. My experience has always been not right at the 13 cutting face, of being the first person to use a device, 14 and getting approval from your trust, if you're 15 introducing something completely novel, would be 16 an important step. 17 Q. That would be an ethical approval or something like 18 that? 19 A. I think it's not necessarily -- it's not an ethics 20 committee, that's really for a research thing, but if 21 you're introducing something that's novel but 22 established, it's something where the medical director 23 should be aware -- 24 Q. I think we discussed earlier the medical director, 25 I think Mr Redfern told us, would be the route by which Page 132

1 you would get access to such devices and things anyway, 2 but there should also be a discussion if it's novel, 3 you're telling us, to make sure the medical director is 4 happy with that course? 5 A. Yes. 6 Q. And I wondered, Mr Redfern, whether in these areas, the 7 use of devices, using novel techniques, are these the 8 sorts of things that one would expect to be happening -- 9 you explained earlier the sort of hierarchy of the 10 different types of units and there being a general unit 11 and there being certain things that you, in your 12 hospital, would have referred on to more specialist 13 people. Are these the sorts of things that would take 14 place in a general unit like the one you worked in? 15 MR REDFERN: Yes, you might start new techniques. With 16 regards to the cervical disc replacement, just to give, 17 by way of balance for you to perhaps understand how the 18 process works with the new technology, what was 19 explained was that the potential benefits, there are -- 20 there was a school of thought which was, you know, be 21 not the first by whom the new is tried, nor yet the last 22 to cast the old aside. So we were taught, if you like, 23 a certain caution about having new technology. But the 24 potential benefits of cervical disc replacement, as has 25 just been explained, in terms of maintaining mobility Page 133	1 had the added risk. 2 So those balancing factors would need to be 3 considered before a new technology was accepted. In 4 those in whom it was going to be accepted, then you'd 5 need to go to -- in my hospital, the way to do it was 6 through an ethics committee, but it was effectively like 7 getting approval for a new technique. When I started 8 there was a condition called -- a procedure which is 9 called automated lumbar percutaneous discectomy and 10 there, you introduced a probe, which had a little 11 guillotine on the end and a chamber, directly into the 12 disc. And the idea was then that the patient wouldn't 13 have -- do you remember this procedure? 14 PROFESSOR WHITFIELD: I don't. 15 MR REDFERN: The patient would not then have an insertion in 16 the back, just a probe put down, radiologically put into 17 the disc. Of course, if there was a fragment of the 18 disc that had come out that had breached the membrane 19 around the disc, that wouldn't be amenable. But the 20 idea was that if you reduced the bulk of disc within the 21 disc space then things would settle down in a much more 22 satisfactory fashion than with -- as a minimum invasive 23 procedure. I did a number of those but I did it in 24 collaboration with -- having discussed it with -- not 25 just the patients themselves, as this being a new Page 135
1 were seen to be self-evident but some of the early 2 studies showed, first of all, there was no particular 3 clinical benefit in terms of the pain relief. So the 4 pain relief, in terms of arm symptoms or what have you, 5 was actually no better. All you're doing is -- you're 6 still doing the decompression, but you're looking for 7 the longer-term effect. 8 So the initial benefit would be no different, and 9 there were concerns that if things went wrong, if 10 these -- if they did get infected or if they became -- 11 subsequently became immobile, then revision surgery 12 might be more complex and furthermore -- and I think 13 I'm borne out by the facts, that over time, a number of 14 these mobile cervical disc replacements did seize up and 15 become fused. 16 MR WIGFIELD: Absolutely, so a lot of them did fuse so one 17 can argue it's just a delayed fusion with a more 18 expensive device in quite a lot of cases. That's not 19 uniformly the case. 20 MR REDFERN: No, no. I think -- when I last went to the 21 cervical spine research meeting, I think the figure was 22 something like 85% were still mobile at five years. 23 That means 15% have fused up within that time. So, in 24 effect, there has actually been no patient benefit at 25 all from that, but there has the risk that -- they have Page 134	1 procedure, but with my colleagues throughout the 2 hospital to make sure that they understood that this 3 wasn't a bit of an experimental thing and there was 4 back-up. 5 So I think the idea is if you're using a new 6 procedure, that you don't just turn up with this piece 7 of kit and start doing it. It needs to be done in 8 collaboration with your colleagues who know why you are 9 doing it, who don't think you're a rogue. And you need 10 to discuss it with patients to say what the benefit of 11 this might be and what the disadvantages might be. 12 Q. Thank you. Just a couple of spinal things before I move 13 back to Professor Whitfield. One matter you were asked 14 about, Mr Wigfield, in your spinal section was connected 15 to degenerative disc disease and I think you told us in 16 the report that this isn't, in fact, a disease at all; 17 is that right? 18 MR WIGFIELD: That is right, I think it's a misnomer. It's 19 very commonly referred to as degenerative disc disease, 20 but what one is observing are wear and tear changes, 21 that's a consequence of aging, that's a consequence of 22 us being a bi-ped mammal that chooses to walk around on 23 a planet with this gravitational pull. This is what we 24 see. This is not a disease, this is a degenerative wear 25 and tear age-related process. That's very different Page 136

1 from: oh, this is a tumour, this is an infection, this 2 is a fracture. That's very different but it provides 3 a concept that there's a process that will make you ill. 4 Q. And would it, despite the ideas that you've just put 5 forward, be wrong to think that that only happens in 6 older, elderly people? 7 A. No, you can see degenerative changes in younger patients 8 and it's a continuous sort of process. So sometimes we 9 do see patients who, for example, are in their early 10 20s, and one might look at a scan and say: well, that 11 looks rather more advanced wear and tear, degenerative 12 changes than you'd normally see in a 20-year-old. Now, 13 it might be different if they have a different 14 pathological process underlying that. So if, for 15 example, a patient had an inflammatory spine condition 16 such as ankylosing spondylitis, one might see these 17 changes, but it's not degenerative disc disease then, 18 it's ankylosing spondylitis, a different thing. People 19 will have reported scans and they say things like "black 20 disc disease". Well, what does that mean? On certain 21 sequences for an MRI scan in a healthy young patient, 22 the discs might look bright white and if they have 23 dehydration and degenerative changes, the discs lose 24 that bright whiteness and they appear darker or grey or 25 black and yet somebody has chosen to label it as "black Page 137	1 root. And when neurosurgeons get involved is if there 2 is compression on the cauda equina that requires 3 surgical intervention or decompression. And that might 4 more commonly be a disc -- a large disc prolapse that 5 has caused compression on those nerve roots in an acute 6 fashion and is causing rapid deterioration. It could be 7 a more gradual process where there's an ageing process 8 and more wear and tear and narrowing around the lumbar 9 spine. And you get narrowing around the lumbar spine 10 and it causes compression around the cauda 11 equina rootlets. 12 As I pointed out, cauda equina syndrome is 13 a constellation of symptoms and there are other 14 non-surgical causes for cauda equina syndrome. And when 15 patients are referred with possible cauda 16 equina syndrome, the imperative is to establish 17 a diagnosis or to exclude a surgical remediable cause, 18 so that's typically nowadays with an urgent MRI scan. 19 But it's not uncommon for patients to present with 20 the constellation of symptoms that make up cauda 21 equina syndrome and have a pristine spine on imaging and 22 no compression. And people might scratch their heads 23 and say: well, I wonder what's going on. And there are 24 other conditions, so there are inflammatory conditions, 25 there are infective conditions, there's -- commonly Page 139
1 disc disease" because of what it looks like on a scan. 2 And it's not necessarily helpful because it creates 3 a catastrophising scenario. 4 Q. One further matter that you helped us with in the report 5 that I just ask for you to tell us a bit about and tell 6 us what sort of issues one experiences with this sort of 7 condition is cauda equina. Could you tell us what that 8 is and whether that is particularly complex and what the 9 sort of complications that can be associated with it 10 are? 11 A. Well, that's quite a big subject. 12 Q. Yes, I was rather worried that it might be. 13 A. So, the cauda equina is the anatomical description for 14 the lumbar nerve roots as they pass through the lumbar 15 spine, meaning it looks like a horse's tail, and that's 16 contained within the lining, the meninges or the thecal 17 sac around the lumbar spine. So that is the cauda 18 equina. Cauda equina syndrome is a constellation of 19 symptoms that can include bladder disturbance, pain down 20 one or both legs, bilateral sciatica, maybe back pain, 21 possibly numbness in, or loss of sensation in the groin. 22 Loss of sexual function or sensation, potentially loss 23 of continence of bladder or bowel in the extreme. 24 So it's a constellation of symptoms that are 25 associated with dysfunction of the cauda equina nerve Page 138	1 herpes simplex virus can cause inflammation/dysfunction 2 of the nerve roots. So there are other things that 3 cause cauda equina syndrome than just a nerve root 4 compression that needs an operation. 5 THE CHAIR: Whatever the cause, is it always an emergency 6 situation if somebody presents at a hospital with 7 symptoms consistent with the syndrome? 8 MR WIGFIELD: So it's an emergency if it has got a treatable 9 remediable cause. So if one could see obviously a large 10 disc or someone has a spontaneous bleed and there's 11 a big blood clot for some reason pressing on the nerve 12 roots and it matches the symptoms and the history, then 13 one would want to get on and treat that urgently. But 14 if someone has a pristine scan and they still have the 15 symptoms, then the investigation: well, what else could 16 be going on or what is treatable, is much, much less 17 clear. 18 THE CHAIR: And more complicated? 19 MR WIGFIELD: And more complicated and probably not in the 20 domain of a neurosurgeon. 21 MR DAWSON: Thank you. Professor Whitfield, back to our 22 discussion earlier in relation to matters of assistance 23 to us in the intracranial field. You told us about the 24 methods by which one might probe or open up the head for 25 surgery. As far as sort of putting everything back Page 140

1 together at the end is concerned, could you run us 2 through the various procedures that might be involved in 3 that related to the various techniques of opening things 4 up that you talked about earlier? 5 PROFESSOR WHITFIELD: Sure. So we've kind of got two main 6 openings, up high on the head, the craniotomy window. 7 Low down here at the base of the brain is access to 8 an area called the posterior fossa and the opening 9 technique there often involves removal of bone which 10 doesn't get replaced. Nowadays, I think most surgeons 11 do put the bone back, but during the relevant period, 12 I think a lot of surgeons would choose not to. And the 13 reason for that is the intracranial contents can get 14 swollen from your operation and there isn't much room 15 for them to swell at the back. So if you leave the bone 16 off, there's a bit more room for swelling. If the brain 17 swells and it's not got nowhere to go, it will press on 18 the brain stem and cause very rapid, serious loss of 19 consciousness. So often in the posterior fossa approach 20 is infratentorial, they're often called, the bone may 21 have been left out. 22 However, between the bone and the brain is the bone 23 call the dura which lines the skull and the dura retains 24 the brain fluid inside the cranial cavity. Now, we 25 actually have, at any one moment in a normal patient, Page 141	1 Sometimes we will use the patient's own tissue. My 2 preference up the top for sure is to use tissue from the 3 scalp and to just use that as -- we call it 4 an autologous graft and stitch it in place and often 5 seal it with some glue. 6 At the back, the access to that tissue is not 7 actually as good, the tissue at the back is not quite as 8 suitable, so it's more common to use a graft. There are 9 a number of different grafts, but they're analogous to 10 putting a patch of Gore-Tex in, basically. A lot of the 11 grafts need stitching, suturing, some of the grafts you 12 can apply and compress for a few minutes and they have 13 a kind of self-welding chemical reaction to seal them. 14 Most surgeons would use some sort of dural sealant, 15 which is a synthetic type glue or a fibrin-based glue 16 which is derived from human tissues to supplant that and 17 try to make the closure watertight. And that -- very 18 commonly done throughout the whole of my career. 19 Q. I think one of the things that you addressed in the 20 statement which -- you may have mentioned these things 21 was -- you mentioned there a glue which was involved in 22 stitching things up or part of stitching things up at 23 the end of the surgery. There was another type of glue 24 I think that you addressed at a point in the report, or 25 something that we understood to be called a glue, which Page 143
1 about 75mls of spinal fluid, CSF, inside the head. We 2 actually make a pint a day, 500mls roughly, and it 3 circulates around and gets absorbed into a vein. But we 4 have a concern when we're closing the head, that CSF may 5 leak to the outside, and if CSF can leak to the outside 6 microbes, organisms can get inside and cause 7 intracranial infection. So particularly at the back of 8 the head we try to put a waterproof type layer to 9 protect the brain from CSF leak. 10 Supratentorially, is higher up. It's not quite so 11 important to have a watertight leak because when the 12 patient is walking around, the pressure in the fluid is 13 not straining your repair and so it's much less likely 14 to get a leak up top. 15 The dura is a thin membrane, it's like -- it's 16 thicker than clingfilm but thinner than a piece of 17 leather and we open that up normally, close it. But in 18 opening it up, it can be quite vascular and that might 19 necessitate us to coagulate with heat to stop bleeding 20 and that causes shrinkage. So when you're closing up at 21 the end, often it's not a very good fit and there's gaps 22 between your stitches. Up here, doesn't really matter. 23 Down the back, we're not so keen on that because of the 24 risk of CSF leak. 25 So we often use a thing called a dural substitute. Page 142	1 was more to do with the coagulation side of things. 2 I think you probably mentioned both of those already, 3 but just to understand that those are different things, 4 is that right? 5 A. They are different things. 6 Q. Yes. One is involved in sealing up after the surgery 7 and one is to do with trying to help the blood 8 coagulate? 9 A. No, it's actually -- it is to try and help seal. It's 10 called "TISSEEL", so tissue seal, is a common type of 11 that glue. So there is a separate, similar 12 item "FLOSEAL", which is trying to establish -- trying 13 to cause coagulation in blood vessels. And that's used 14 to assist with control of haemorrhage. 15 Q. Thank you. Something we've seen in quite a lot of notes 16 is that at the end of the operation there will be a note 17 saying the incision was "closed in the usual fashion"? 18 A. Yeah. 19 Q. Is that a normal thing to write in a note? 20 A. Yes, I personally normally write "the incision was 21 closed in anatomical layers" and I interpret what you've 22 said as a very similar thing. So the scalp has five 23 layers. They spell the word "scalp": skin, close 24 connective tissue, then a layer called aponeurosis, 25 a layer called loose connective tissue and then a layer Page 144

1 called pericranium and we normally would close, with 2 sutures, the aponeurotic layer and the actual skin 3 itself. Most of us use staples on the skin and 4 essentially close it in two layers. At the back here, 5 there is a lot more muscle so you'll find -- your 6 incision, you're about 5 centimetres in to get to the 7 base of skull when you're going through the back and you 8 would have sutures in the muscle layer and then it's 9 called the fascia, it's a tendinous layer over the top 10 of the muscle and then perhaps a subcutaneous fat and 11 then the skin. But to write "closed in usual fashion", 12 "closed in layers" would be pretty normal language. 13 Q. Does that just mean closed in the way that that 14 particular surgeon would normally close the wound? 15 A. Yes, I think it does. Yes. 16 Q. I think you've told us that there are different ways of 17 doing it but presumably people use their own techniques 18 dependent on the area -- 19 A. I think they're similar. I don't think there would be 20 much variation in the techniques from one surgeon to 21 another. 22 Q. Thank you. You've mentioned a couple of times 23 cerebrospinal fluid. 24 A. Yes. 25 Q. Could you tell us what that is and in the intracranial Page 145	1 Functions it serves. First of all, one of them is 2 protective. I can remember going to a lecture as 3 a medical student where a neurosurgeon had a washing up 4 bowl and a football and the washing up bowl contained 5 water and he banged the bowl and the ball just gently 6 bobbed across because the cerebrospinal fluid cushioned 7 the impact. He then threw the water across the lectern, 8 across the stage in front of him and then dramatically 9 made it look like a pinball machine, with the ball 10 bouncing around. 11 So one of the functions is protection of the brain. 12 It's also almost certainly involved in the movement of 13 nutrients into and out of brain cells. The brain is 14 reliant on oxygen and glucose for its energy. It has -- 15 you know, the brain is this big, and it requires as much 16 energy as the rest of the body put together, more or 17 less. And that high energy transfer into the brain for 18 brain function, the cerebrospinal fluid is almost 19 certainly involved in that process. There's a kind of 20 barrier between the brain and the blood called the 21 blood-brain barrier, which is also quite an important 22 concept in how the brain gets its nutrition. 23 Q. You mention, I think in the report, the possibility that 24 cerebrospinal fluid may leak and that that would be 25 something that a neurosurgeon might get involved in Page 147
1 sense, its significance? 2 A. Yes. So there's about 500 millilitres made per day, 3 20 mls an hour. It's made within the brain in 4 reservoirs called ventricles and there are two lateral 5 ventricles on each side. They intercommunicate via 6 a small channel called the foramen of Monro, a Scottish 7 anatomist, to the third ventricle. There's one third 8 ventricle and that's in the midline. And then that 9 communicates through a narrow channel called the 10 aqueduct of Sylvius to a structure called the fourth 11 ventricle which lies immediately behind the brain stem, 12 it's still within brain substance. And the fourth 13 ventricle has three small apertures and the fluid flows 14 through those and goes into a layer around the brain and 15 the spinal cord. 16 And I think the best analogy is to imagine the brain 17 the spinal cord wrapped in clingfilm and the spinal 18 fluid is in the layer between the clingfilm and the 19 brain and that's called the subarachnoid space. So the 20 fluid flows around in that area and it gets absorbed 21 into a big vein at the top of the head. So there's 22 a continuous, low-volume flow of this fluid from its 23 site of manufacture in the brain, around the brain and 24 up to the sagittal sinus is the name of the blood 25 vessel. Page 146	1 doing something about. What sort of circumstances would 2 pertain where that arises? 3 A. Yes. Well, you can get spontaneous leakage and you can 4 get post-operative leakages. So if we deal with 5 post-operative leakage, you've had an operation for 6 a brain tumour, perhaps, or an aneurysm and that fluid 7 can leak through the wound externally and that's not 8 good because there's a high risk of developing 9 an intracranial infection. And essentially, the leak -- 10 ultimately, you need a technique to allow the leak to 11 heal and repair itself, or you have to go in to repair 12 the leak. 13 One technique to accelerate the leakage is to put in 14 a plastic tube, a silastic tube into the lumbar spine 15 region, called a lumbar drain, drain the CSF, the 16 cerebrospinal fluid, through that drain into a closed 17 circuit, collect it, and it takes the pressure off the 18 intracranial wound to allow it to heal without leakage 19 of fluids. So that's commonly done, inserting a lumbar 20 drain, quite common after an acoustic neuroma operation, 21 for example, where CSF leak rates are in the low 22 percentages rather than very rare. They happen every 23 20, 30 cases, something like that. 24 Spontaneous CSF leaks, trauma is a big precipitant 25 and you can get a dural tear, usually as a result of Page 148

1 a skull fracture. And the fluid can leak into the 2 sinuses, air spaces in the bone around the skull and 3 drip out of the nose. It can also -- there's 4 a connection between the bone of the ear and the back of 5 the throat and it then -- CSF, with a fracture of that 6 bone, the petrous bone, can appear at the back of the 7 throat after trauma. 8 So those patients who have had skull base fractures, 9 we normally give them a vaccine against pneumococcus, 10 which is a particular organism that has quite a high 11 incidence of causing meningitis after a traumatic CSF 12 leak. 13 And usually we wait a few days and most leaks stop 14 spontaneously but sometimes they need to have a repair 15 done. That repair, early on in the relevant period, 16 would often require imaging to try and identify where 17 the leak is. Sometimes with quite complex imaging, a CT 18 myelogram, where you're injecting a contrast, a dye into 19 the spinal fluid of the lumbar spine, tip the patient up 20 so that the dye goes into the intracranial 21 compartment -- this is all done by a radiologist -- and 22 then they try and identify the leak site. So you, as 23 a surgeon, know where to target your operation. 24 And those operations, nowadays, are much more 25 commonly done up the nose with these little telescopes Page 149	1 some significance. Do neurosurgeons get involved in 2 dealing with epilepsy? 3 A. Yes, they do. This is usually the same neurosurgeons 4 who do functional surgery that we talked about, so it's 5 a branch of functional surgery. I should say my 6 experience of epilepsy surgery is minimal. 7 Q. So just in a high level then, in principle, what would 8 a surgeon be able to do to help someone with epilepsy? 9 A. I think there's two aspects. If the epilepsy is due to 10 a lesion such as a tumour or a blood vessel abnormality 11 such as a cavernoma, removing the abnormal lesion. And 12 that's something I do and other surgeons will do and 13 you've got a pretty good chance of significantly 14 improving the epilepsy, either no seizures or much less 15 frequent and less severe seizures. So that's very 16 commonly done, that's sometimes called a lesionectomy. 17 You then have patients who have had investigations, 18 EEGs, and sometimes an open procedure measuring their 19 brain activity with electrodes on the brain and you're 20 trying to identify a physiological focus of origin for 21 the epilepsy. So with the lesionectomy you can see 22 an anatomical problem. In this other group of patients, 23 you're not finding an anatomical problem but you're 24 trying to find a physiological origin. And that might 25 be targeted by a receptive type procedure, a temporal Page 151
1 called endoscopes but in the relevant period it wouldn't 2 be uncommon to do quite a big craniotomy at the front, 3 take some tissue from the patient's thigh called fascia 4 and lay that across the anterior cranial fossa, the 5 floor of the skull, to try to prevent a leak. 6 Q. Right. So if we're thinking about cases involving 7 cerebrospinal fluid leak, we should be thinking about 8 infection. Should we also be thinking about the 9 possibility that the leak may be minimising the 10 cushioning effect that you described that the fluid 11 would have? 12 A. That's not such an issue because the patient is in 13 hospital and they're not particularly vulnerable to 14 trauma. The people we see, it's not so much CSF leak 15 but we see patients with atrophy, loss of brain volume. 16 Alcoholics are the commonest example where the brain has 17 actually got a lot of room to rattle around potentially 18 and they're more prone to getting trauma. 19 THE CHAIR: Presumably the body will continue to produce 20 this fluid, notwithstanding a leak? 21 PROFESSOR WHITFIELD: It does seem to continue, yes. 22 I can't think of any condition where cessation of CSF 23 production produces a disease. 24 MR DAWSON: Another area -- just to run through a couple of 25 the areas that you told us something about that may have Page 150	1 lobe resection, and a more advance form of that called 2 a selective amygdalohippocampectomy might be performed, 3 where you're resecting the medial part of temporal lobe, 4 but you need to have the backing of your 5 neurophysiologist. That is the problem before you go 6 ahead with that type of surgery. 7 There's another branch to that -- 8 Q. Was that second part, would that be in the functional 9 area then? 10 A. Yes, absolutely. 11 Q. Understood. Carry on, please. 12 A. The third aspect is a procedure to try to stop the 13 propagation of seizures. So a seizure occurs when the 14 telephone exchange that is the brain has a problem in 15 part of it and it sends electrical chaos everywhere. 16 And sometimes you can stop the spread of that electrical 17 chaos by targeting different parts of the brain and 18 resecting or causing a lesion in certain pathways. 19 Q. And again, that would be functional? 20 A. Yes. 21 Q. Thank you. Understood. You very helpfully, as 22 Mr Wigfield also did, told us about a number of 23 different intracranial procedures, conditions etc 24 explained what they were, what the risks were and 25 Mr Redfern did that also in connection with spinal Page 152

1 surgeries. We asked you at the end whether there were 2 any surgeries that were commonly done by neurosurgeons 3 that you would like to comment on that you thought the 4 Inquiry should know about. And I think the two that you 5 added were -- you added something to do with Chiari 6 malformation and something to do with cerebral 7 metastases. So as these are things you added in and you 8 obviously wished the Chair to understand to assist the 9 Inquiry, why were these things you added in and can you 10 tell us a little bit about their significance and 11 prominence in your surgical practice? 12 A. Yes. Okay, they're things that are commonly seen by 13 a neurosurgeon that weren't on the long list. So, 14 cerebral metastases is a brain tumour but it actually 15 has a primary somewhere else in the body. So commonly 16 a breast tumour or a lung cancer might spread via the 17 blood, plant some seeds in the brain that grow into 18 a tumour. And we often are involved in resection of 19 those tumours, they're often treated by radiotherapy and 20 often by chemotherapy agents as well. And more recently 21 melanoma is one -- that's a type of skin cancer, that 22 has shown itself to be very responsive to a type of 23 immunotherapy treatment that augments the immune system. 24 So as a surgeon, if we see a patient with a large 25 metastasis in an accessible area, the oncologists at as Page 153	1 hydrocephalus, which is a build-up of excess CSF in the 2 brain and that CSF can cause pressure and it can 3 exacerbate the situation, pushing these tonsils further 4 down. 5 Those tonsils, when they compress the brain stem and 6 the spinal cord, can cause headaches. A classical 7 headache with this condition is called the cough 8 headache. So when the patient coughs, their 9 intracranial pressure transiently rises -- everybody's 10 pressure will -- but that pressure normally normalises, 11 in a normal person, very rapidly because the CSF can 12 move through this opening. But these tonsils are 13 plugging the opening, so the CSF remains in the head 14 after the cough and the headache -- patients really 15 describe a cough headache: it's a severe headache when 16 I cough and then it fades away over 30 seconds or so. 17 The compression, if it's severe, can impair blood 18 supply to the brain stem. That can cause all sorts of 19 problems, swallowing difficulties, hiccups, double 20 vision, sometimes numbness in the face, facial pain. It 21 can affect the spinal cord as well. And the spinal 22 cord's quite an interesting -- why the spinal cord gets 23 affected -- the reasons behind this are theories, 24 nothing is proven. 25 So, the spinal -- if we go back to embryology, when Page 155
1 our MDT meeting may say: we'd much rather you take that 2 out before we treat with these other treatments. So 3 that's quite a common procedure. 4 Q. Is that a resection type procedure? 5 A. Yeah, yeah. We would go in aiming to remove. 6 Q. Understood. 7 A. Normally. 8 Q. Thank you. 9 A. The second procedure, the Arnold-Chiari malformation. 10 So a Chiari malformation, as it's more commonly called, 11 is a malformation where the back end of the brain, the 12 cerebellum, protrudes through the large opening in the 13 skull -- there's an opening in the skull about 14 3 centimetres in diameter through which passes the brain 15 stem where it meets the spinal cord. 16 Q. This is at the back? 17 A. It's right down here, at the back. 18 Q. Thank you. 19 A. But the cerebellum, which is the balance bit of the 20 brain, has a couple of projections called tonsils and 21 they normally project just into the foramen magnum but 22 if, through an anatomical variant, they project a lot, 23 they can cause problems. And those problems can cause 24 quite widespread symptoms. So the first thing they can 25 do is they can be associated with a condition called Page 154	1 we're about 3 days old, we're a little flat disc and at 2 about the twentieth day after gestation, the disc 3 develops a trough and that trough then separates off 4 from the surface of the disc and becomes the spinal cord 5 and the brain. And there are a couple of openings in 6 that disc -- in that trough, it's a tube-like structure. 7 Those openings normally close at about 27, 29 days 8 gestation, so this is all really early on, first 9 six weeks of pregnancy. 10 If those openings fail to close properly someone can 11 get spina bifida, at the lower end, and at the upper 12 end, they can get a very rare condition called 13 an encephalocele. It's very rare in the UK to see that. 14 But the point of it is there's a tube and the spinal 15 cord develops around the tube. 16 That tube in the middle regresses during fetal 17 development and disappears away to nothing. If we look 18 at a slice of the spinal cord on a histology slide, the 19 spinal cord is pretty small. It's about the size of my 20 little finger really, all the way up and down. It 21 widens in a couple of places but it's a pretty small 22 structure. But if you look at a microscope, you can 23 normally just see the remnant of that canal I have told 24 you about. 25 But these patients with the Chiari malformation, Page 156

1 that canal, particularly in the neck, can enlarge and it 2 can enlarge massively, so it almost occupies the whole 3 of the spinal cord. And this is called syringomyelia. 4 Syrinx is a Greek word, I think -- not very good on 5 languages -- for a tube. And it's a tubular structure 6 within the spinal cord. "Myelia" means spinal cord. 7 And this is a very interesting condition because 8 right by that tube, there are nerves that sub-serve pain 9 and temperature. And the expansion of the tube can 10 specifically affect those nerves. So patients -- often 11 their first symptoms are they're burning their hands 12 when they're putting things in the cooker and they don't 13 realise until they smell their skin burning because 14 they're not feeling the pain sensation. And with 15 progression of that condition, that can cause paralysis 16 in the lower limbs, due to the longer tracks going down 17 to the legs losing their function. 18 So with a patient with a Chiari malformation causing 19 secondary syringomyelia, there is an operation that's, 20 in theory, quite a simple operation to make the hole 21 bigger, to give the tonsils more room to let the CSF 22 circulate better and these symptoms often stabilise and 23 may regress. 24 Q. Thank you for that very detailed explanation which 25 I'm sure has made the stenographer's day, given the Page 157	1 Psychosurgery has also been used -- and I don't know 2 whether this was done in Dundee or not -- for anorexia 3 nervosa. There was a famous pop singer who had such 4 surgery, I think in Cardiff, Lena Zavaroni, many years 5 ago. So my understanding of how -- you know, I have 6 been in British neurosurgery 30 years, I have not heard 7 of psychosurgery procedures being done really, other 8 than that one case I've had personal contact with when 9 I was working in Aberdeen, that would have been in about 10 2000. 11 Q. Similar to some of the procedures we're discussing with 12 Mr Wigfield, would that then be something very rarely 13 offered and experimental? 14 A. Very rarely offered. I don't know about the word 15 "experimental" because I think there was a bit of 16 a literature basis for it. I know Bob worked in London 17 where, at the Maudsley, psychosurgery was done. So 18 Mr Redfern might have a bit more to say about that. 19 MR REDFERN: I'm old enough that I have actually done it, 20 but as a trainee. I worked at the Brook 21 Hospital, which is now -- if anybody is interest to 22 know -- Sainsbury's on Shooters Hill, but it used to be 23 the Brook, a very old hospital built in the 1890s and 24 that was the birth place of the Geoffrey Knight unit. 25 And Geoffrey Knight was a neurosurgeon in the '50s and Page 159
1 number of difficult concepts. Thank you very much 2 indeed for that. There is one final day thing, 3 Professor, I want to ask you about and I'm asking you 4 about this because, as you all did in various place, you 5 helpfully drew our attention I think to the fact that 6 this is something -- a process or a type of surgery that 7 was offered at Dundee and that's psychosurgery. Again, 8 could you tell us a bit about what that is and what your 9 understanding is of what the offering was in Dundee in 10 relation to that? 11 A. Well, the answer, in one word, is very limited. That 12 was two words, but varies importance. I don't know to 13 what extent this was done in Dundee. I did, when I was 14 in Aberdeen, have a patient come in who had had surgery 15 in Dundee for severe depression and he had had bilateral 16 cingulotomies, so he had two of these burr holes made 17 here, a probe placed into an area called the cingulate 18 gyrus, and then a destructive lesion, a heat lesion to 19 damage that tissue, to try to suppress his overwhelming 20 feelings of depression. 21 That's an example of psychosurgery. Psychosurgery 22 sort of started decades and decades before that with 23 frontal lobotomy type operations to try to alter 24 patients' personalities, to improve them if they had 25 a psychotic or a very severely depressed state. Page 158	1 '60s and his post was then taken by John Bartlett who 2 trained me. And John worked closely with a psychiatrist 3 called Paul Bridges. And the answer to your question, 4 for the purpose of this Inquiry, is that that process 5 was very strictly controlled. The patients were those 6 with severe depressive illnesses, or with obsessive 7 compulsive disorders, who were -- whose treatment had 8 been refractory to all known drugs and other mechanisms 9 of trying to control it. I saw some of these patients 10 and they were at their -- they were as low as I've ever 11 seen anybody, just unimaginable symptoms that they 12 suffered. 13 They were then assessed in this controlled group, 14 led by Paul Bridges, the consultancy psychiatrist and 15 aided by the surgeon John Bartlett. There were strict 16 regulations under the Mental Health Act as to how they 17 could be controlled and the timing of the procedures. 18 And then the procedure itself, once they'd gone through 19 that process, as I say, which was very regimented in 20 terms of how they would progress through it, the 21 procedure then had to be done within a certain time, 22 I think within six weeks of the assessment being 23 completed, in case their condition then changed. And 24 there was then -- there were two targets. The targets, 25 for the record, were the thing called the subcaudate Page 160

1 tractotomy and we put -- using a little disc inserted 2 into the skull to act as a base from which these little 3 yttrium seeds were implanted, there were four on each 4 side. It was a stereotactic procedure a bit like you've 5 heard before. Four seeds were implanted on each side in 6 the subcaudate region. 7 I tried, with John Bartlett -- I was there, it was 8 about four or five of them I assisted him with. I think 9 I did one under his supervision. I tried to understand 10 quite how it was that he chose the target and there was 11 always a little bit of something which was somewhat 12 subjective. But there was -- we did radiology first to 13 deduce it and then he would choose these targets based 14 on his previous experience. And I was asked, in fact 15 recently, what was the outcome? In some of these 16 patients, the outcome was dramatic. In others, it 17 wasn't particularly effective, but in some it was 18 dramatic in terms of their symptom control. But the 19 thing to emphasise, this was done in a very regimented, 20 structured like -- the equivalent term would be an MDT 21 fashion. It was not for the one-off surgeon. 22 MR DAWSON: Understood. Sir, that might be an appropriate 23 moment to take a short break. 24 THE CHAIR: Yes, certainly. 15 minutes, gentlemen and we'll 25 be ready to resume after that. Thank you. Page 161	1 Q. We can find that out from other sources I'm sure but, 2 from some of the evidence you've given already, I think 3 some of the principles in this we might find, as we go 4 through it, are universal irrespective of the date. 5 Although of course, as we've heard evidence already, 6 there are some aspects of practice that perhaps are 7 different at different periods of time. So if we're 8 looking at things, I think it would be helpful just to 9 try to clarify which fall into which category. 10 If we could look at page 49, please. I think, as 11 I understand it, this document is attempting to put into 12 a more focused surgical context the sorts of things one 13 finds in Good Medical Practice by recognising that there 14 are certain things which perhaps need more emphasis in 15 surgery and to put it into a more fact-specific context 16 for surgeons; would that be broadly correct? 17 A. It would, yes. 18 Q. So it's ethical guidance for surgeons? 19 A. It was the college's take on professionalism really, 20 based on Good Medical Practice. 21 Q. This is one of the pages where we see the principles set 22 out relating to the importance of acting with honesty 23 and integrity. It says: 24 "Provision of information about surgeons' practice. 25 "Surgeons must demonstrate probity in all aspects of Page 163
1 (3.27 pm) 2 (A short break) 3 (3.42 pm) 4 MR DAWSON: Thank you, sir. Moving away, then, from the 5 technical details of spinal, intracranial surgery. 6 There's a few questions I would like to address with you 7 all now, contributing, as you see fit, about important 8 features in neurosurgical practice. You helpfully 9 produced for us a copy, both of Good Medical Practice we 10 heard something about yesterday from a representative of 11 the GMC, but also a document I'd like to have a little 12 bit of a like at called "Good Surgical Practice". Could 13 you bring up, please, ELJ0001-00030. 14 Could you tell us, please Professor Whitfield, 15 perhaps first of all, what this document is you provided 16 with the report? 17 PROFESSOR WHITFIELD: It was a guide produced by the Royal 18 College of Surgeons of England for surgeons who were 19 fellows and/or members of the college. I'm not sure 20 what year it is. You might have better information. 21 Q. If you go over the page, there's an entry saying 22 something. This particular version appears to be 2014. 23 Do you think that was the first version of it or do you 24 think it was maybe this is a re-issue? 25 A. I honestly don't know. Page 162	1 their professional practice and ensure that they do not 2 abuse their patients' trust in them or the public's 3 trust in the profession. You should adhere to all the 4 principles set out in Good Medical Practice ... In 5 addition, you should: 6 "Ensure that any information about your knowledge, 7 skills and services is truthful, factual and serves the 8 interests of patients." 9 Why is it important -- why is the concept of probity 10 important in -- particularly in relation to 11 neurosurgery, let's say? 12 A. Well, the contract between the patient and the surgeon 13 is entirely based on trust but there's a power gradient, 14 so the surgeon has the knowledge and the patient has to 15 accept the surgeon's application of that knowledge. And 16 only by being honest can you really develop the 17 patient's trust. The comment about ensuring any 18 information about your knowledge, skills and services is 19 truthful, probably is targeting those who do private 20 practice in particular because patients will see the 21 information about you on websites, be it a private 22 hospital's website, be it your own private website. And 23 if the information is not truthful, the patient may be 24 letting themselves into a contract under a misapprehension 25 and that -- basically lying or being economical with the Page 164

1 truth is not a good foundation for a professional 2 relationship with a patient. 3 And in neurosurgery some of your -- in many branches 4 of surgery some of your contacts with patients are 5 longitudinal, over a long period of time. So patients 6 with tumours always get followed up for years, spinal 7 conditions very common, particularly in the private 8 sector, but patients get recurrent disease, they get 9 disease at different levels. So often there's 10 a longitudinal aspect to that relationship between 11 patient and surgeon. 12 So if the patient can trust their surgeon, that's 13 the footing all these relationships should be based 14 upon. 15 Q. And I think, as you've explained, that's particularly 16 important in a surgical context given the particular 17 nature -- the power nature of the relationship, as you 18 set out; is that right? 19 A. Yes. 20 Q. Thank you. Some other aspects of this I'd like to look 21 at which I think are relevant to some of the evidence 22 that you provided to us. Could we have a look, please, 23 at page 13. Thank you. This seems to have some -- it 24 says: 25 "Apply knowledge and experience to practice. Page 165	1 When the complexity of the procedure is an issue, you 2 should consider shared decision making and shared 3 operating with another expert consultant colleague. 4 When appropriate, you should transfer the patient to 5 another colleague or unit where the required resources 6 and skills are available." 7 Reading a bit further down, three points down: 8 "Ensure that patients receive satisfactory 9 postoperative care and that relevant information is 10 promptly recorded and shared with the relevant teams, 11 the patient and their supporters." 12 And over the page again, in the second bullet point: 13 "Ensure that, when the patient is discharged from 14 hospital, appropriate information is shared with the 15 patient, the patient's supporters and the extended care 16 team. In addition, unless the patient requests 17 otherwise, all relevant information should be sent to 18 the patient's GP, where possible in electronic form, 19 within 24 hours. For complex cases, consideration 20 should be given to a telephone communication with the 21 patient's GP." 22 And at the bottom: 23 "Provide adequate time for patients and their 24 supporters prior to surgery to discuss the proposed 25 procedures and implications, risks and benefits, and Page 167
1 "Good standards of clinical practice. 2 "Ensure that patients are treated according to the 3 priority of their clinical need. 4 "Take full responsibility for patient management, 5 leading the surgical team to provide best care. 6 Responsibility should encompass preoperative 7 optimisation and postoperative recovery. 8 "In conjunction with colleagues in the 9 multidisciplinary healthcare team, construct and discuss 10 with the patient a diagnostic and treatment plan based 11 on clinical evidence and investigation findings. The 12 risks and benefits of surgical intervention and the use 13 of alternative forms of treatment should be considered 14 carefully. Ensure that multidisciplinary team meetings 15 are fully utilised both preoperatively and 16 postoperatively. 17 "When providing elective care for patients with 18 non-urgent conditions, carry out procedures that lie 19 within the limits of your competence and the range of 20 your routine practice, and refer where necessary. 21 "Carry out surgical procedures in a timely, safe and 22 competent manner, and ensure that you follow current 23 clinical guidelines in your field." 24 And then, over the page: 25 "Use the skills and knowledge of other clinicians. Page 166	1 allow the patient to make a fully informed decision 2 before signing a consent form as described in section 3 3.5.1." 4 So there's a lot in there that covers a lot of 5 aspects, but if I could tease out some of the aspects 6 some of which we've touched on already. 7 The first is the importance, I think, related to 8 consultants perhaps, of taking full responsibility for 9 the surgical team. We've touched on this already 10 I think but why is it important that that happen? 11 A. Well, the consultant is the fully trained member of the 12 team. The other members of the team will not have the 13 depth and breadth of experience of the consultant to 14 necessarily make good clinical judgments all the time. 15 So you may have a trainee who's trained, for example, 16 for one or two years in the specialty, so they'll have 17 a reasonable idea about what the right thing to do is 18 but they might not know all the alternative options. 19 Their description of the risks may be limited. You 20 may have nurse practitioners who are very good at 21 certain aspects of communicating with patients and 22 families but not necessarily have the big, broad 23 picture. So consultant responsibility at the top is 24 something that's been paramount since the outset of the 25 NHS. Page 168

1 Q. Another aspect that comes here and is, I think 2 particularised later in this document which perhaps, 3 based on your report, applies particularly in 4 neurosurgery, where neurosurgeons we've mentioned it -- 5 you've mentioned it several times already, work with 6 lots of different other types of medical professionals. 7 The importance here of working in conjunction with and 8 relying upon the skills of other medical professionals, 9 both within one's field of neurosurgery and beyond is 10 another feature which seems to be prominent here. So as 11 far as neurosurgery is concerned, and I know you've 12 provided detailed list of all the types of medical 13 professionals that a neurosurgery may come in contact 14 with and it's a very extensive list of, frankly, just 15 about every type of medical professional one could 16 imagine. But why, therefore, is that important in 17 maximising patient care? 18 A. Well, you have to consider the patient holistically. 19 The patient isn't just a brain or a spinal cord, it's 20 the whole effect of that condition on their illness, 21 it's understanding the other options. Sometimes the 22 timing of other options. I mentioned earlier about 23 discussions with oncology and they may think it's best 24 for you to resect before they treated with radiotherapy 25 and/or chemotherapy for some tumour types. And it's Page 169	1 A. Yes. So radiology has many sub-types of which 2 neuroradiology is one. Neuroradiology is divided into 3 two sub-types, so there are interventional radiologists 4 who do procedures. Those procedures might include 5 taking biopsies using scans as guidance, particularly in 6 the spine. They might involve putting coils into 7 ruptured intracranial aneurysms or non-ruptured 8 intracranial aneurysms, or glue into blood vessels, into 9 vascular structures, like AVMs. So that's your 10 interventional neuroradiologist. 11 You have the diagnostic neuroradiologist who is 12 an expert at understanding the physics of how scans are 13 produced, CT scans, MRI scans and more complex imaging, 14 functional imaging. But beyond that, they also are 15 experts at reading the scans. And although we, as 16 neurosurgeons, look at scans all the time and we think 17 we're very good at looking at them, the radiologist are 18 very systematic in how they look at scans. So everyone 19 can see the big disc but can everyone see the little 20 disc at the level above that's very laterally located, 21 that might actually be the cause of the leg pain. And 22 so they're good at making sure the whole image and 23 series of images is captured and it would be a foolish 24 neurosurgeon to ignore a neuroradiology report. 25 Close discussion with neuroradiologists is important Page 171
1 absolutely crucial to have those discussions to optimise 2 care. 3 That's a decision-making about treating the disease. 4 There's also -- with surgery, there's a concept of 5 pre-operative care and optimising the patient for the 6 general anaesthetic. Do they have latent diabetes that 7 nobody knew about? If they do, that needs to be 8 controlled. Do they have hypertension? We need to pick 9 it up and treat it, to make the actual surgical 10 procedure safer. Are they on any drugs or medications 11 that might cause harm in surgery, that may need to be 12 stopped before surgery? So blood thinning, 13 anti-coagulant type medications. So these are things 14 that you really have to look at the whole picture to 15 make safe decisions. 16 Q. Another aspect which relates to that, I think, is the 17 need to rely on the skills of others appropriately. One 18 area, which I think we touched on with Mr Wigfield 19 earlier, related to scanning. We talked about that in 20 a particular area. One aspect that has come up in some 21 recent evidence that we've heard, relates to the 22 relationship between a neurosurgeon and a radiologist 23 relating to the interpretation of scans. Is 24 a radiologist an expert in telling you what you can see 25 on a scan? Page 170	1 and that's really what's driven MDTs, these 2 multidisciplinary meetings because there, you have 3 a weekly forum to discuss all of the oncology, 4 cancer-type cases with a neuroradiologist. And we do 5 that on a Thursday morning, we are usually discussing 6 50 patients or thereabouts and we'll have two or three 7 radiologists in that meeting and they will have looked 8 at the material beforehand. 9 So those are really important discussions to 10 optimise and put -- as Crispin said, in particular, to 11 put the clinical symptoms into context with the 12 radiology, so all the pieces of the jigsaw match 13 together. 14 THE CHAIR: We talked with, I think Mr Redfern, earlier on 15 this morning about the different types and sizes of 16 hospitals and levels of specialisation that existed at 17 a particular period of time. Can I take it that where 18 there is a neurosurgical presence in a hospital, there 19 will invariably be radiologists of both types that 20 you've just described? 21 A. That's a very good question. The answer is diagnostic 22 radiologists, definitely. Interventional 23 neuroradiologists, perhaps not. Certainly when I was in 24 Aberdeen we were right at the point, in neurosurgery, 25 where coiling had -- was just beginning to be shown to Page 172

1 be more effective than surgeons clipping and we didn't 2 have anyone who did coiling in Aberdeen and we had to 3 send patients to Edinburgh and I suspect the same 4 happened in Dundee and that would have been in the 5 relevant period. 6 THE CHAIR: At the relevant period. Thank you. 7 MR DAWSON: The other aspect of the passages I read out is 8 the importance -- 9 THE CHAIR: Sorry, did you want to say something? 10 MR WIGFIELD: I wanted to add a point that even within the 11 diagnostic radiology field there would be 12 sub-specialisation now to an extent which there probably 13 wasn't so much during the relevant period. So there are 14 diagnostic radiologists who specially attend MDTs for 15 oncology and tumours, others who will go to the epilepsy 16 MDT, others who will focus much more on the spinal MDT. 17 So they're not all the same, all covering everything. 18 MR DAWSON: I see, so in the same way as neurosurgery has 19 generally become specialist, so has radiology? 20 A. Exactly. 21 MR DAWSON: Thank you. The other aspect of the passages 22 that I read out, again particularised in the later 23 passages is the importance of the relationship between 24 the neurosurgeon and the patient. In particular, as we 25 touched on earlier, the provision of adequate time for Page 173	1 investigations already, particularly in spine, they'll 2 have had their MRI scan beforehand. And you would see 3 the patient, take a history, examine them if relevant, 4 look at the investigations and then propose a management 5 plan. And that management plan nearly always would 6 include doing nothing, perhaps doing nothing but 7 observing, perhaps of a follow-up scan or a review of 8 the situation in a few months' time, or doing 9 a procedure. And a procedure might be an injection type 10 procedure for pain, or it might be something -- 11 an operation and there may be different ways to do the 12 same operation. 13 So in your half an hour you've got to convey all of 14 this and you've got to have an in-depth discussion about 15 what would seem the best option for the patient. 16 There is a concept called shared decision-making. 17 Personally, I prefer to call it supported 18 decision-making because I mentioned earlier that the 19 surgeon knows the medical information and the patient is 20 going to try and apply that to their situation and you 21 need to support the patient and they want to rely on 22 your experience to guide them into what the expectations 23 are. And setting expectations is absolutely crucial. 24 If you over expect, if the patient over expects, they 25 will be disappointed with the results. Page 175
1 patients and their supporters prior to surgery to 2 discuss proposed procedures and implications, risks and 3 benefits, to allow the patient to make a fully informed 4 decision. 5 And in the particular context of neurosurgery, we 6 touched on this earlier with Mr Wigfield, there are, as 7 we found out this afternoon, considerable complexities 8 in some of these procedures and it would appear, very 9 difficult decisions to be made about risks and 10 alternatives in often very troubling circumstances. And 11 so would one say that although that is, of course, 12 important across the board in medicine, that there is 13 a particular skill needed to be able to explain things 14 to patients, to make sure that they understand and are 15 making decisions for themselves which may require more 16 time and more effort than perhaps in other medical 17 fields? 18 PROFESSOR WHITFIELD: It would be hard for me to say 19 "compared with other medical fields" because I have only 20 been in this one for a long time. 21 Q. I understand. 22 A. But there's some external pressures. So there's 23 pressures on the time, the outpatient contact time and 24 so for the majority of patients you would have a new 25 patient in clinic. Majority of them would have had Page 174	1 But equally, you don't want to be a doom and gloom 2 surgeon, you want to be realistic. But most surgeons 3 would be, in 30 minutes of an outpatient appointment, 4 able to get that across to the patient. They may not -- 5 they may say to the patient: you don't need to decide 6 now. What I personally do, and have done all of my 7 consultant career, is write to the patient summarising 8 the discussion and the options and if they're undecided 9 in clinic -- some people say: I know I want the 10 operation, I know that's what I want. But some patients 11 are undecided. If they need it, they may need a second 12 follow-up appointment. But there's definitely a kind of 13 unwritten pressure not to prevaricate and put the 14 decision-making, kicking the can down the road. And of 15 course there are long waiting lists and the longer you 16 take to make the decision, the longer you'll wait for 17 the operation. So in that half an hour most surgeons 18 I think would be, and would have been, skilled enough to 19 get the information across to the family and their 20 chosen ones, to come to some decision about next steps 21 in treatment. And that includes a discussion about the 22 risks of the procedure. 23 Q. I think the passage we went to also talked about 24 constructing and discussing with the patient 25 a diagnostic and treatment plan. So that would mean Page 176

1 there being a clear understanding, I think, of what -- 2 if surgery is being proposed, what that surgery is going 3 to be, is that right? 4 A. Yes. 5 Q. And we discussed earlier, again with Mr Wigfield, the 6 possibility that the surgery might not quite be what was 7 expected but that there be certain limits in which that 8 would be deemed to be reasonable, but beyond that, there 9 would be limits where you'd feel would you need to speak 10 to the patient because effectively it becomes a separate 11 operation; is that correct? 12 A. It is. I think to wake a patient up without having done 13 a procedure that's going to benefit them, that's a big 14 call. You've got your patient asleep, the risks of the 15 anaesthetic. And I think most surgeons, once the 16 patient is under anaesthetic and you're operating, will 17 aim to complete an operation to try and help them, help 18 their disease process. Crispin mentioned earlier you 19 might abandon the surgery because of very heavy 20 haemorrhage and feel it's better to go in another day 21 and I think that is a circumstance where you would do 22 that. 23 If you were doing a lumbar disc and you get in there 24 and you find a bit of the disc bulge but the scan showed 25 a big disc prolapse, the first thing I would do would be Page 177	1 that don't quite go to plan, but as I think we discussed 2 earlier as well, the importance of communication, 3 candour, clarity with a patient when that's happened? 4 A. Absolutely. And these things happen in neurosurgery, 5 you get -- you're going in to remove a tumour or put 6 a shunt in and you have an unexpected haemorrhage, the 7 patient doesn't wake up in recovery and you're faced 8 with a completely different situation of 9 a life-threatening complication and treatment of that 10 complication may be achievable, but with a very big 11 change to the patient's quality of life. And so you, in 12 that heat of the moment, will be having discussions with 13 their relatives about do we do a lifesaving operation 14 but they're very likely to be severely disabled. If 15 you've got a handle on that from your pre-operative 16 discussions, it does make things easier. If it's 17 completely out of the blue in what we might regard as 18 a relatively small operation, we can be faced with 19 really challenging discussions which are time-pressured 20 as well. 21 Q. There is an aspect of one of the comments I'd just like 22 to expand on where is says you need to ensure that the 23 patient receives satisfactory post-operative care. And 24 that relevant information is promptly recorded and 25 shared with relevant teams, patient and their Page 179
1 to take an x-ray to check I'm in the right position. If 2 I'm in the wrong position, I'm at the wrong level, 3 I personally would think it's in the patient's best 4 interests to continue and to move up or down a level to 5 the correct level so that when the patient wakes up, 6 I have actually done what we set out to do. And then 7 I'd go about explaining that unfortunately we have made 8 a mistake and we opened up at the wrong level, but we 9 recognised that situation and we've clarified it and 10 hopefully no harm has been caused and your symptoms will 11 get better from us having operated at the correct level. 12 Q. You mentioned there what I would consider to be 13 a responsibility of the surgeon to make decisions in 14 those types of situations but to do so in the patient's 15 best interests. 16 A. Yes. 17 Q. Is it important, in making decisions in the patient's 18 best interests, that you understand what those interests 19 are? 20 A. Yes, it is. 21 Q. Yes, and therefore there has been communication with the 22 patient and trust and rapport built up with that 23 patient? 24 A. Yes, absolutely. 25 Q. And you mentioned the possibility of there being things Page 178	1 supporters. Do you think that refers to post-operative 2 care within the neurosurgical unit, or post-operative 3 care that might be required by somewhere else, or both? 4 A. I think there's two aspects because I think it does 5 refer to post-operative care in hospital, that little 6 section. But there is another section within the same 7 bit talking about discharge summaries and handing over 8 the care to the GP with information. 9 The handing over, once discharge has occurred, that 10 is a hospital-wide process. The introduction of 11 electronic patient records across a lot of the NHS -- 12 we're still not there yet -- should facilitate that and 13 in fact, with the NHS app it should facilitate it going 14 to the patient. So there are significant inroads being 15 made to that. But that communication should include 16 information about what medications they are taking. If 17 any of those medications should be stopped, for example, 18 we sometimes give anticonvulsants for a week or so after 19 brain surgery, which should then stop. Patients don't 20 need to be on them indefinitely. And steroids are 21 another very common drug that we give for a temporary 22 period around some neurosurgical operations. So that 23 sort of guidance should be passed on. 24 When the patient's in hospital, the 25 post-operative -- I would expect the consultant surgeon Page 180

1 to see the patient, usually in the recovery suite after 2 surgery or on the ward at the end of the operating list, 3 to check they're well and there's no early 4 complications. 5 The subsequent, immediate face-to-face contact would 6 normally be with the registrar, the trainee who would do 7 a ward round every morning. That's changed a bit with 8 this European Working Time Directive, so it might not be 9 the registrar who was in theatre but it will be someone 10 who has been handed over information about the case. 11 So they should get seen by a neurosurgical trainee 12 at least once a day whilst they're in hospital and if 13 there are any issues, they should be discussed with the 14 consultant. And I would expect most consultants to see 15 their patients, inpatients, two or three times a week. 16 Not necessarily every day. 17 Q. Thank you. Could we go to page 16, please, of the 18 document. One aspect that we touched on, I think 19 earlier, that I just want to ask you something about. 20 Third bullet point down. It mentions that it's 21 important to ensure -- there's a bit at the beginning 22 I think that defines "ensure" being as a positive 23 obligation: 24 "... that you are able to respond promptly to a call 25 to attend to an emergency patient. If you are on call Page 181	1 consultant who is in the hospital but not necessarily 2 on-call. 3 Q. I see. That would be a situation really where you would 4 have two patient interests conflicting, one of which you 5 were dealing with at that moment which would logically 6 I think need to take priority? 7 A. Yeah, I think it is aspirational, that particular 8 comment. I think the private sector responsibilities, 9 that's an interesting one. I think everyone would agree 10 that you shouldn't be working in the private sector when 11 you're on-call. I suspect, in the early part of the 12 relevant period, some surgeons would be working in the 13 private sector seeing patients in clinic but would be 14 immediately available on their telephone and similarly, 15 would drop their clinic to go to the hospital if needed. 16 Q. Thank you. Could we go to page 21, please. This is -- 17 there are a number of entries here but this is an area 18 we haven't touched on but I just wanted to understand, 19 from a neurosurgical perspective, the significance and 20 importance of this. It says: 21 "Record your work clearly, accurately and legibly. 22 "Surgeons must ensure that accurate, comprehensive, 23 legible and contemporaneous records are maintained of 24 all their interactions with patients. In meeting the 25 standards of Good Medical Practice you should: Page 183
1 in a specialty with a high emergency workload you should 2 be free of all other commitments, including elective 3 commitments and private sector responsibilities. This 4 arrangement should be formally reflected in your job 5 plan." 6 Is neurosurgery a specialty with a high emergency 7 workload? 8 A. It is. 9 Q. Thank you. If I could just ask you one other aspect at 10 page 21. 11 A. Can I make a comment about that? I think that's a bit 12 aspirational, that paragraph, about including elective 13 commitments. So I don't think, in most units, elective 14 commitments would be cancelled. So I might be on-call 15 on a Monday and I might have a clinic on a Monday and if 16 a patient comes in with a head injury that I have to go 17 to theatre for and there are no other colleagues who can 18 step in because I'm in outpatients, I would have to 19 abandon my outpatient clinic to go to the theatre. So 20 I think it's a prioritisation. 21 Q. Prioritisation within the hospital? 22 A. Yes. So if I am operating and I'm on-call, which does 23 happen and something very urgent comes in, we would take 24 the patient to the nearest immediately available theatre 25 with the most appropriate surgeon, who might be another Page 182	1 "Be fully versed in the use of the electronic health 2 record system used in your organisation and record 3 clinical information in a way that can be shared with 4 colleagues and patients and reused safely in 5 an electronic environment. 6 "Take part in the mandatory training on information 7 governance offered by your organisation, including 8 training on data protection and access to health 9 records. 10 "Ensure that all medical records are accurate, 11 clear, legible, comprehensive and contemporaneous and 12 have the patient's identification details on them. 13 "Ensure that when members of the surgical team make 14 case note entries these are legibly signed and show the 15 date, and, in cases where the clinical condition is 16 changing, the correct time. 17 "Ensure that a record is made of the name of the 18 most senior surgeon seeing the patient at each 19 postoperative visit. 20 "Ensure that a record is made by a member of the 21 surgical team of important events and communications 22 with the patient or supporter (for example, prognosis or 23 potential complication). Any change in the treatment 24 plan should be recorded. 25 "Ensure that there are clear (preferably typed) Page 184

1 operative notes for every procedure. The notes should 2 accompany the patient into recovery and to the ward and 3 should give sufficient detail to enable continuity of 4 care by another doctor. The notes should include: 5 Then on the next page, there's a long list of 6 different matters that should be included and at the 7 bottom, it says: 8 "Ensure that sufficiently detailed follow-up notes 9 and discharge summaries are completed to allow another 10 doctor to assess the care of the patient at any time. 11 "Ensure that you are familiar and fully compliant 12 with [data protection laws]." 13 How important is it in surgical practice that these 14 rules are complied with? 15 A. It's extremely important and the reason for that is 16 continuity of care and handover of care. You know, 17 we're not all around all of the time and complications 18 can happen at any point in time. And people need to be 19 able to step in and be well informed about what has 20 happened already. 21 I guess, if there's one comment I make there about 22 the legibility of signatures. A signature is 23 a signature. And I think what is better and this 24 statement would be better if it said the name was 25 printed underneath the signature. Page 185	1 patients may be put in jeopardy for any reason. Such 2 a reason may include the conduct, performance or health 3 of a colleague, as well as inadequate resources, systems 4 and policies. You should not assume that someone else 5 will take action. If you have concerns about patient 6 safety, it is your responsibility to establish whether 7 action [has] already ... taken [place]. 8 "Use local policies and resources for raising 9 concerns in the first instance. Normally, you should 10 raise your concerns to your immediate superior, followed 11 by the medical director and the chief executive. 12 "Escalate your concern to the appropriate regulator 13 if you have not been satisfied that your concern has 14 been adequately addressed through local channels." 15 Again, how important to the effective 16 patient-centred operation of a neurosurgical unit are 17 these considerations? 18 A. Yes, these are very important. We call it clinical 19 governance. This came to the fore in the late 1990s. 20 It was a term -- I think it was introduced in the late 21 1990s, the term "clinical governance" and this is really 22 what this is describing. And the raising concerns, 23 being open, is such an important way. If you put up 24 barriers to people raising concerns, problems will go on 25 and on and on. And the concerns have to be listened to, Page 187
1 Q. Thank you. Again, there is an allocation of 2 responsibility, I think, there to the particular 3 individual who has carried out things including 4 a consultant to make sure the notes of what they have 5 done are compliant with these rules, is that right? 6 A. Yes. 7 Q. Could we go to page 26, please. It says here: 8 "Respond to risks to safety. 9 "It is the cornerstone of professionalism and the 10 primary duty of every surgeon, regardless of seniority 11 or grade, to put the care and safety of patients above 12 all other considerations and take action or 'speak up' 13 through the appropriate channels when concerns arise." 14 It says that you are required to: 15 "Recognise that your primary accountability is to 16 the patient and support a culture of openness, honesty 17 and objectivity where concerns can be raised safely by 18 all staff members. 19 "Act promptly to rectify, or notify those 20 responsible for rectifying, any incidents of poor 21 quality of care or shortfalls in resources that might 22 compromise safe care including suitable facilities, 23 equipment and support services. 24 "Raise concerns at the earliest opportunity when you 25 have reasonable belief that the care and wellbeing of Page 186	1 have to be investigated, have to be acted upon and the 2 route there would be the normal route. There's a system 3 in most hospitals called Datix raising which -- it's not 4 anonymised but you can raise a concern about any 5 issue you like, electronically, and it goes to 6 a relatively senior person in your department to screen 7 them. And so if a patient falls out of bed, a Datix 8 should be filled in. So factors can be looked at as to 9 why they fell out of bed. Was there an adequate nursing 10 ratio? Were the cot sides down when they should have 11 been up? Did the patient come to any harm from it? Was 12 a doctor called appropriately? Etc, etc. 13 So Datix is an easy route in for people to raise 14 concerns. 15 Q. So a Datix maybe part of what I think is referred to 16 there as "local procedures"? 17 A. Yes. 18 Q. Yes, I think the guidance that I have just read out is 19 emphasising a number of things, but one of the things is 20 the need to act quickly when these things happen, is 21 that right? 22 A. Yes. 23 Q. And why is that important? 24 A. Well, you don't want to miss the situation, let it 25 evolve into something more serious. You don't want Page 188

47 (Pages 185 to 188)

1 repeated problems that cause harm to more patients. If 2 a concern isn't raised, that particular individual 3 patient may come to more harm because there may be 4 action that can be taken to rectify the problem. So 5 it's focusing on avoidance of problems to other 6 patients, improvement of the patient and trying to 7 correct the system. Often errors, complications, are 8 system errors, it's -- I'm sure you've heard of the 9 Swiss cheese model, where all the holes in the Swiss 10 cheese align up and you get a big problem but there's 11 often little factors that can influence the evolution 12 of problems -- the evolution of problems. 13 Q. Thank you. I have a couple of final questions on 14 a couple of matters that were raised. One of -- you 15 were asked in the statement, or in the request for the 16 statement, if there were any other matters that you 17 thought should be brought to the Inquiry's attention and 18 the Inquiry might wish to look at and one matter that 19 you raised was -- that you were not aware of, that you 20 thought the Inquiry might be interested in, was whether 21 Mr Eljamel carried out any medicolegal work which 22 would be work provided by a qualified independent doctor 23 in providing expert evidence in connection with legal 24 proceedings. 25 I have provided you, this morning, with an extract Page 189	1 his assessment, and based on that, how accurate were his 2 predictions of prognosis and outcome? And that might 3 have influenced -- his opinion will definitely have 4 influenced the size of settlement that patients in 5 personal injury situations will have received. 6 The second aspect of medicolegal work is clinical 7 negligence and if we look at clinical negligence I think 8 there's three aspects to that. There is -- was there 9 a breach of duty by a doctor at any point in a patient's 10 care? And commonly in neurosurgery, cauda 11 equina syndrome is one of the biggest medicolegal 12 complainant situations. So a patient presents to 13 a hospital, often a small hospital, a district general 14 type hospital with severe sciatica, numbness on one or 15 both buttocks and urinary difficulties. And they may 16 get to A&E at 5 o'clock in the evening and they're told: 17 all the scanning staff have gone home, we'll give you 18 some paracetamol and codeine and if the symptoms get 19 worse, come back. So did a breach of duty occur? And 20 that breach of duty may have been that that patient 21 should actually have had a scan. 22 The second thing is if that patient eventually had 23 surgery, and let's say they ended up having surgery 24 two days after their original presentation, if they'd 25 had the scan that first night, they may have had surgery Page 191
1 from a CV that was produced to the Inquiry by a member 2 of the Scottish Parliament who gave evidence, which sets 3 out some information at least that Mr Eljamel has put 4 forward suggesting that he was involved in medicolegal 5 work. I was simply interested in understanding why it 6 is that if there is a surgeon about whom there are 7 concerns, as is the position here, there should be 8 an investigation into his activities during medico 9 legal practice as well as his clinical practice? 10 A. It's probably best by describing what medicolegal 11 practice is and there's really two strands to medico 12 legal practice. So the first strand is so-called 13 personal injury. So a patient has had, for example, 14 a car accident and they've sustained a head injury and 15 they need to see an expert to confirm that a head injury 16 has occurred, to discuss the severity of that injury and 17 to discuss and advise on the prognosis of that injury. 18 And that may help that patient in claiming 19 compensation, perhaps from the insurers of the car that 20 struck theirs. So the accuracy of -- we, when we 21 received the instructions, as you said at the beginning, 22 had not seen anything other than what was in the public 23 domain to do with the Eljamel case. And if Mr Eljamel 24 was providing evidence for that sort of thing, how 25 careful was his assessment of patients, how thorough was Page 190	1 within six, eight hours of that original presentation. 2 So the second question is: did that breach of duty, not 3 doing a scan, actually cause the patient harm? So for 4 a patient to have successful clinical negligence they 5 have to show there's been a breach of duty and it has 6 caused harm. 7 And a neurosurgeon may be involved -- well, will be 8 involved in guiding the legal profession on whether or 9 not there has been causation by the breach of duty. The 10 breach of duty would be judged by an A&E doctor or 11 perhaps by a GP if there was a delay in sending someone 12 to hospital but the neurosurgeon would advise on the 13 causation, whether or not harm was caused. And again, 14 that requires thorough diligence in making that 15 assessment. 16 The third strand of medical negligence is where 17 a neurosurgeon is accused by a patient of having 18 performed an operation incompetently and caused them 19 harm. And another neurosurgeon would give their 20 opinion, they would opine on that situation. And 21 I don't know if Mr Eljamel opined in such situations, 22 clinical negligence against peers, but the question -- 23 I have no knowledge of his clinical competence, but the 24 question obviously arises of, was he competent to 25 provide those sorts of opinions. Page 192

49 (Pages 193 to 196)

1 there was a passage in the Good Surgical Practice about 2 what I think you were talking about, which is to do with 3 a log kept by trainees of all the surgeries they have 4 been involved in, is that right? 5 MR WIGFIELD: Yes, that is what I was referring to. 6 MR DAWSON: That too is an important part of training 7 I think. It's in Good Surgical Practice where I think 8 it says it is necessary for records to be kept for 9 training purposes of the details of surgeries one has 10 been involved in, is that right? 11 A. That's correct. 12 Q. And presumably that's so that proper evidence can be 13 presented as to the experiences one has had in the 14 training process? 15 A. That's right. 16 Q. Thank you. The next question I have relates to where 17 consent is given to a neurosurgery, is that consent that 18 a particular surgeon will carry out the operation or -- 19 that's the question? 20 MR WHITFIELD: No, it's a consent for the procedure. The 21 form, in the small print, almost certainly has written 22 on it, certainly the current versions do, that "I cannot 23 guarantee who will be doing the procedure". So if 24 I cycle to work and have an accident on the way, the 25 patient's procedure may still take place if I'm not Page 197	1 I'm confident in their competence. 2 Q. And if that has happened in accordance with 3 the decision-making of the responsible consultant, 4 should the patient be at least aware after the surgery 5 who has carried it out? 6 A. I'm not sure that happened in the relevant period 7 either. I think that the trainees may tell the patient 8 that they've done the procedure but I think they perhaps 9 are wary of saying that if the patient didn't know. 10 So it's an interesting situation because on-call 11 most of the procedures in a big unit with senior 12 trainees, most of the on-call procedures will be done by 13 a trainee and the patients know that. In the elective 14 situation -- I mean, when patients ask, the answer 15 I normally give is that: I can't guarantee it will be me 16 and we are training and I have trainees but whoever 17 operates will be competent to perform. 18 Q. Presumably the details of who actually perform the 19 operation and who was there should be recorded in the 20 notes though? 21 A. Yes, definitely. 22 Q. Thank you. A couple of questions about private practice 23 which you've said something about in the statement. 24 Should consultant neurosurgeons be able to refer NHS 25 patients effectively to themselves in private practice? Page 199
1 there if someone else competent is able to do that 2 procedure. 3 Q. Is the exception or caveat that you've mentioned in the 4 form designed to cater for those types of situations 5 where for extraneous reasons that one couldn't control, 6 the surgeon who had -- the consultant surgeon who was 7 responsible couldn't do the surgery or is it meant to 8 cover a wider range of situation? 9 A. I think it's probably a wider range so that a trainee 10 can do the procedure. 11 Q. In circumstances where a patient had been consented for 12 example by a consultant and therefore perhaps 13 an expectation been created that the consultant would 14 carry out the procedure. In the event that obviously 15 the consultant were to decide that the trainee was 16 appropriate and it would be a useful training 17 opportunity, would it be important -- would the patient 18 be made aware of that before the surgery? 19 A. I think in the relevant period often not. 20 Q. But should the patient be made aware of that? 21 A. I think nowadays surgeons will say that a trainee is 22 doing it and normally would back that up with my 23 supervision. So what I say to patients is: 24 I'm responsible for your operation and if a trainee is 25 doing it I may be there, I may not be there, but Page 198	1 A. The situation that can arise is that a patient may 2 realise there's a six-month waiting list or longer and 3 wants that consultant to undertake the surgery 4 privately. Normally the patient would contact that 5 consultant's private secretary and the consultant may 6 direct them to do that and I think that is how the 7 process would normally work. It always feels an 8 uncomfortable situation and, you know, if it feels 9 uncomfortable it probably is uncomfortable but 10 I'm pretty sure that's how most private referrals would 11 be generated. I'd be very surprised and would not 12 expect a surgeon to say, I can do this on you in the 13 NHS, it's going to take ten months, but if you phone my 14 secretary at Fernbrae Hospital I can do it for you in 15 two weeks' time. I would expect the patient to initiate 16 the discussion about private practice. 17 Q. I see. Should that be the case? 18 A. Yes. 19 Q. We heard some evidence from a representative of Circle 20 Healthcare who was in a slightly odd situation that his 21 organisation had taken over responsibility from -- 22 effectively taken over another company which had 23 responsibility for a private hospital where Mr Eljamel 24 offered neurosurgery and he was trying to help us by 25 looking through the paperwork as to what he thought had Page 200

1 gone on in that private hospital and what services were 2 offered. And the impression that he had formed, and he 3 thought this was appropriate, was that the procedures 4 that were offered there, which he considered were only 5 spinal procedures, were low to moderate level if you 6 like spinal surgeries in terms of risk. Would it be 7 appropriate for a private hospital only to be offering 8 that type of surgery and nothing more complex than that? 9 A. Yes, it would. 10 MR WIGFIELD: It would be very common for private hospitals 11 to offer low to moderate level risks and not high level 12 risks. Partly related to what facilities have they got 13 to rescue anyone that was undergoing any complications. 14 Particularly intensive care facilities. 15 Q. Should private hospitals be covering intracranial 16 surgery? 17 MR WHITFIELD: A limited number do, mostly in London and in 18 big cities, but most smaller centres will not offer 19 a private intracranial surgery. 20 Q. Is the relevance of it being a big city that one could 21 get a patient in an emergency situation to 22 another hospital? 23 A. No, the relevance is -- for example in London there are 24 hospitals that are fully equipped with CT, MRI, 25 Intensive Care in the private sector, and these are the Page 201	1 way about what your work involves. But has it been 2 effective in terms of stopping people like 3 Harold Shipman, or the cases we've heard in the last 4 week or two that have come to the medical press? No, it 5 hasn't. So it's been, for individual doctors, in terms 6 of looking at reflective practice and keeping -- perhaps 7 helping them to keep up to date with modern thinking and 8 perhaps things like these documents that we've been 9 looking at today, then yes, it's an effective process. 10 It does, I think, offer some reassurance to the public 11 that we are doing some reflection in our practice, but 12 in terms of keeping outliers in check, then no, I don't 13 think it's successful. That's a personal view. 14 Q. Are there particular features of a neurosurgical 15 practice that mean that it might not have worked quite 16 as well as it was intended, or is that a sort of 17 reflection of the whole report? 18 A. I think -- yes, within our document, I think we've put 19 in terms of the audit that goes on. The cardiac 20 surgeons and the British Association of Spine Surgeons 21 were some of the first to start doing regular, 22 nationwide audit because some of the types of conditions 23 and objective assessments of those conditions that could 24 be fed in, lent themselves to audit and to outcome-based 25 data, which is to see that the particular procedures are Page 203
1 facilities you need for intracranial surgery. So you 2 shouldn't be operating intracranially if you haven't got 3 an immediately available CT scanner, and most private 4 hospitals in regional units will not have that 5 capability. In some centres you may be able to -- so 6 some NHS hospitals have private wards and allow private 7 patients to go into the NHS hospital and have private 8 paid surgery. 9 Q. Thank you. And the final area I have been asked to 10 explore with you is something that's covered in the 11 report and so there is commentary on this, but in sort 12 of broad terms -- I think maybe Mr Redfern it's 13 a section that you cover -- do you think that the 14 revalidation and appraisal system has worked well in the 15 neurosurgical field? 16 MR REDFERN: I have to say I can't answer as an expert. 17 I haven't spoken to a lot of people about it in 18 an objective sense. 19 Q. Understood. 20 A. If you read between the lines of what is there, you will 21 see that there have been mixed views about its benefit. 22 Having myself now been doing it, what, for over 23 20 years, I think it is a helpful thing to do. It gives 24 you some structure to getting CPD, to doing reflective 25 practice, to actually thinking in a quiet, considered Page 202	1 producing a good result or not. 2 But if you look at the variety of some neurosurgical 3 conditions, so Peter talked, for example, about 4 Arnold-Chiari malformation, the range of the different 5 clinical presentations of that and the severity and the 6 radiological -- but it's difficult to look in the round 7 and to say: how can you audit that. There's low numbers 8 of high complexity things. So I think neurosurgery is 9 not a good specialty for looking at those sorts of 10 outcome data. It's been difficult to do it, even though 11 attempts have been made in some aspects of it. Is that 12 a fair reflection? 13 Q. Is that, to be clear, because of neurosurgery's variety 14 and complexity? 15 A. Yes, yes. 16 MR DAWSON: Thank you. Thank you very much indeed. Those 17 are my questions. Thank you very much for your 18 evidence. 19 MR WHITFIELD: Thank you. 20 MR REDFERN: Thank you. 21 THE CHAIR: Thank you. We're just on 4.55, gentlemen. You 22 have been in this room on and off for a long time and 23 during the course of today given evidence and offered 24 a number of insights and reflections on the practice of 25 neurosurgery, which has been very helpful indeed. Page 204

1 I'm also very conscious that your evidence today is, of 2 course, the product of and on the back of a very long 3 and detailed report that you've prepared along with the 4 ancillary documentation associated with it. 5 It is, if I may say so, a rich seam of information 6 which we will continue to mine as the Inquiry continues, 7 but that is the context against which I would like to 8 offer the thanks of the Inquiry for all that work, as 9 well as the evidence you've given today and indeed my 10 personal thanks for visiting us in Edinburgh to give 11 that evidence. I wish you a safe journey home. Thank 12 you and you're free to go. 13 PROFESSOR WHITFIELD: Thank you. 14 MR WIGFIELD: Thank you very much. 15 MR REDFERN: Thank you. 16 THE CHAIR: I think I'm right in saying that we are not 17 sitting on -- or rather, we are not starting on Tuesday 18 but we will be sitting on Monday, but not in the 19 morning, is that correct? 20 MR DAWSON: That's correct, sir. We have a slightly 21 different arrangement due to witness availability next 22 week so we'll sit on Monday afternoon. 23 THE CHAIR: At 1.45, everybody. All right. Thank you for 24 your help this week. We'll see you next week. 25 (4.56 pm) Page 205	1 INDEX 2 PAGE 3 PROFESSOR PETER1 4 WHITFIELD (called) 5 MR CRISPIN WIGFIELD1 6 (called) 7 MR ROBERT REDFERN1 8 (called) 9 MR ROBERT REDFERN1 10 (affirmed) 11 PROFESSOR1 12 PETER WHITFIELD (sworn) 13 MR CRISPIN WIGFIELD2 14 (sworn) 15 Questions by COUNSEL TO THE2 16 INQUIRY 17 18 19 20 21 22 23 24 25 Page 207
1 (The hearing adjourned until 1.45 pm, on Monday, 2 21 September 2026) 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 Page 206	

A				
A&E 45:20 191:16 192:10	accelerate 148:13	189:4	137:11	alleged 193:13
abandon 68:5,6 177:19 182:19	accelerated 124:6	actively 84:12 89:14	advantage 78:24 95:13 110:21	alleviating 35:24
abandoned 68:8	accept 164:15	activities 82:17 96:9,10,14 190:8	advantages 46:24 47:3 56:1,3 77:19 128:14	allocated 17:19 18:1 95:16
abbreviated 71:13	accepted 3:1 16:11 135:3,4	activity 151:19	advise 190:17 192:12	allocation 186:1
abdomen 121:19	access 56:10 103:22 113:23,25 114:3 115:3 117:24 121:10,25 128:20 133:1 141:7 143:6 184:8	actual 84:21 86:23 116:12 145:2 170:9	advised 45:12	allow 128:18 148:10,18 168:1 174:3 185:9 202:6
Aberdeen 10:9 22:3 33:21 34:3 34:11 35:7 95:3 108:17 158:14 159:9 172:24 173:2	accessible 122:2 153:25	acute 25:18 32:18 88:22 101:24 139:5	affect 155:21 157:10	allowed 29:16 32:14 76:6 82:24 83:1
ability 8:4,20 16:16 22:24 31:8 92:19 123:3	accessing 114:25	acutely 101:20 102:9	affirmation 1:22	allowing 54:14
able 6:15 22:25 23:16 41:16 47:11,13 58:23 77:3,7,12 87:18 87:21 88:12 89:5 90:12,19,20,21 90:22 91:6 93:7 93:19,19 94:11 96:12 105:1,10 105:21 108:22 111:3 151:8 174:13 176:4 181:24 185:19 195:17,21 198:1 199:24 202:5	accident 88:22 190:14 197:24	add 17:21 49:4 69:7 130:23,24 132:8 173:10 194:22	affirmed 1:23 207:10	allows 51:3,4
abnormal 60:1 125:8 151:11	accompany 185:2	added 135:1 153:5 153:5,7,9	afraid 2:12	alluded 75:12
abnormality 151:10	account 34:2 81:19	addition 164:5 167:16	aftermath 67:11	alter 158:23
absolutely 8:25 9:4 16:2 30:13 37:25 55:11 83:1 101:17 112:10 132:6 134:16 152:10 170:1 175:23 178:24 179:4	accountability 186:15	address 2:21 15:25 18:17 53:13 65:17 80:22 91:3 92:21 162:6	afternoon 119:10 174:7 205:22	alternative 30:2 80:21 83:22 127:1 130:16 166:13 168:18
absorbed 142:3 146:20	accounting 51:24 54:19 100:17	additional 66:20 106:18 127:3	afternoon's 195:9	alternatives 80:15 174:10
abuse 164:2	accuracy 107:17 108:2 190:20	addressed 2:20 70:20 126:24 143:19,24 187:14	age 42:16 51:10,13 83:19	amenable 89:13 98:9 135:19
academic 10:2	accurate 4:8 97:21 111:17,18 183:22 184:10 191:1	adequate 167:23 173:25 188:9	age-related 54:23 136:25	amend 17:21
Academy 5:9	accurately 62:15 73:17 107:16,16 125:4 183:21	adequately 187:14	aging 136:21	amortisation 78:13
	accused 192:17	adhere 164:3	ago 20:13 42:23 100:11 106:25 159:5	amount 23:24 54:17 110:24 194:24
	ache 41:9	adjacent 84:8 112:18 124:20,21	agree 17:23 29:9 183:9	amounts 55:17
	achievable 179:10	adjoin 206:1	agreed 67:19	amygdalohippoc... 152:2
	achieve 52:2,10 80:5	adjournment 119:8	agreement 64:12	anaesthesia 110:14 127:10
	achieved 5:1,2,6	adjust 73:22	ahead 68:9 86:14 101:17 152:6	anaesthetic 68:3 110:5,6 170:6 177:15,16
	acoustic 35:18 104:13 148:20	administrative 77:17 96:13	aided 160:15	anaesthetised 68:1 71:3 73:13 110:2 110:4
	acquaintance 7:8 8:3 9:2 10:17	adopted 16:7	aim 40:23 51:21 51:25 70:11 71:2 118:23 119:3 177:17	Anaesthetist 196:8
	acquiring 77:8	adult 50:7,10	aiming 154:5	analogous 143:9
	act 160:16 161:2 186:19 188:20	advance 2:11,17 56:24 152:1	aims 84:2	analogy 92:11 146:16
	acted 188:1	advanced 26:20 110:15 124:6	air 149:2	anatomical 45:15 57:19 74:5,7 75:2 79:18 112:2 112:11,23 120:8
	acting 163:22		akin 117:3	
	action 42:20 59:13 186:12 187:5,7		Alcoholics 150:16	
			align 189:10	

123:2 127:7 138:13 144:21 151:22,23 154:22 anatomically 63:23 anatomist 146:7 anatomy 45:15,18 58:10 59:16,17 61:22 66:19 121:21 122:12,13 ancillary 205:4 and/or 131:18,23 162:19 169:25 anecdotal 28:12 aneurysm 35:21 148:6 aneurysms 171:7 171:8 angle 74:17 animal 107:1 ankylosing 137:16 137:18 annual 9:22 anomaly 66:2 anonymised 188:4 anorexia 159:2 answer 14:16 93:13 100:4 102:7 120:23 121:2 158:11 160:3 172:21 195:17,20 199:14 202:16 answered 14:17 96:2 answers 109:1 anterior 103:23 104:1,4 121:11 121:16 122:17,20 150:4 anti-coagulant 170:13 Antibiotics 129:12 anticipates 73:23 anticonvulsants 180:18 anybody 101:8 159:21 160:11 anyway 133:1	aortic 121:21 apart 116:6 apertures 146:13 apex 115:23 apologise 2:11,17 101:14 195:1 aponeurosis 144:24 aponeurotic 145:2 app 180:13 apparatus 114:11 114:11 appealing 124:18 appear 3:14,17,19 67:20 70:21 101:2 137:24 149:6 174:8 appearance 55:4,4 appeared 24:9 appears 54:1 162:22 193:10 appendix 18:18 applicable 38:15 application 164:15 applied 46:11,12 applies 45:1 125:10 169:3 apply 17:9 97:1,2 105:20 109:17 129:4,15 143:12 165:25 175:20 applying 39:8 46:17 appoint 93:22 appointed 14:4 27:15 34:25 40:7 40:23 49:24 95:24 appointment 10:10 176:3,12 appraisal 202:14 appreciate 10:13 appreciated 1:16 apprenticeship-t... 93:16 approach 16:7 17:15 54:11 56:13 81:10,13 102:8 104:24	121:8,18 122:18 122:20 127:2 128:24 141:19 194:6 approached 64:20 104:19 121:6 approaches 54:9 127:7 approaching 85:17 appropriate 15:22 16:4 20:19 24:4 25:23,23 40:9 41:13 57:17 59:5 63:3 89:19 92:17 102:12 130:4 161:22 167:4,14 182:25 186:13 187:12 198:16 201:3,7 appropriately 26:8 130:3 170:17 188:12 approval 132:14 132:17 135:7 approve 17:23 approximate 73:20 approximately 73:13 aqueduct 146:10 archetypal 37:9 area 5:25 20:18 21:4,7 23:3 24:7 27:23 28:6 36:20 36:24 37:25 38:22 39:3 41:5 48:19 55:24,24 61:18 67:1 73:20 83:9,13 104:1,7 104:16,17 105:8 111:13 113:5 120:25 129:14 131:16 141:8 145:18 146:20 150:24 152:9 153:25 158:17 170:18,20 183:17 202:9	areas 11:7 12:15 16:18 20:12 24:11 28:9 49:10 75:12 123:4 133:6 150:25 argue 134:17 arguments 124:1 arisen 76:19 120:5 arises 148:2 192:24 arising 76:25 104:11 129:14 arm 130:13 134:4 Arnold-Chiari 154:9 204:4 arrangement 6:13 95:3 182:4 205:21 arrhythmias 68:3 arrived 77:4 arteries 121:21 articulate 62:7 artificial 52:7 127:17 aside 75:22 133:22 asked 1:16 9:18 11:4 13:3,21,23 14:11,12 15:14 15:23 16:16 17:12 42:18 70:24 79:5 136:13 153:1 161:14 189:15 193:6,17 194:17 202:9 asking 109:22 119:12 158:3 asleep 73:12 110:6 177:14 aspect 14:16 22:13 31:7 32:5 33:8,9 36:16 45:1 50:13 64:8 69:5 72:25 79:1 90:4 97:17 119:14 126:17 152:12 165:10 169:1 170:16,20 173:7,21 179:21 181:18 182:9	191:6 aspects 5:17 10:12 15:20 18:16 33:13 37:5 49:8 52:13 109:24 120:14 130:24 151:9 163:6,25 165:20 168:5,5 168:21 180:4 191:8 204:11 aspirational 182:12 183:7 aspiring 194:4 assault 86:2,11 assess 89:7 185:10 assessed 160:13 assessment 57:11 160:22 190:25 191:1 192:15 assessments 82:13 85:20 86:22 203:23 assist 11:21 14:25 31:23 144:14 153:8 assistance 1:18 90:23 140:22 assisted 161:8 assisting 44:5 associated 49:16 59:18 98:18 101:2 113:8 138:9,25 154:25 205:4 association 2:15 29:19 49:15 203:20 associations 49:16 assume 26:2 100:25 187:4 assuming 53:7 assumptions 16:5 assured 88:10 atlases 112:19 atrophy 150:15 attach 107:9 attached 74:4 86:3 93:8 94:10 attempt 17:7
---	---	---	---	---

127:25 attempting 127:25 163:11 attempts 204:11 attend 173:14 181:25 attended 9:13 attending 26:9 attention 23:21 43:1,2 79:7 81:7 81:24 158:5 189:17 attitude 55:19 attitudes 83:16 attractive 39:17 audit 48:25,25 203:19,22,24 204:7 augments 153:23 author 17:17 Authority 5:8 autologous 143:4 automated 135:9 availability 77:2 205:21 available 22:9 57:2 60:14 80:15 96:12,23 97:8,15 105:6 108:21 167:6 182:24 183:14 193:16 202:3 AVMs 171:9 avoid 72:21 117:18 avoidance 189:5 awake 110:15 111:2 112:25 aware 14:18 80:7 89:20 132:23 189:19 193:7,18 198:18,20 199:4 awareness 72:3,8 72:16,17	77:25 79:25 80:4 82:14 89:12 94:23 95:22 98:5 98:8,9,11,15,16 98:17 100:18 102:19 108:23 114:12,23 121:7 126:6 129:13 135:16 136:13 138:20 140:21,25 141:11,15 142:7 142:23 143:6,7 145:4,7 149:4,6 154:11,16,17 155:25 191:19 198:22 205:2 back-up 136:4 background 10:13 10:19 39:10 backing 152:4 backwards 107:11 bacteria 127:21 baked 117:4,5,6,9 117:10 balance 25:22 32:22 104:10,11 133:17 154:19 balancing 135:2 ball 147:5,9 banged 147:5 barcodes 196:13 barrier 147:20,21 barriers 187:24 barrister 42:20 Bartlett 160:1,15 161:7 base 28:18 35:18 36:12 94:4 103:12,21,23 104:2,4,6 141:7 145:7 149:8 161:2 based 21:13 23:6 33:23 37:18 63:5 64:2 65:21 69:10 96:10 123:3,8 161:13 163:20 164:13 165:13 166:10 169:3	191:1 194:9 basic 196:10 basically 45:24 46:19 107:1 129:12 143:10 164:25 196:10 basis 9:13 16:10 22:24 33:15 89:7 104:20 159:16 beams 117:8 becoming 41:20 108:21 bed 188:7,9 beds 78:3 beginning 8:1 10:16 110:10 172:25 181:21 190:21 behalf 88:5 behaviour 85:7 belief 186:25 believe 54:11 83:5 believes 79:21 beneath 116:13 benefit 77:12 96:7 105:1 123:23 124:7 134:3,8,24 136:10 177:13 202:21 benefits 77:21 83:22 84:2 133:19,24 166:12 167:25 174:3 benign 109:14,16 benign-like 109:11 best 12:11 14:16 16:16 23:12 36:5 44:12 74:11 77:7 146:16 166:5 169:23 175:15 178:3,15,18 190:10 better 42:25 111:2 128:20 134:5 157:22 162:20 177:20 178:11 185:23,24 beyond 9:22 42:5 169:9 171:14	177:8 bi-ped 136:22 bifida 156:11 big 36:9 69:12 99:8 113:20,23 116:21 118:5 127:7 138:11 140:11 146:21 147:15 148:24 150:2 168:22 171:19 177:13,25 179:10 189:10 196:3 199:11 201:18,20 bigger 15:3 21:15 21:17,18 114:8 114:15,15 115:3 157:21 biggest 124:20 191:11 bilateral 138:20 158:15 binoculars 116:23 biological 127:18 128:3 131:20 biomechanically 125:7 biomechanics 120:1 biopsies 171:5 biopsy 115:16 118:5,5,9,18 Birmingham 47:9 birth 159:24 birthday 48:1 bit 3:16 5:21 24:17 34:11 35:15 39:23 44:7 56:19 72:7 75:17 80:23 84:25 100:2,7 108:1 112:6 113:23 115:4 116:6 117:3,10 117:11,11 126:6 128:22 131:3 136:3 138:5 141:16 153:10 154:19 158:8 159:15,18 161:4	161:11 162:12 167:7 177:24 180:7 181:7,21 182:11 black 137:19,25,25 bladder 138:19,23 blancmange 116:6 blanked 3:12 bleed 140:10 bleeding 68:10 142:19 blood 35:21 60:1 117:17 121:20 127:22 140:11 144:7,13 146:24 147:20 151:10 153:17 155:17 170:12 171:8 blood-brain 147:21 bloods 86:22 blue 179:17 BM 4:22 board 42:2 43:13 105:20 174:12 Bob 1:9 34:24 112:6 159:16 bobbed 147:6 bodies 23:25 50:23 body 7:16 49:6,17 61:3 63:16 73:16 82:25 86:1 98:2 99:21 120:1 127:19 147:16 150:19 153:15 bone 41:5 52:10 59:21 104:6,7,8,9 104:9,20 114:12 114:12 127:18 128:3,7,7 129:8 141:9,11,15,20 141:22,22 149:2 149:4,6,6 bones 54:14 bony 50:23 52:6 58:10 74:3 122:7 book 96:14 193:9 193:14,16,17,19 193:20,24 194:1
B				
back 3:22 29:6 31:18,25 34:16 39:8 41:9 44:16 59:6 68:12 75:25				

194:5,9,11,17 196:3,4 boost 37:15 borne 124:16 134:13 bottom 167:22 185:7 bouncing 147:10 bounds 66:21 bowel 138:23 bowl 147:4,4,5 box 76:1 brain 37:20,20 88:23 103:17,20 107:2 109:3,3,4,6 110:25 111:5,13 111:14 113:16,20 113:23,25 114:6 114:7,25 115:2 115:13,22 116:3 116:10,11 117:3 141:7,16,18,22 141:24 142:9 146:3,11,12,14 146:16,19,23,23 147:11,13,13,15 147:17,18,20,22 148:6 150:15,16 151:19,19 152:14 152:17 153:14,17 154:11,14,20 155:2,5,18 156:5 169:19 180:19 branch 151:5 152:7 branches 165:3 breach 191:9,19 191:20 192:2,5,9 192:10 breached 135:18 breadth 35:15 168:13 break 70:11,15 109:20 118:22,24 119:2 127:24 161:23 162:2 195:7,13 breakdown 37:15 breast 153:16	Bridges 160:3,14 briefly 119:17 bright 116:14 137:22,24 bring 25:8 40:24 42:25 50:14 123:10 162:13 brings 49:8 Bristol 44:3,6 47:9 122:23 British 29:18 47:20 49:5 159:6 203:20 broad 14:3,8,12 84:11 120:17 168:22 202:12 broader 15:22 120:20 121:2 broadly 12:13 13:5,24 20:21 21:10 47:23 53:14,15 163:16 broken 78:6 Brook 159:20,23 brought 25:5 43:1 77:23 79:7 189:17 BS 6:24 budget 78:12 build 26:17 90:19 92:12 build-up 155:1 built 19:15 159:23 178:22 bulge 99:8 101:1 177:24 bulges 98:23 bulging 63:24 bulk 135:20 bullet 167:12 181:20 burning 157:11,13 burr 114:3,10 158:16 business 77:16,18 78:10,17 busy 34:21 buttocks 191:15 buy 78:17	C C 71:13,13 cage 52:8 cages 52:8 call 21:15 68:22 82:2 88:20 98:25 109:5 141:23 143:3 175:17 177:14 181:24,25 187:18 called 1:12,13,14 2:16 13:19 31:14 37:14 40:22 45:20 52:8,8 59:10 60:10 79:8 84:20 103:11,19 103:21 104:8,12 104:13 108:7 109:9 112:2,17 113:19 114:14 115:16 116:5 135:8,9 141:8,20 142:25 143:25 144:10,24,25 145:1,9 146:4,6,9 146:10,19 147:20 148:15 150:1,3 151:16 152:1 154:10,20,25 155:7 156:12 157:3 158:17 160:3,25 162:12 175:16 188:3,12 193:9 207:4,6,8 calvaria 103:19 Cambridge 36:8 37:3 46:19,21,22 47:3,4,6,11 69:12 camera 108:4 cameras 108:4 canal 156:23 157:1 cancelled 182:14 cancer 153:16,21 cancer-type 172:4 candour 67:23 179:3 capabilities 90:15 capability 20:17 202:5	capable 89:1,8 capacity 9:20 117:20 capsule 112:17,19 captured 171:23 car 190:14,19 cardiac 68:3 203:19 Cardiff 31:15,17 40:17 159:4 cardiology 19:6,14 19:15,16 care 9:1 19:4,5,9 19:25 20:4 21:2 27:5 29:1 92:1 118:11 166:5,17 167:9,15 169:17 170:2,5 179:23 180:2,3,5,8 185:4 185:10,16,16 186:11,21,22,25 191:10 201:14,25 career 6:9 45:22 94:17 143:18 176:7 careful 85:2 122:16 190:25 carefully 109:11 116:2 128:25 166:14 carers 79:14 carried 186:3 189:21 199:5 carries 60:5 carry 26:25 27:1 40:19 46:10 58:8 64:14 152:11 166:18,21 197:18 198:14 case 12:5 26:11,15 55:18 70:4 77:16 77:18 78:10,15 78:18 87:14 97:13,25 98:11 113:1 117:19 131:10,24 134:19 159:8 160:23 181:10 184:14 190:23 200:17	caseload 27:24 cases 19:18 20:4 22:19 23:9 25:13 25:18 26:13,17 27:12,16,19 28:14 75:7 89:11 89:13 102:15 134:18 148:23 150:6 167:19 172:4 184:15 203:3 cash 78:16 cast 133:22 casualty 88:21 catastrophising 138:3 catchment 20:18 20:25 23:3 34:11 category 163:9 cater 198:4 cauda 138:7,13,17 138:18,25 139:2 139:10,12,14,15 139:20 140:3 191:10 causation 192:9,13 cause 32:20 54:24 85:11 100:10 101:3 111:8 128:8 139:17 140:1,3,5,9 141:18 142:6 144:13 154:23,23 155:2,6,18 157:15 170:11 171:21 189:1 192:3 caused 106:8 139:5 178:10 192:6,13,18 causes 139:10,14 142:20 causing 35:25 63:11 64:25 117:25 139:6 149:11 152:18 157:18 caution 133:23 cautious 55:2
--	---	--	--	--

caveat 68:20 198:3	71:14 119:21	charges 78:14	cities 201:18	closely 160:2
cavernoma 151:11	121:23 122:9,11	charitable 78:1,4,8	city 201:20	closing 66:1 142:4
cavity 141:24	122:18 123:23	check 74:7,21	civil 193:3	142:20
celebrating 47:25	125:24 126:1	75:20 110:12	claiming 190:18	closure 143:17
cells 116:12	133:16,24 134:14	122:6 178:1	clarified 178:9	clot 88:22 140:11
147:13	134:21	181:3 195:7	clarify 17:11 49:6	CME 44:7
centimetres 74:19	cessation 150:22	203:12	61:21 67:12	CNS 27:13
145:6 154:14	Chair 1:5,10,15	checklist 60:25	120:21 163:9	coagulate 142:19
central 106:5	11:21 14:25 15:7	cheese 189:9,10	clarity 14:3 132:1	144:8
centralised 29:3	17:9 29:5,21	chemical 143:13	179:3	coagulation 116:4
centre 21:15,17,18	37:22 59:8,23	chemotherapy	classed 125:13	144:1,13
47:5,7 50:1 94:3	60:4 70:11,17	118:12 153:20	classical 155:6	coalface 96:8
107:12	105:6 118:22	169:25	clear 3:24 5:22	codeine 191:18
centres 22:8	119:10 140:5,18	cheque 78:17	11:12 72:18	coiling 172:25
201:18 202:5	150:19 153:8	chest 19:5	74:20 82:6	173:2
century 125:18	161:24 172:14	Chiari 153:5	140:17 177:1	coils 171:6
cerebellum 154:12	173:6,9 195:6	154:10 156:25	184:11,25 204:13	collaboration
154:19	204:21 205:16,23	157:18	clearly 64:24	135:24 136:8
cerebral 153:6,14	chairing 48:6	chief 187:11	183:21	collaborations
cerebrospinal	challenging 125:4	child 28:16,19,21	clingfilm 142:16	9:24,25
145:23 147:6,18	179:19	42:16,17 92:9,10	146:17,18	collateral 111:7
147:24 148:16	chamber 135:11	children 27:20	clinic 174:25 176:9	118:1,8
150:7	chance 112:20	44:8	182:15,19 183:13	colleague 24:19,21
certain 1:20 5:24	117:25 151:13	choice 23:11	183:15	24:22 34:4,6
26:6,24 27:10,14	change 5:7 29:2	choose 82:24 83:1	clinical 16:22 22:8	36:4 40:15 49:7
28:8 33:13 38:10	37:25 74:17	83:2,3 93:8,19,20	26:18 27:6 33:6	63:1 65:1 167:3
54:6 63:4 64:14	102:21 124:21,22	93:21 94:12	82:4 101:25	167:5 187:3
67:2 77:3,6	124:23 127:2	95:16 117:24	106:1 134:3	colleagues 29:17
81:17 105:9	179:11 184:23	141:12 161:13	166:1,3,11,23	34:4 35:16 44:3
110:23 112:24	changed 30:16	chooses 38:8	168:14 172:11	77:10 136:1,8
120:10,14,24	54:10 61:12	136:22	184:3,15 187:18	166:8 182:17
125:14 131:12	93:10 94:21	chose 161:10	187:21 190:8	184:4
133:11,23 137:20	131:3 160:23	chosen 26:4	191:6,7 192:4,22	collect 148:17
152:18 160:21	181:7	137:25 176:20	192:23 194:10	collection 196:11
163:14 168:21	changes 32:8	cingulate 158:17	204:5	college 4:25 5:4
177:7	51:10 54:24 55:7	cingulotomies	clinician 132:10	6:3,25 48:18,21
certainly 9:9,13	59:19 100:13	158:16	clinicians 82:5	49:12,14 162:18
45:2 58:5 68:15	124:6 136:20	Circle 7:15 200:19	84:22 166:25	162:19
69:23 72:22	137:7,12,17,23	circuit 148:17	clinics 34:16	college's 163:19
75:18 76:13	changing 38:14	circulate 157:22	clipping 173:1	colleges 6:4
80:17 81:15	184:16	circulates 142:3	close 46:14 55:10	collide 130:21
100:17 104:2	channel 146:6,9	circumstance	68:16 98:24	colonised 127:21
113:1 124:11,25	channels 186:13	177:21	112:16 142:17	colour 116:15
126:3,6,21,23	187:14	circumstances	144:23 145:1,4	column 51:5
129:24 147:12,19	chaos 152:15,17	67:7 83:15 86:1	145:14 156:7,10	Coma 45:13
161:24 172:23	characterise 18:9	88:9 89:4 114:20	171:25	combination 70:1
197:21,22	characteristics	123:16 126:15	closed 67:14	combined 121:17
cervical 60:19	79:12,13	148:1 174:10	144:17,21 145:11	come 7:20 9:19
62:9,11,12,13	charge 87:2	198:11	145:12,13 148:16	10:4 20:2,4 24:7

27:20 31:18 32:10 39:22 42:17 43:22 44:13 53:21 54:18,25 60:9 63:1 64:8 67:7 69:25 75:25 87:25 99:6 124:13 131:16 135:18 158:14 169:13 170:20 176:20 188:11 189:3 191:19 196:7 203:4 comes 56:17 78:10 89:10 100:21 169:1 182:16,23 comfortable 36:2 comfortably 117:5 coming 22:19 27:5 29:15 30:19 36:7 94:16 101:8 102:18 121:12,19 122:3 commenced 29:19 comment 32:6 153:3 164:17 182:11 183:8 185:21 commentary 202:11 comments 179:21 commitments 182:2,3,13,14 committee 10:10 27:3 130:10 132:20 135:6 common 43:18 52:16 53:23 84:5 103:25 121:22 122:18 143:8 144:10 148:20 154:3 165:7 180:21 201:10 commonest 61:18 129:10 150:16 commonly 109:9 109:10 136:19 139:4,25 143:18	148:19 149:25 151:16 153:2,12 153:15 154:10 191:10 commonplace 76:14 communicates 146:9 communicating 168:21 communication 167:20 178:21 179:2 180:15 communications 184:21 communities 21:5 community 9:6 19:4 20:8 24:5 48:8 company 200:22 comparable 20:21 compared 174:19 compartment 149:21 compatible 32:16 compelled 130:16 compensation 190:19 compensatory 32:2 competence 166:19 192:23 199:1 competency 30:1 competent 166:22 192:24 198:1 199:17 competitive 39:10 compilation 9:1 compile 17:19 compiled 18:10 compiling 12:4,8 complainant 191:12 complaining 57:8 complement 21:19 complete 4:6 177:17 196:18 completed 160:23	185:9 196:22 completely 57:21 130:5 132:15 179:8,17 complex 16:18 17:7 19:17 91:16 94:5 121:13 130:24 134:12 138:8 149:17 167:19 171:13 201:8 complexities 174:7 complexity 105:11 105:13 130:23 167:1 204:8,14 compliant 33:2 185:11 186:5 complicated 140:18,19 complication 129:10 179:9,10 184:23 complications 123:11 127:4 138:9 181:4 185:17 189:7 201:13 complied 4:3 10:25 185:14 comply 11:20 components 132:5 comprehensible 16:19 comprehensive 183:22 184:11 compress 143:12 155:5 compressed 99:2 compression 35:24 55:25 64:25 139:2,5,10,22 140:4 155:17 comprising 1:7 compromise 44:1 44:13 186:22 compulsive 160:7 computer 108:5 concentrate 5:17 concentrated 27:8	58:15 122:21 concentration 26:12 concept 32:15 36:15 60:25 106:25 107:7 110:13 116:7 125:3 126:7 130:5 137:3 147:22 164:9 170:4 175:16 concepts 55:14 126:8 158:1 concern 129:5 142:4 187:12,13 188:4 189:2 concerned 25:9 75:15 85:21 141:1 169:11 193:14 concerns 92:18 128:5 134:9 186:13,17,24 187:5,9,10,22,24 187:25 188:14 190:7 conclude 195:9 condition 26:21 135:8 137:15 138:7 150:22 154:25 155:7 156:12 157:7,15 160:23 169:20 184:15 conditions 23:18 24:17 27:7 37:7 59:21 94:6 139:24,24,25 152:23 165:7 166:18 203:22,23 204:3 conduct 187:2 conducted 67:19 conducting 51:14 62:17 85:25 113:5 confer 71:15 conference 9:11 48:12,15 77:11	conferences 9:14 9:22 38:21 48:10 confidence 92:6,12 confident 199:1 confirm 3:24 4:2 7:17 59:6 74:9 190:15 conflict 7:10 conflicting 183:4 confronts 22:25 conjunction 166:8 169:7 connect 114:10 connected 7:13 12:3 136:14 connection 7:11 7:13 10:16 98:1 149:4 152:25 189:23 connective 144:24 144:25 conscious 205:1 consciousness 141:19 consensus 11:18 17:22 18:5 consent 66:4 85:19 86:14 126:19 168:2 197:17,17 197:20 consented 64:11 66:17,22 198:11 consenting 66:5 89:18 consents 132:4 consequence 37:22 127:19 136:21,21 consequences 66:12 72:11 81:4 125:9 consequential 38:6 conservative 102:7 consider 7:9 8:2 15:21 61:17 66:20 167:2 169:18 178:12 193:6 considerable 50:6 110:24 131:22
--	--	---	--	---

132:1 174:7 consideration 30:4 83:15 167:19 considerations 34:1 126:18 129:4,15,16 186:12 187:17 considered 8:2 17:16 109:13 135:3 166:13 201:4 202:25 considering 44:19 55:22 71:12 consistency 51:10 consistent 103:1 140:7 consolidated 122:23 constellation 82:9 138:18,24 139:13 139:20 constrained 51:3 construct 166:9 constructing 176:24 consult 6:19 29:16 consultancy 160:14 consultant 4:17 5:11 6:21 7:22 8:11 10:9 13:8 13:25 14:4 18:23 19:3 21:22 31:1 33:17,20 38:22 49:25 50:4 87:1 87:11,15,19 88:4 88:9,14 89:24 90:7,9 91:7,19 92:3,6 93:6,14,18 94:10,11 96:4 97:4,6,7,11 167:3 168:11,13 168:23 176:7 180:25 181:14 183:1 186:4 196:5,8,10 198:6 198:12,13,15 199:3,24 200:3,5 consultant's 93:9	200:5 consultant-led 19:20 20:7 30:23 35:13 97:5 consultants 9:9 22:6 23:16 24:2 28:8 31:1,4 41:21 92:24 93:11 95:14,18 168:8 181:14 consultation 87:11 contact 86:4,16 87:20 159:8 169:13 174:23 181:5 200:4 contactable 97:11 contacted 46:19 contacts 165:4 contain 193:15 contained 138:16 147:4 196:13 contains 104:10 194:12 contemplate 123:16 contemporaneous 183:23 184:11 contemporaneo... 196:22 contemporary 81:16 93:11 content 17:22,23 48:24 88:15 contents 121:20 141:13 context 15:22 26:1 28:3 30:12 32:15 38:2 57:6 79:4 82:2 87:5 105:18 120:5,11 163:12 163:15 165:16 172:11 174:5 193:23 205:7 continence 138:23 continue 41:25 42:3 52:14 64:18 150:19,21 178:4 205:6 continues 193:16	205:6 continuity 29:1 185:3,16 continuous 7:6 137:8 146:22 contract 34:22,23 34:23 35:4 78:6 86:8 164:12,24 contrast 21:14 149:18 contribute 7:18 109:23 contributed 8:24 contributing 162:7 contribution 126:12 control 144:14 160:9 161:18 198:5 controlled 111:13 160:5,13,17 170:8 controversy 123:21 124:9 convenient 70:10 118:21 conversation 65:7 65:22 68:7,14 69:6 89:6 108:24 110:12 convey 175:13 convolution 115:23 convolutions 115:21 cooker 157:12 coordinates 107:13 copy 3:9,13 162:9 cord 128:11,12 146:15,17 154:15 155:6,21,22 156:4,15,18,19 157:3,6,6 169:19 cord's 155:22 core 42:6 47:17 117:9 cornerstone 186:9 correct 2:5,6,7,24	4:17 5:13 6:2,11 6:19,23 7:1,25 8:7,13,14,18,22 9:21 10:2,3,14,22 11:23 12:12,22 13:2,16 14:22 15:5,11,17 18:8 18:21 20:11 21:10 24:6 29:19 32:17 33:19 49:17,18,23 50:2 50:3,5 53:3,4,8 53:14,15,25 55:23 57:4,17,18 57:23,24 59:1,2 61:16 62:21 63:2 63:3,18 64:7 70:6,7 92:17,19 95:6 97:3,10,12 105:25 107:20 111:1,6,9 113:2 119:22 122:5 123:5,6 131:1 163:16 177:11 178:5,11 184:16 189:7 196:6 197:11 205:19,20 correctly 71:8 76:17 correlate 57:18 60:23 82:17 101:25 correlates 101:22 102:6 corridor 117:24 corridors 56:10 corroborative 59:4 cortex 116:12 cost 78:13 costs 78:14 cot 188:10 cough 155:7,14,15 155:16 coughs 155:8 council 48:2 COUNSEL 2:2 207:15 counselling 103:3	count 61:24 122:8 122:9,10 123:3 196:6 counting 122:17 country 37:3 129:21 couple 44:16 71:21 117:20 124:13,14 136:12 145:22 150:24 154:20 156:5,21 189:13 189:14 199:22 course 1:19 6:9 7:20 15:19 21:6 22:20 25:3 29:6 29:14 30:4 32:21 33:4 34:8 54:22 59:13 73:3 85:23 92:7 98:8 133:4 135:17 163:5 174:11 176:15 204:23 205:2 Coventry 47:9 cover 29:5 35:7 50:9,11,16,17 65:23 198:8 202:13 covered 13:24 17:13 21:3 36:16 36:18 50:7 194:24 202:10 covering 16:18 173:17 201:15 covers 98:6 168:4 CPD 7:7 202:24 cranial 25:15 33:16,17 104:4 141:24 150:4 craniotomy 114:14,22 129:7 141:6 150:2 create 52:5 54:16 77:18 created 115:2 198:13 creates 138:2 creating 77:15 creepage 40:22,22 41:1,11,12
--	---	--	---	---

criminal 193:3 Crispin 1:8,13 2:1 98:21 172:10 177:18 207:5,13 Crispin's 84:24 crops 22:21 cross 100:7 cross-purposes 196:1 cross-refer 106:8 crowd 125:1 crucial 170:1 175:23 CSF 142:1,4,5,9 142:24 148:15,21 148:24 149:5,11 150:14,22 155:1 155:2,11,13 157:21 CT 58:9,18 59:11 69:10 149:17 171:13 201:24 202:3 culture 186:16 current 77:20 112:4 166:22 197:22 currently 42:1 78:11 125:22 cushioned 147:6 cushioning 150:10 cutting 125:14,17 132:13 CV 18:19 21:20 30:16 33:14 44:18 45:2 49:24 190:1 cycle 197:24 cyst 100:16	date 63:15 163:4 184:15 203:7 Datix 188:3,7,13 188:15 Dawson 1:6 2:3,11 29:22 38:2 60:5 70:9,18 118:20 119:10,11 140:21 150:24 161:22 162:4 173:7,18 173:21 195:15 196:1 197:6 204:16 205:20 day 10:11 28:17,19 28:22 30:19 34:10 44:5 69:19 70:8 76:18 86:6 94:18 142:2 146:2 156:2 157:25 158:2 177:20 181:12,16 day's 28:17 day-to-day 25:1 94:8 days 21:21 34:20 48:16 74:9 95:20 100:11 149:13 156:1,7 191:24 daytime 34:16 deal 22:25 23:4,5 24:16 25:12,13 25:18 27:19,21 27:22 42:18 53:6 105:3,14 106:11 148:4 dealing 23:8 25:10 41:9 42:10 44:8 54:8 89:1 151:2 183:5 deals 99:15 101:5 dealt 19:18 23:12 25:14 27:13 28:14 debatable 126:2 debate 123:20,21 124:9 decades 54:11 71:21 131:3 158:22,22	decide 12:7 59:12 85:14 129:18 176:5 198:15 decided 12:14 42:7 deciding 80:14 decision 58:23 115:22 118:16 167:2 168:1 174:4 176:16,20 decision-making 83:10,19 84:13 86:23 87:10 89:16 105:17 130:24 170:3 175:16,18 176:14 199:3 decisions 12:9 35:13 57:1 85:20 170:15 174:9,15 178:13,17 decompress 51:21 decompression 119:18 121:1 123:18 128:19 134:6 139:3 decompressions 121:4 deduce 161:13 deemed 46:24 86:2 129:16 177:8 deep 37:20 116:1 117:23 118:7 deficit 102:11 define 102:8 defined 13:18 14:7 105:3 defines 181:22 definitely 38:14 47:3 104:16 108:14 172:22 176:12 191:3 199:21 definitions 105:5 deformity 55:23 degenerative 35:23 54:23 55:7 59:19 100:13 124:21,22 136:15 136:19,24 137:7	137:11,17,23 degree 38:5 51:3 91:24,25,25 degrees 82:8 dehydration 137:23 delay 192:11 delayed 1:3 134:17 delegate 89:7 96:7 delegated 87:16,16 87:21 89:17 delegating 96:23 delegation 88:7,11 89:14 deliberately 93:24 delicate 92:13 deliver 6:16 77:7 92:1 delivered 14:21 32:6 33:9 81:19 delivery 91:9 demand 131:5 demonstrate 163:25 demonstrated 102:5 department 20:2 41:1 75:24 77:17 77:24 78:21 188:6 departments 40:12 depend 40:12,20 dependent 145:18 depending 53:6 100:5 117:14 120:15,18 depends 51:18 66:4 depreciation 78:13 depressed 158:25 depression 158:15 158:20 depressive 160:6 depth 74:19 168:13 derived 10:21 32:12 79:9 143:16	describe 5:14 13:10 20:9 89:2 97:22 155:15 described 24:24 30:12 38:3 41:20 42:6 63:7 107:23 118:2 150:10 168:2 172:20 describing 26:2 29:23 187:22 190:10 description 85:8 97:21 99:14 138:13 168:19 194:16 designed 59:12 114:2 198:4 desire 113:8 despite 137:4 destabilising 66:14 destructive 107:18 158:18 detail 6:6 50:16 185:3 194:11 detailed 18:15 21:25 157:24 169:12 185:8 205:3 details 58:19 99:11 162:5 184:12 196:12 197:9 199:18 deterioration 139:6 determine 12:10 determines 40:19 determining 81:10 develop 38:20 45:10 60:8 116:19 164:16 developed 75:24 107:1 125:22 developing 148:8 development 7:6 29:8 93:1 119:25 156:17 developments 79:5 develops 156:3,15 device 52:7 54:14
---	--	---	--	---

D

damage 37:19
65:10 111:7,8,16
118:1,8 158:19
damaging 115:12
dangerous 117:14
darker 137:24
data 131:6 184:8
185:12 203:25
204:10

77:9 126:22 128:9 129:19 130:2,22 131:19 131:23 132:11,13 134:18 devices 125:19,21 126:16,19 127:13 127:23 131:1,5 131:11,17 133:1 133:7 DGH 18:24 21:11 diabetes 170:6 diagnosis 55:2 59:7 139:17 diagnostic 63:14 118:3,5 166:10 171:11 172:21 173:11,14 176:25 diagram 98:22 diameter 154:14 differ 15:2 116:19 difference 97:14 123:7 124:19 126:2 127:9 130:17 differences 120:18 120:20 123:2,2 different 6:9 9:24 11:16 12:14 13:12 15:3 18:1 18:2 24:11 36:17 37:5 45:3,5 46:25 47:1,1,1,12 48:6 50:19 51:1 51:15 53:5,9 57:6 58:1 61:19 63:21 64:4 74:23 76:7 82:10 87:4 94:1 98:1,6 99:21 103:10 113:25 116:16,18 120:14 121:18,22 121:25 122:1,11 123:4,4,8,9,10 127:6,7 128:13 128:16 130:5,8 130:22 132:5 133:10 134:8 136:25 137:2,13	137:13,18 143:9 144:3,5 145:16 152:17,23 163:7 163:7 165:9 169:6 172:15 175:11 179:8 185:6 204:4 205:21 differs 115:24 difficult 2:15 9:16 16:17 35:20 39:7 44:1 69:11 75:1 75:13 103:22 113:12 116:7 158:1 174:9 204:6,10 difficulties 32:20 32:23 91:5 155:19 191:15 dilemma 23:4 43:9 43:18 diligence 192:14 diluted 33:7 direct 79:18 86:4 87:11 200:6 directed 194:1 Directive 32:11 33:1 181:8 directly 15:9 20:1 20:4,8 51:22 91:2 135:11 director 42:12 46:4 95:17 132:22,24 133:3 187:11 director's 43:2 disability 51:24 disabled 179:14 disadvantages 136:11 disappears 156:17 disappointed 175:25 disc 50:22,22 51:8 51:18,20,25 52:4 52:5,22,24 53:2,2 53:17,18,19 54:4 54:4,8,10,12,13 54:17,18,20,22	54:25 55:9,9,17 55:24 58:11 59:20 63:9,12,15 63:22,23 64:21 64:22 65:6,9,10 68:25 69:4,10 84:7 98:14,22,23 101:1,24 102:20 119:18,21 120:1 120:2,25 121:10 123:14,16,22 124:17,23 125:2 125:6,24 126:23 133:16,24 134:14 135:12,17,18,19 135:20,21 136:15 136:19 137:17,20 138:1 139:4,4 140:10 156:1,2,4 156:6 161:1 171:19,20 177:23 177:24,25 disc-type 121:1 discectomies 121:5 121:24 discectomy 51:20 53:11 55:21 64:14,19,22,23 65:6 84:4 121:16 126:1 135:9 discharge 180:7,9 185:9 discharged 167:13 discourtesy 2:18 discovered 67:17 discs 41:9 50:21,21 51:16 53:23 54:1 66:11 72:6 121:15 124:4 137:22,23 discuss 18:3 36:4 83:20 87:11 119:1 136:10 166:9 167:24 172:3 174:2 190:16,17 discussed 8:9 17:15 50:6 65:15 66:1 89:20	128:14,24 130:20 131:19 132:24 135:24 177:5 179:1 181:13 discussing 64:13 73:1 89:11 159:11 172:5 176:24 discussion 8:19 22:22 64:10 67:23 84:1,11 87:15,22 127:6 127:11 133:2 140:22 171:25 175:14 176:8,21 200:16 discussions 106:4 120:6,7,11 169:23 170:1 172:9 179:12,16 179:19 disease 22:20 35:24 59:18 98:14 101:19 111:24 136:15,16 136:19,24 137:17 137:20 138:1 150:23 165:8,9 170:3 177:18 disorders 37:8 160:7 display 76:1 disruption 85:11 dissections 45:15 dissuade 80:19 distance 78:3 90:13 Distinction 4:22 distribution 57:20 district 18:24 19:6 20:10 28:24 58:13 191:13 disturbance 138:19 divided 109:4 171:2 doctor 16:21 46:7 67:4 75:20 185:4 185:10 188:12	189:22 191:9 192:10 doctorate 53:18 119:25 doctors 35:10 41:22 95:12 203:5 doctors' 34:22 document 32:24 76:18 162:11,15 163:11 169:2 181:18 203:18 documentation 79:9 205:4 documents 15:9 203:8 doing 28:17 31:1,4 34:10,15,16 35:23 36:11,12 37:3 40:3,16,19 41:10 42:7,13,24 43:12 46:15,16 56:10 66:12 69:10 72:17,19 86:22 88:4 92:12 92:17 96:13,19 99:1,13 101:12 103:7 110:7 112:1,3 123:16 124:11 125:15 134:5,6 136:7,9 145:17 148:1 175:6,6,8 177:23 192:3 197:23 198:22,25 202:22 202:24 203:11,21 domain 140:20 190:23 donations 78:1 doom 176:1 doomed 98:13 door 23:20 28:10 doorstep 22:23 DOPA 37:14 dot-to-dot 114:10 double 155:19 double-check 62:25 63:1 65:1 doubt 17:9 59:12
--	---	--	---	--

85:3 doubts 92:18,20 92:21 dozen 48:3 draft 17:19 18:1 18:12 drafted 18:3 drafts 17:20 drain 148:15,15,16 148:20 drainage 129:9 dramatic 161:16 161:18 dramatically 147:8 draw 25:21 117:21 drew 158:5 drift 74:16 drifted 74:13 drip 149:3 drive 28:18 49:1 driven 28:9,11 68:12 172:1 driver 39:11 drop 102:11 183:15 drug 180:21 drugs 160:8 170:10 due 15:19 29:6 98:17 151:9 157:16 205:21 Dundee 7:15 14:1 21:6,7 22:1 34:12 41:14 94:23,23,25 95:5 95:9,11,15,25 106:3 108:16,18 110:16 111:20 158:7,9,13,15 159:2 173:4 dura 141:23,23 142:15 dural 121:9 142:25 143:14 148:25 duties 10:20 11:1 duty 4:3,4 11:21 14:25 35:1,1,8	67:23 96:23 186:10 191:9,19 191:20 192:2,5,9 192:10 dye 149:18,20 dysfunction 138:25 E ear 104:7,15,19,20 149:4 earlier 8:10 69:5 74:9 75:12 77:4 97:18 105:17 106:15 107:19 108:24 109:7 118:2 120:6 132:24 133:9 140:22 141:4 169:22 170:19 172:14 173:25 174:6 175:18 177:5,18 179:2 181:19 193:6 earliest 130:1 186:24 early 5:2 29:11 36:8 39:8 61:10 76:13 81:9,20 86:21 94:25 125:2 131:10 134:1 137:9 149:15 156:8 181:3 183:11 193:7 easier 179:16 easily 57:14 easy 72:12 73:16 74:15,15 83:2 114:2 188:13 economical 164:25 edge 125:14,18 Edinburgh 21:16 22:7 95:4,8,22 106:8 173:3 205:10 edition 193:11 education 5:8,10 13:3 38:6 48:16 educational 26:20	33:5 82:18 educationally 194:7 EEGs 151:18 effect 26:23 112:3 134:7,24 150:10 169:20 effective 161:17 173:1 187:15 203:2,9 effectively 18:3,6 23:19 31:10 43:15 54:3 85:24 113:24 127:16 135:6 177:10 199:25 200:22 effects 38:6 effort 174:16 eight 46:21 192:1 either 39:1 52:7 54:13 74:8 115:12 151:14 199:7 elderly 137:6 elected 48:2,3 elective 42:13 69:19 166:17 182:2,12,13 199:13 electric 112:4 electrical 152:15 152:16 electrodes 151:19 electronic 167:18 180:11 184:1,5 195:23,24 electronically 188:5 element 54:20 80:3 elements 44:18 49:9 81:25 84:23 elephant 106:2 eliminate 59:12 ELJ0001-0001 3:8 ELJ0001-00030 162:13 Eljamel 7:9,14,21 9:13,19 10:9	13:21 15:15 24:9 38:18 60:10 189:21 190:3,23 190:23 192:21 193:8,13 200:23 Eljamel's 13:25 15:10 16:6 embryology 155:25 emergencies 30:18 50:12 emergency 20:1 23:14 26:9 31:20 31:21 34:15 58:11 82:4 88:18 89:6 140:5,8 181:25 182:1,6 201:21 emerging 36:14 emits 117:8 emphasis 163:14 emphasise 101:15 102:24 161:19 emphasising 188:19 employed 95:12 employment 32:14 81:2 82:18 enable 185:3 enables 107:15 111:2 195:7 encephalocoele 156:13 enclosed 103:17 encompass 166:6 encounter 62:22 encountered 103:9 encountering 68:10 encounters 103:8 ended 191:23 endoscope 69:1 endoscopes 150:1 endoscopic 68:22 ends 26:15 energy 147:14,16 147:17 Eng 4:22 5:4 England 5:1 6:25	46:20 49:15 162:18 enlarge 157:1,2 ensure 113:4 164:1,6 166:2,14 166:22 167:8,13 179:22 181:21,22 183:22 184:10,13 184:17,20,25 185:8,11 ensuring 164:17 ENT 104:21 enter 100:6 enthusiasm 124:25 enthusiastic 125:1 entirely 44:14 164:13 entitled 12:7 entries 183:17 184:14 196:22 entrusting 96:24 entry 123:9 162:21 196:18,23 environment 77:14 184:5 epilepsy 40:7 151:2,6,8,9,14,21 173:15 epileptic 37:6 equally 176:1 equate 56:14 equina 138:7,13 138:18,18,25 139:2,11,12,14 139:16,21 140:3 191:11 equipment 77:3,6 78:5,6,19 108:21 108:23 114:23 186:23 equipped 201:24 equivalent 86:20 161:20 era 37:1 83:9 108:18 errors 189:7,8 193:15 Escalate 187:12 esoteric 125:23
--	---	---	--	--

especially 23:14 26:9 essentially 36:4 37:10 78:10 107:15 109:3 114:3 145:4 148:9 establish 139:16 144:12 187:6 established 48:2 129:20,21,25 132:22 ethical 132:17 163:18 ethics 130:10 132:19 135:6 European 32:12 33:1 181:8 evening 191:16 event 41:19,19 42:4 61:2,3,5 198:14 events 61:1,14 184:21 eventuality 65:23 eventually 191:22 everybody 12:1 18:7 37:9 48:14 205:23 everybody's 155:9 everyday 28:11 evidence 1:7 2:24 4:3 5:21 9:23 11:12 12:2 14:5 15:7 16:6 17:1,4 17:10 24:8 29:22 32:10 37:18 49:13 53:22 54:2 54:15 60:14 79:1 91:1 105:5 118:25 119:2 124:10 163:2,5 165:21 166:11 170:21 189:23 190:2,24 194:22 197:12 200:19 204:18,23 205:1 205:9,11 evolution 189:12	evolutionary 29:7 evolve 38:24 188:25 evolved 54:10 71:20 evolvment 189:11 EWT 33:1 EWT-compliant 32:25 EWTD 94:15 exacerbate 155:3 exact 58:19 65:25 107:12 exactly 59:13 65:18 173:20 exam 46:20 49:11 examination 5:2,6 6:3,5 59:4 60:22 81:1 examine 175:3 example 19:12 20:3 25:11 38:18 39:12 42:2,7 57:7 58:11 59:6 61:17 62:3 63:6 63:12 64:14,20 65:3 66:18 67:25 68:10,12 73:17 73:22 77:8 80:2 85:6 86:19 88:18 91:6 97:1 99:18 102:10,18 110:21 126:1 128:10,20 137:9,15 148:21 150:16 158:21 168:15 180:17 184:22 190:13 198:12 201:23 204:3 exception 89:4 198:3 excess 155:1 excessive 85:7 exchange 152:14 excise 110:22 115:7 excision 105:9 exclude 101:3 139:17	executive 7:14 187:11 exercise 14:25 29:25 exhausted 37:17 exist 91:3,5,10 106:18 existed 172:16 existence 106:7 exists 79:10 103:15 exit 100:6 exiting 98:24 expand 24:17 39:23 179:22 expanse 125:20 expansion 157:9 expect 63:2,13,20 63:22 64:17 67:22 68:6 69:3 75:4,5 80:10 133:8 175:24 180:25 181:14 200:12,15 expectation 63:4 64:2 67:2,18 72:24 198:13 expectations 80:23 81:18 175:22,23 expected 6:15 63:10 72:20 73:5 84:14 90:14 177:7 expecting 62:23 63:17 64:19 67:9 116:2 expects 175:24 expensive 78:19 134:18 experience 6:5 9:17 12:15 21:13 23:6,6 26:17 33:6 42:11,22 43:8,17 44:18 88:25 92:22 93:5 95:21 99:3 112:7 132:2,12 151:6 161:14 165:25 168:13 175:22	experienced 25:5 40:15 87:18 98:1 99:24 experiences 138:6 197:13 experiencing 46:25 55:6 experiment 130:8 experimental 129:17 130:18 131:2 136:3 159:13,15 experimented 131:21 expert 1:7 2:23 3:5 7:9 17:17 119:14 167:3 170:24 171:12 189:23 190:15 202:16 expertise 9:18 18:11 25:20 26:12 122:21,23 experts 9:16 17:15 17:20,21,23 171:15 194:19 explain 4:23 6:7 11:17 16:17,22 36:23 88:12 97:20,23 126:25 127:1 128:15 129:24 130:10 174:13 explained 17:2 72:7 133:9,19,25 152:24 165:15 explaining 85:19 178:7 explanation 56:23 101:18 102:17 157:24 explore 79:2 126:9 202:10 exposed 22:16 26:19 39:3,6 40:4 exposure 25:21 26:13 27:16 64:21 65:5 74:1 expressed 4:5	extended 79:24 167:15 extensive 56:12 66:13,15 128:19 169:14 extent 12:3 28:9 81:17 93:17 158:13 173:12 external 82:23 112:11 174:22 externally 148:7 extra 127:13 130:23 extract 189:25 extraneous 198:5 extreme 138:23 extremely 39:10 90:5 185:15
F				
FAcadMED 4:23 face 4:21 103:21 132:13 155:20 face-to-face 181:5 faced 179:7,18 facial 155:20 facilitate 180:12 180:13 facilities 186:22 201:12,14 202:1 facility 20:17 fact 8:1 15:9 38:9 67:3,19 99:15,20 120:10 131:22 136:16 158:5 161:14 180:13 196:6 fact-specific 163:15 factor 106:18 factors 40:21 45:7 45:8,9 61:15 77:22 79:20 80:6 81:20 82:10,24 85:15 135:2 188:8 189:11 facts 3:24 134:13 factual 16:5 164:7 factually 194:12 194:15				

fad 125:12	fellows 162:19	finger 156:20	150:20	forms 166:13
fades 155:16	fellowship 4:25	finger nail 114:4	fluids 148:19	fortunate 99:4
fail 127:24 156:10	5:4,16,18,22 6:3	finished 28:17	fluoroscopy 75:16	forum 172:3
failure 98:13	fellowships 4:24	firm 51:12 93:13	76:6	forward 49:1
fair 9:15 13:15	5:22 6:2,4	94:2,3,3,4 95:15	flush 78:16	77:19 117:19
14:13,24 30:12	felt 44:12	first 1:21 2:21 3:10	focus 13:13 21:12	137:5 190:4
38:13 39:6 46:23	Fernbrae 7:15	9:9 18:1,12	33:8 49:21 90:4	forwards 107:11
72:14 81:10	200:14	31:16,18 33:20	100:11 111:11	fossa 141:8,19
132:5 204:12	fetal 156:16	34:5 62:1,6	121:4 151:20	150:4
fairly 99:4,6,7	FHEA 4:23 5:8	73:11 74:13	173:16	found 66:3 174:7
122:5	fibre 117:21	95:21 104:22	focused 25:4 55:21	foundation 165:1
faith 74:11 79:23	fibres 116:5,13	108:8 113:17	163:12	four 22:2 44:4
fall 163:9	fibrin-based	121:4 126:12,14	focusing 33:13	114:9 161:3,5,8
fallen 44:9	143:15	129:22 132:13	63:12 189:5	fourth 35:9 62:2
falls 188:7	fibrocartilage	133:21 134:2	fold 117:10	146:10,12
familiar 44:7	50:24,25	147:1 154:24	follow 64:20 102:2	fracture 137:2
185:11	fibrous 51:9	156:8 157:11	102:3 119:17	149:1,5
families 168:22	field 73:21 100:24	161:12 162:15,23	166:22	fractures 149:8
family 176:19	140:23 166:23	168:7 177:25	follow-up 109:18	fragment 54:18
famous 159:3	169:9 173:11	187:9 190:12	175:7 176:12	135:17
far 36:19 53:22	193:3,3,4 202:15	191:25 193:10	185:8	frame 107:9,11,12
64:8 75:14 85:18	fields 174:17,19	195:20 203:21	followed 165:6	108:3 112:12,12
89:13 92:10	fifth 62:2	first-year 194:3,4	187:10	114:24
102:12 107:11	fight 127:22	fit 142:21 162:7	following 32:1	frameless 108:7,12
115:17 117:5	figure 134:21	five 22:6,7 28:15	follows 30:11	108:16
140:25 169:11	files 196:12	44:4 60:20,21	foolish 171:23	frank 84:1
fascia 145:9 150:3	filled 188:8	104:22 131:7	foot 102:11	frankly 169:14
fashion 113:25	final 5:9 86:13	134:22 144:22	football 107:2,3,6	FRCS 4:22,22 5:4
135:22 139:6	158:2 189:13	161:8	107:24 113:4	5:20 46:20
144:17 145:11	202:9	fixed 107:6	147:4	free 54:18 109:24
161:21	finalise 17:22	flag 85:14	footing 165:13	182:2 205:12
fast 124:9	finance 78:12	flags 79:8,12 82:2	foramen 99:1	frequency 37:7
fat 73:16 145:10	find 9:16 15:8 55:9	82:3,4 84:19	146:6 154:21	frequent 151:15
fault 92:22	63:3,5,17,18,20	85:16	force 29:13	frequently 10:6
fear 80:3 131:20	63:22 64:21 65:5	flat 156:1	forces 131:13	Friday 1:1
feature 169:10	65:18,21 66:7,8	flight 82:15	fore 187:19	front 19:22 81:8
features 101:25	66:10 68:18 85:3	flippant 24:19	foreign 127:16	103:23 121:7,12
162:8 203:14	92:13 115:4	floor 103:19,20,24	foremost 81:8	121:15,24 122:4
fed 203:24	116:2 123:15	150:5	forget 128:2	147:8 150:2
feel 42:8 64:17	129:22 145:5	FLOSEAL 144:12	form 89:21 128:4	front-back 107:7
109:24 126:4	151:24 163:1,3	flow 146:22	152:1 167:18	front/back 107:14
177:9,20	177:24	flowery 85:8	168:2 197:21	frontal 113:17,19
feeling 42:11	finding 65:25 81:2	flows 146:13,20	198:4	158:23
124:12 157:14	151:23	fluid 114:6 141:24	formalities 1:20	fuel 50:10
feelings 158:20	findings 59:4	142:1,12 145:23	formally 100:15	fulfilment 11:22
feels 92:5 195:21	166:11	146:13,18,20,22	182:4	full 48:16 50:7
200:7,8	finds 163:13	147:6,18,24	formed 2:23 201:2	166:4 168:8
fell 30:1 188:9	fine 25:22	148:6,16 149:1	former 44:2	full-time 34:21
fellow 5:8,9 6:24	fine-tune 130:19	149:19 150:7,10	formerly 33:3	fully 88:12 166:15

168:1,11 174:3 184:1 185:11 201:24 function 37:23 38:1 47:23 91:10 110:13,21 111:3 111:8,12,12 115:11 138:22 147:18 157:17 functional 36:19 36:25 37:3,5,23 38:7,19,19 40:9 40:14 41:13 42:8 47:16,17 50:10 84:22 111:23 112:1 151:4,5 152:8,19 171:14 functions 125:7 147:1,11 fundamentals 59:2 funds 78:9 further 44:16 54:23 65:1 84:10 117:11,11 138:4 155:3 167:7 194:22 195:8 furthermore 102:15 134:12 fuse 54:15 134:16 fused 60:21 62:7 134:15,23 fusion 25:15 52:5 52:10 123:18 124:2 125:25 127:25 128:2,3,4 134:17	38:12,23 39:11 45:20,23,24 46:16 50:17 67:1 76:25 85:17 86:8 86:15 101:12 103:7 105:11,19 110:6 120:4,25 126:8 129:14 130:20 133:10,14 170:6 191:13 193:19 194:16 generally 13:14 19:9,25 31:22 70:5 98:7,15 104:18 125:15 126:11 173:19 generated 200:11 generation 25:3,5 25:7 90:17 93:16 gentlemen 1:15 70:11 118:22 161:24 195:6 204:21 gently 147:5 Geoffrey 159:24 159:25 geographical 15:3 gestation 156:2,8 getting 39:12 73:8 99:11 107:20 125:5 131:6 132:14 135:7 150:18 202:24 ghost 67:6 Gigli 114:11 give 6:6 29:17 33:23 92:24 96:8 96:20 100:18 111:4 133:16 149:9 157:21 180:18,21 185:3 191:17 192:19 199:15 205:10 given 16:17 17:16 58:19 72:5,9,9 77:8 109:10 157:25 163:2 165:16 167:20 197:17 204:23	205:9 gives 116:24,24 202:23 giving 85:24 86:14 101:18 118:25 gland 104:1 Glasgow 21:17 22:5,7 44:21,24 45:12,12,14,17 45:21 46:12 94:24,24 95:22 106:9 gliomas 109:9 gloom 176:1 glucose 147:14 glue 143:5,15,15 143:21,23,25 144:11 171:8 GMC 14:6 162:11 go 3:11 9:24,25 10:18 12:8 17:12 25:16 27:9 28:19 31:22,24 33:2 35:12 38:21 42:1 42:6,10 44:16 45:12 46:20 48:12 62:1 68:9 75:23 77:7,11 79:3 80:4 86:14 89:15 93:23 101:17 105:4 113:14 115:1,21 115:23,24 117:4 117:11 118:6 119:14 129:13 130:7 131:18 135:5 141:17 148:11 152:5 154:5 155:25 162:21 163:3 173:15 177:20 178:7 179:1 181:17 182:16,19 183:15,16 186:7 187:24 195:9 202:7 205:12 goes 63:4 146:14 149:20 188:5 203:19	going 1:16 2:19,20 32:23 33:6 41:16 41:24 43:3,14 53:1,20 56:25 58:22 60:3 64:12 64:24 65:24 66:8 71:5,10 72:18 73:14,24 77:25 86:14 87:9,16,22 88:12 90:17,17 91:2 93:10,23 94:1,18 95:13 98:14,15 99:9 110:17 115:6 117:18 118:4,22 120:4,19 126:22 127:8 130:7,14 131:13 135:4 139:23 140:16 145:7 147:2 157:16 175:20 177:2,13 179:5 180:13 200:13 good 1:5,6,15 2:3 27:4,7 58:10,23 80:9 84:9 90:14 92:25 105:21 119:10 126:4 128:23 130:7 142:21 143:7 148:8 151:13 157:4 162:9,12 163:13,20 164:4 165:1 166:1 168:14,20 171:17 171:22 172:21 183:25 194:5,7 194:24 197:1,7 204:1,9 Gore-Tex 143:10 governance 27:5 184:7 187:19,21 Government 7:14 GP 167:18,21 180:8 192:11 GPs 34:18 gradation 82:7 grade 39:14 109:10,12 186:11	grades 109:10,13 gradient 164:13 gradual 41:2 80:3 82:7 99:6 139:7 gradually 51:11 graduated 80:5 graft 52:10 128:3 143:4,8 grafts 143:9,11,11 gravitate 93:18 gravitational 136:23 great 78:23 105:3 106:12 116:21 greater 75:3,5 Greek 157:4 green 82:8 grey 116:12,15 137:24 grimacing 85:7 gristle-like 51:12 groin 138:21 group 1:7 2:23 3:2 12:7 18:10 48:7 48:8 122:24 151:22 160:13 groups 48:6 grow 153:17 growing 26:11 92:10,11 109:4,6 grows 109:8 guarantee 61:16 197:23 199:15 guess 48:20 185:21 guessing 37:2 guidance 23:24,25 92:25 163:18 171:5 180:23 188:18 guide 118:11 162:17 175:22 guided 37:11 guidelines 166:23 guiding 192:8 guillotine 135:11 gynaecological 100:16 gynaecologist 100:20
--	---	--	--	--

G

gain 95:21
gaining 70:22 76:9
gaps 142:21
gathering 53:22
60:13
general 5:23 10:4
13:12 14:18
15:12 18:24 19:4
19:6,6,7,8,13,17
19:25 20:10
26:14 27:4,20
28:24 33:16,17

gyrus 158:18	hazard 128:10	101:15 123:13	honesty 163:22	huge 36:17
H	hazards 127:3	132:7 138:2	186:16	Hull 47:9
haematoma 114:7	128:10	163:8 193:5,21	honorary 4:16,19	human 143:16
haemorrhage	head 85:10,12	194:18 202:23	48:5 49:4	hydrocephalus
144:14 177:20	107:9 108:4	204:25	honourable 43:21	27:13 155:1
179:6	114:2 116:25	helpfully 36:22	hope 79:17 80:9	hypertension
half 9:9 31:1,10	140:24 141:6	79:9 111:20	195:16	170:8
48:15 103:24	142:1,4,8 146:21	152:21 158:5	hopefully 116:8	hypothetical 96:1
175:13 176:17	155:13 182:16	162:8	178:10	hypothetically
hand 89:10	190:14,15	helping 203:7	horse's 138:15	41:19
handed 181:10	headache 155:7,8	hernias 55:9 59:20	hospital 7:15 8:12	I
handing 180:7,9	155:14,15,15	herpes 140:1	14:1,21 18:24	idea 27:5 67:12
handle 105:22	headaches 155:6	hiccups 155:19	19:7,12 20:10,14	73:21 124:16
179:15	heading 79:19	hierarchy 133:9	20:14,21,23	128:1 130:7
handover 185:16	heads 139:22	high 92:14 118:8	21:13,14 24:13	135:12,20 136:5
hands 43:5 157:11	heal 148:11,18	141:6 147:17	28:15,16,18	168:17
handwritten 71:12	health 42:2 43:13	148:8 149:10	29:23 34:25 35:5	ideal 44:12
hang 43:11	160:16 184:1,8	151:7 182:1,6	35:12 39:15	ideally 65:5 78:11
happen 19:24	187:2	201:11 204:8	40:10 43:4,19	ideas 137:4
28:13 41:23	healthcare 7:15	higher 5:8,16 96:4	58:12,13,14	identification
60:18 62:8 67:7	166:9 200:20	142:10	69:12 77:24 78:3	184:12
72:8 82:25 83:2	healthy 137:21	highlight 123:8	78:12,16 96:10	identified 100:14
148:22 168:10	hear 16:6	highly 41:12 79:21	96:18 97:9	identify 2:4 57:20
179:4 182:23	heard 5:21 9:23	Hill 159:22	105:19 129:19	58:6 60:24 62:15
185:18 188:20	14:5 24:8 37:10	hip 51:1	133:12 135:5	62:23 71:3,9
happened 22:1	48:13 49:13,22	histology 156:18	136:2 140:6	73:17 149:16,22
39:1 43:15 51:19	50:15 66:25 75:6	historically 75:6	150:13 159:21,23	151:20
67:10 173:4	159:6 161:5	78:2 124:2	167:14 172:18	identifying 59:25
179:3 185:20	162:10 163:5	history 46:23 59:3	180:5,24 181:12	60:2 122:17
199:2,6	170:21 189:8	59:4 60:7,13,22	182:21 183:1,15	ignore 171:24
happening 54:6	200:19 203:3	63:7 80:25 112:9	191:13,13,14	iliac 121:21,21
131:7 133:8	hearing 1:6 104:10	112:9 124:24	192:12 200:14,23	ill 137:3
happens 16:21	104:15 206:1	140:12 175:3	201:1,7,22 202:7	illness 169:20
22:21 42:17	heat 142:19	hold 73:19 114:13	hospital's 164:22	illnesses 160:6
60:14,16 64:9,16	158:18 179:12	holds 92:11	hospital-wide	illuminates 56:20
65:13,22 89:25	heated 123:21	hole 98:25 114:4	180:10	illumination
93:12 137:5	heavily 110:10	114:15,19 115:15	hospitals 21:1,2	116:25
happy 44:14 133:4	heavy 177:19	157:20	26:7 28:25 70:2	illustrate 99:12,14
hard 104:9 174:18	held 9:11 17:22	holes 114:3,10	70:4 172:16	illustrates 28:13
harder 62:14	19:19	158:16 189:9	188:3 201:10,15	image 51:8 61:20
78:21	help 16:24 60:12	holistically 169:18	201:24 202:4,6	61:20,21 74:8,8
hardware 129:10	61:7 93:1 98:15	home 31:24	hot 100:15	75:15 76:5,7,13
harm 170:11	98:15 144:7,9	191:17 205:11	146:3 175:13	76:22 171:22
178:10 188:11	151:8 177:17,17	hone 31:19	176:17	images 76:9
189:1,3 192:3,6	190:18 200:24	honed 95:9	hours 32:13 34:22	171:23
192:13,19	205:24	honest 69:21	70:8 117:14	imagine 10:6
harmed 193:13	helped 138:4	164:16	167:19 192:1	65:24 73:15
Harold 203:3	helpful 15:7 24:18	honestly 63:17	house 46:1 75:20	74:17 107:2
haystack 115:5	56:23 99:13	110:15 162:25		146:16 169:16

imaging 56:25 57:13,18,20 58:2 58:17 59:16 60:22 62:24 67:20 69:7 73:2 139:21 149:16,17 171:13,14	142:11 147:21 162:7 164:9,10 165:16 168:10 169:16 171:25 172:9 174:12 178:17 181:21 184:21 185:13,15 187:15,18,23 188:23 197:6 198:17	incorrect 194:13 194:15 increase 72:3 increasing 54:15 68:21 72:8,16,16 increasingly 80:7 80:18 81:6 indefinitely 180:20 indelible 71:19 independence 7:11 9:3 independent 4:3 8:5,17,21,24 11:5 189:22 INDEX 207:1 indicate 4:21 7:25 11:9,15 111:16 indicates 45:2 indicating 7:19 indication 58:20 71:12 98:4,12 101:23 111:4 indicators 79:15 individual 2:16 18:12 43:21 83:11 86:4,16 87:17 90:15 91:20,22 93:19 186:3 189:2 203:5 individual's 31:7 individualised 81:13,15 83:15 individually 17:18 individuals 18:2 32:13 infant 51:11 infected 127:22 129:6,11 134:10 infection 60:1 127:20,23 129:6 129:10 137:1 142:7 148:9 150:8 infections 27:13 infective 139:25 Infirmary 45:21 inflammation/d... 140:1	inflammatory 137:15 139:24 influence 82:10,20 106:20 189:11 influenced 191:3,4 inform 16:24 information 15:1 33:24 36:22 89:3 162:20 163:24 164:6,18,21,23 167:9,14,17 175:19 176:19 179:24 180:8,16 181:10 184:3,6 190:3 194:13 196:11,15 205:5 informed 8:15 57:1 86:12 130:15 168:1 174:3 185:19 infratentorial 141:20 infrequent 9:13 inherent 127:13 initial 17:19 24:15 67:22 74:14 134:8 initially 22:9 52:9 66:16 initiate 200:15 injecting 149:18 injection 175:9 injury 22:21 182:16 190:13,14 190:15,16,17 191:5 innovations 32:8 inpatients 181:15 Inquiry 1:18 2:2 2:12,24 3:5 7:12 8:5,15,16,21 10:15 11:13,21 14:25 15:21 16:6 16:25 20:22 21:21 40:25 79:6 126:14 131:17 153:4,9 160:4 189:18,20 190:1 193:8,12 194:23	205:6,8 207:16 Inquiry's 7:16 189:17 inroads 180:14 insert 125:11 inserted 161:1 inserting 148:19 insertion 135:15 inserts 128:9 inside 51:9 107:6 141:24 142:1,6 insight 25:24 43:22 insights 204:24 insist 131:6 instability 128:22 instance 2:21 187:9 institutions 10:1,2 instructed 16:4 instruction 3:4 10:21 12:5 13:19 15:16 16:11,15 instructions 190:21 instrument 74:4 108:6 116:4 117:7 instrumentation 36:5,14 55:22 121:17 insurers 190:19 integrate 127:18 integrity 163:23 intend 12:2 65:20 intended 62:19 65:12 67:25 74:12,12 111:6 203:16 intending 73:18 intense 113:22 intensifier 61:21 74:8 75:16 76:5 76:14,22 intensive 201:14 201:25 intents 98:10 interact 91:23 interactions
--	--	---	--	--

183:24 intercommunicate 146:5 interest 5:5 7:10 7:13 17:5,10 19:13 24:8 38:20 39:4,16 41:17 49:25 94:5 119:20 159:21 interested 13:9,14 13:17 14:20 15:19 17:6 20:12 20:13 21:22 22:11 45:8 60:12 79:7 80:16 83:12 120:25 121:2 123:15 189:20 190:5 193:18 194:2 interesting 32:3 125:3 155:22 157:7 183:9 194:11 199:10 interests 29:14 164:8 178:4,15 178:18,18 183:4 interject 46:1 52:12 interjected 120:13 internal 112:12,17 112:19,21 international 7:7 interoperative 62:25 68:9 interpret 58:22 144:21 interpretation 108:5 130:19 170:23 intervening 54:7 intervention 51:17 51:18 55:3 57:16 67:5,8,21 79:16 85:25 139:3 166:12 interventional 171:3,10 172:22 interventions 53:10	intervertebral 50:22 interview 10:11 intracranial 12:20 58:7 101:10 103:6,16 105:12 110:1 119:13 129:3 132:9 140:23 141:13 142:7 145:25 148:9,18 149:20 152:23 155:9 162:5 171:7,8 201:15,19 202:1 intracranially 129:5 202:2 intraoperative 73:6,8,11 75:14 122:6 intraoperatively 61:20 63:5 intrinsic 109:5,9 113:15,18 introduce 40:20 introduced 108:20 135:10 187:20 introducing 132:15,21 introduction 180:10 invariably 172:19 invasive 54:8 56:2 56:4,9,13 68:23 85:4 113:9 135:22 investigated 125:19 188:1 investigation 76:19 140:15 166:11 190:8 investigations 59:5 60:9 70:22 87:8 151:17 175:1,4 invited 46:20 involve 30:4 108:21 171:6 involved 10:5 49:2 50:20 51:5 83:18 83:20 84:12	86:22 89:14,16 94:7 96:8 105:24 112:14 119:23 139:1 141:2 143:21 144:6 147:12,19,25 151:1 153:18 190:4 192:7,8 197:4,10 involves 90:14 141:9 203:1 involving 51:15 53:23 54:1 126:19 150:6 inwards 104:8 Ireland 34:5 48:9 irksome 41:8 irrespective 82:23 163:4 irritation 100:9 issue 30:3,5 150:12 167:1 188:5 issues 22:17 60:9 76:19 91:3,7 138:6 181:13 item 78:25 144:12 items 78:20 J Jack-of-all-trades 24:25 jelly 116:6 jelly-like 51:11 jeopardy 187:1 jigsaw 114:11 172:12 job 34:21 45:14,19 45:20 46:11,12 46:13,17 81:3 105:21 182:4 jobs 39:8 John 40:3 160:1,2 160:15 161:7 joined 27:23 joins 61:22 joint 41:6 50:23,24 51:1,1,2 joints 102:19 journey 52:14 60:5 205:11	judged 192:10 judgment 25:22 25:24 29:25 66:9 102:25 105:21 106:1,17 judgments 85:20 90:12 92:3 168:14 junction 100:7 junior 24:3 31:14 35:7,10 39:25 46:4 75:20 95:1 95:5,23 97:9 justice 193:2 justification 128:23 K keen 130:11 142:23 keep 43:24 53:16 119:1 203:7 keeping 203:6,12 kept 25:23 197:3,8 key 79:5 kicking 176:14 kidney 75:7 kind 42:6 114:10 116:5 117:16 141:5 143:13 147:19 176:12 Kingdom 9:17 48:9 72:1 125:24 kit 136:7 knee 51:2 knee-jerk 102:20 knew 41:15 170:7 knife 116:3 Knight 159:24,25 knits 52:6 know 8:10 10:10 20:13 22:4 36:19 38:23 41:14 46:12 48:21 56:5 56:15 57:8 60:8 62:23 75:7 81:8 82:1,3,10 84:7 87:20 88:4,25 89:8 94:5,17 110:15 111:1,22	117:19,22 121:2 132:11 133:20 136:8 147:15 149:23 153:4 158:12 159:1,5 159:14,16,22 162:25 168:18 169:11 176:9,10 185:16 192:21 193:18 199:9,13 200:8 knowing 106:15 knowledge 4:1,2 7:8 21:25 90:14 164:6,14,15,18 165:25 166:25 192:23 known 83:23 160:8 knows 108:5 175:19 L L 71:14 lab 116:20 label 137:25 lamented 24:21 landmark 74:6,7 landmarks 112:12 112:21 122:7 123:3 language 16:19 85:7 145:12 languages 157:5 large 12:18,25 21:6,7 55:17 73:16 74:17 100:16 121:20 125:20 139:4 140:9 153:24 154:12 largely 22:22 79:13 119:18 larger 21:19 22:8 23:1,2,8 34:12 114:21 late 24:21 29:11 40:1 76:13 125:1 187:19,20 latent 170:6
---	---	--	---	--

laterally 171:20	legible 183:23	lie 166:18	161:11 162:11	127:20 131:6
law 32:12	184:11	lies 146:11	171:19 180:5	134:7
laws 185:12	legibly 183:21	life 28:11 32:4	189:11	longitudinal 165:5
lay 97:20 150:4	184:14	45:4,6 179:11	live 35:4	165:10
layer 51:9 142:8	legislation 32:12	life-threatening	lived 46:12	look 7:2 18:18
144:24,25,25	71:22	179:9	liver 61:4	34:25 35:11,12
145:2,8,9 146:14	legs 138:20 157:17	lifesaving 179:13	Liverpool 22:5	40:25 59:15
146:18	Lena 159:4	lift 114:12	38:17 39:12 40:3	61:19 63:10,11
layers 144:21,23	lens 101:6,7	light 74:25 82:8	50:2 112:7	63:13 70:23
145:4,12	lent 203:24	86:2 117:1	load 27:20	74:23,24 75:11
layperson 74:25	lesion 151:10,11	liked 41:4	lobe 152:1,3	82:5 105:2 108:4
75:4	152:18 158:18,18	limbs 157:16	lobectomy 113:19	115:1 116:10,11
lead 3:2 12:20,24	lesionectomy	limitation 31:9,9	lobotomy 158:23	116:16 127:5
13:5,10 17:17	151:16,21	77:20	local 28:6 40:12,20	137:10,22 147:9
77:17	lesioning 107:19	limited 22:17	187:8,14 188:16	156:17,22 163:10
leading 166:5	lesions 37:19	101:5 158:11	localisation 112:11	165:20,22 170:14
leak 142:5,5,9,11	112:15	168:19 201:17	localise 73:14	171:16,18 175:4
142:14,24 147:24	let's 65:3 66:10,13	limits 32:13 43:22	localised 74:5	189:18 191:7
148:7,9,10,12,21	68:2 164:11	81:18 106:15	locally 27:14 95:11	193:17 194:10,11
149:1,12,17,22	191:23	166:19 177:7,9	locate 113:3,13	204:2,6
150:5,7,9,14,20	letter 3:4 10:21	line 73:23 127:4	125:6	looked 55:12 60:6
leakage 148:3,5,13	12:5 13:18	131:7,8,9	located 18:24	172:7 188:8
148:18	letters 20:3	lines 60:23 120:13	100:1 171:20	194:5,13
leakages 148:4	letting 164:24	141:23 202:20	locating 107:23,25	looking 31:20 35:2
leaks 148:24	level 19:11 24:4	lining 109:8 121:8	113:3	37:12 58:22
149:13	35:7 36:5 37:15	138:16	location 57:9,19	59:14 60:13 70:6
learn 38:21 77:9	39:18 60:16,18	linked 47:10	71:9 112:2	75:9 76:11,17
learning 90:16	61:16,23 62:18	links 46:15 51:2	log 196:10,10	81:14 82:13
leather 142:17	62:22 63:19 64:6	52:6	197:3	84:16 91:1 94:8
leave 54:22 141:15	64:14 65:3,4,4,6	liquid 114:7	logbook 195:22,24	105:8 115:4
leaving 98:24	65:8,12,22,25	list 32:1 61:13	196:11	116:22 117:19
lectern 147:7	66:7 72:6 74:12	153:13 169:12,14	logical 30:11	126:14 134:6
lecture 147:2	74:18 75:19,20	181:2 185:5	logically 183:5	163:8 171:17
led 27:2 46:21	76:2 84:8 95:13	200:2	London 40:1	193:21,24 200:25
82:12 160:14	96:4 102:16,16	listen 17:9	159:16 201:17,23	203:6,9 204:9
left 2:4 70:18	120:15 122:6,14	listened 187:25	long 48:1 127:8	looks 57:14 64:4
71:18 75:9	122:14,15,16	listening 12:1 17:4	153:13 165:5	64:22 92:2
107:11 128:22	123:24 124:8,12	lists 176:15	174:20 176:15	137:11 138:1,15
141:21	124:14,15,20,21	literally 100:11	185:5 204:22	loose 35:4 128:6
left-right 107:8	125:5 151:7	literature 159:16	205:2	144:25
left/right 107:14	171:20 178:2,4,5	little 3:16 5:21	long-term 109:17	loosens 128:7
leg 84:5 89:12 98:5	178:8,11 201:5	11:25 24:17 39:9	124:19 126:2	lose 122:10 137:23
98:16,17,21	201:11,11	65:23 72:7 79:23	127:19	losing 157:17
99:10,25 100:18	levels 19:16 37:16	84:17 98:25	long-winded	loss 104:15 111:8
171:21	74:16,23 122:17	100:2 111:25	101:18	138:21,22,22
legal 42:19 88:3	165:9 172:16	112:4 114:13	longer 42:7 118:24	141:18 150:15
189:23 190:8,12	liable 88:3	116:4,20 135:10	127:10 157:16	lost 37:13
192:8 193:3	liberty 131:14	149:25 153:10	176:15,16 200:2	lot 29:25 35:18,20
legibility 185:22	licensed 132:11	156:1,20 161:1,2	longer-term	35:22 36:9 45:3

46:14 49:1 50:15 51:6 60:7 73:16 75:11 82:12 90:7 104:23 113:18 119:25 122:3 123:20,21 125:23 131:19 134:16,18 141:12 143:10 144:15 145:5 150:17 154:22 168:4,4 180:11 193:20 202:17 lots 55:7,8 70:2 169:6 low 34:8 65:4 141:7 148:21 160:10 201:5,11 204:7 low-volume 146:22 lower 23:15 35:19 39:18 62:6 98:7 156:11 157:16 lowest 61:25 lumbar 53:19 58:12 60:20 61:17,22 62:1,3,6 62:9,13 69:10 71:15,17 73:17 84:4 85:12 98:4 98:7,14 100:6 101:24 121:4,10 121:11,16 122:20 135:9 138:14,14 138:17 139:8,9 148:14,15,19 149:19 177:23 lunch 109:20,21 118:23 lung 153:16 lying 164:25	main 98:12 129:5 141:5 maintain 24:4 maintained 183:23 maintaining 133:25 majority 174:24 174:25 making 55:2 58:16 85:19,20 92:3 167:2 171:22 174:15 178:17 192:14 malformation 153:6 154:9,10 154:11 156:25 157:18 204:4 malignant 109:12 118:13 mammal 136:22 manage 82:15 managed 105:10 management 26:21 89:22 166:4 175:4,5 manager 77:17 managerial 77:17 mandatory 184:6 manifestation 27:17 manner 166:22 manufacture 146:23 manufacturers 131:5 manufactures 125:21 marathon 78:3 marble 107:4,5,12 107:17,24 111:25 113:3,12 mark 71:6,19 marker 71:19 73:19 markers 85:14 marking 70:25 71:2 72:1,23 mass 102:3 massively 157:2	master 24:25 match 172:12 matches 140:12 material 17:8 26:18 51:9 54:25 63:15 68:25 69:3 69:4 106:22 127:9,17,17 172:8 materials 23:23 matter 8:2 11:9,16 47:19 116:1 136:13 138:4 142:22 189:18 193:5 matters 3:25 4:6 8:23 13:12 18:17 44:19 70:20 119:1 126:13 140:22 185:6 189:14,16 Maudsley 40:6 159:17 maximising 169:17 MB 6:24 MDT 118:16 154:1 161:20 173:16,16 MDTs 172:1 173:14 mean 30:10 48:13 56:15,16 59:13 63:9,25 71:15 80:8 83:22 84:24 86:6,8 91:12 92:10 93:21 95:19 98:3 102:5 123:1 137:20 145:13 176:25 199:14 203:15 meaning 24:11 35:23 138:15 means 22:14 30:17 67:17 85:16 102:22 134:23 157:6 meant 2:18 21:1 21:18 30:18	44:14 112:24 119:17 198:7 measures 82:13 measuring 151:18 Meccano-like 114:14 Mechanical 127:23 mechanism 113:13 mechanisms 8:3 91:5 160:8 medial 152:3 medical 5:9 14:6 19:12 42:12 43:1 88:2 100:24 132:22,24 133:3 147:3 162:9 163:13,20 164:4 169:6,8,12,15 174:16,19 175:19 183:25 184:10 187:11 192:16 194:1 203:4 medically-based 37:13 medications 37:14 37:15 170:10,13 180:16,17 medicine 19:6 174:12 medico 190:8,11 193:2 medicolegal 96:15 96:18 189:21 190:4,10 191:6 191:11 meeting 34:19 118:17 134:21 154:1 172:7 183:24 meetings 11:19 17:22 18:5 166:14 172:2 meets 154:15 melanoma 153:21 member 18:13 168:11 184:20 190:1 members 48:2,3,6	162:19 168:12 184:13 186:18 membrane 135:18 142:15 meninges 138:16 meningioma 109:8 meningiomas 35:19,20 103:25 104:3 meningitis 149:11 Mental 160:16 mention 16:15 27:9,9,11 30:14 30:15 32:9 49:24 52:22 70:23 72:8 147:23 mentioned 9:23 21:20 25:14 27:11 29:22 30:15 36:18 40:21 44:20 53:11,11 55:15 56:23 57:5,22 59:9 72:25 75:15 76:21 96:20 97:20 103:11 107:19 109:7 110:20 115:10 119:16,19 120:7 120:12 126:17 143:20,21 144:2 145:22 169:4,5 169:22 175:18 177:18 178:12,25 198:3 mentions 181:20 mentor 46:18 mentorship 45:11 92:25 93:3 mesh 52:9 met 9:12 12:10 17:15 metal 52:9 55:22 metastases 153:7 153:14 metastasis 153:25 metastatic 59:22 method 85:4 194:7 methods 140:24
---	--	--	--	---

M

machine 75:21
76:6 116:21
147:9
magnification
116:24
magnifies 56:20
magnum 154:21

metropolis 21:6	193:1	Morrison 20:14	named 7:16	149:14 152:4
micro 56:16,18	miscount 61:23	motion 123:24	names 2:12,17	163:14 166:3
microbes 142:6	62:8	124:17	narrow 146:9	170:8,11,17
microdissectomi...	misinterpreted	motivation 106:10	narrowing 139:8,9	175:21 176:5,11
56:15	71:14 72:10	move 31:18 33:12	national 7:7 9:11	176:11 177:9
microdissectomy	mislead 193:15	136:12 155:12	48:7,7,25	179:22 180:20
56:19	misnomer 136:18	178:4	nationwide 203:22	183:6 185:18
microscope 56:18	misread 72:10	moved 34:4 45:3	natural 37:16	188:20 190:15
116:20,20,23	miss-pretence	74:2 95:22,22	124:24 128:21	202:1
156:22	164:24	107:25 108:17	nature 24:13 30:6	needed 28:16
mid-'90s 69:16,22	mistake 178:8	movement 37:8	38:9 57:9 60:11	31:19 174:13
mid-1990s 36:10	mitigated 63:14	51:3,5 53:16	65:21 165:17,17	183:15
69:9 131:10	mitigating 61:15	124:4,8 125:8	navigating 121:8	needle 73:20,22
mid-2000s 77:15	mitigation 77:22	126:4 147:12	128:12	74:15 107:16
125:2	mixed 202:21	moves 121:23	near 117:14,17,17	115:5
mid-thoracic	mixture 21:4 37:5	moving 45:5 46:24	117:22,24	needs 92:4 97:7,11
62:10	mls 146:3	49:20 101:14	nearest 182:24	102:4,25 131:25
middle 2:7 118:25	mobile 123:25	121:19 162:4	nearly 24:23 59:3	136:7 140:4
156:16	124:3 134:14,22	Mowle 8:12 9:3	175:5	170:7
midline 146:8	mobility 133:25	10:17	necessarily 26:4	negative 72:14,21
miles 28:15 35:5	model 19:21 40:5	MRI 55:8 57:22	58:18,24 70:7	negligence 191:7,7
40:3	93:16 115:2	58:1,3,5,6,14	84:24 86:6 102:4	192:4,16,22
Miller 70:12	189:9	59:5,11 61:19	124:15 126:9	neither 36:18
195:10	models 107:1	69:11,13,14,20	131:10 132:19	neonatal 28:14
millilitres 146:2	moderate 201:5,11	69:24 70:3 77:4	138:2 168:14,22	neonate 28:14
millimetres 107:14	modern 5:25 58:5	99:4 100:4,25	181:16 183:1	nerve 25:25 51:23
128:12	203:7	101:21,25 102:6	196:19	51:23 52:18 53:3
million 20:25 21:4	modify 81:3	102:21 108:5	necessary 23:15	54:16 55:10
24:24 78:20	moment 10:13	117:20,22 137:21	26:7 29:24 52:3	98:22,23,24 99:8
minds 81:8	13:22 20:13	139:18 171:13	74:7 114:20	99:9 104:12
mine 45:11 205:6	65:18 70:10	175:2 201:24	166:20 197:8	116:5,12,13
mini 56:17	118:21 141:25	MRIs 77:2	necessitate 142:19	117:21 118:1
minimal 131:8	161:23 179:12	multidisciplinary	neck 53:19 71:17	138:14,25 139:5
151:6	183:5	118:17 166:9,14	120:3 121:25	140:2,3,11
minimalise 56:22	Monday 182:15,15	172:2	122:4,12 124:1	nerves 35:24 99:15
minimally 54:8	205:18,22 206:1	multiple 60:19	157:1	100:5,8 104:10
56:2,4,9,13 68:23	money 78:3	72:5	need 31:20 32:25	121:8,9 157:8,10
113:9	monitor 111:3	multitude 98:6	33:3 35:1 38:4	nervosa 159:3
minimises 111:7	Monro 146:6	muscle 74:2 145:5	45:14 47:12 55:3	nervous 51:21
117:25	months 28:20,22	145:8,10	60:7 65:14 66:9	network 10:4
minimising 150:9	44:2,4 81:5 94:2	mustn't 86:11	66:15 74:21	networking 48:16
minimum 56:5,6	94:2 95:21	Myelia 157:6	76:21 78:6,8	neuro-oncology
135:22	200:13	myelogram 149:18	79:25 85:1 90:18	109:1
minutes 35:5 76:4	months' 175:8		90:23 91:10,10	neurological 88:24
76:4 143:12	morning 1:5,6,15		92:16,20,24	102:10 110:20
161:24 176:3	2:3 31:24 32:2	name 3:13,17,20	100:19,20 105:13	111:12 128:8
193:24	88:21 172:5,15	14:6 37:23 50:24	107:4 128:3,3	neurologist 37:11
minutes' 70:12	181:7 189:25	86:25 146:24	135:2,5 136:9	37:12,17
miscarriages	205:19	184:17 185:24	143:11 148:10	neurology 5:5,19
		196:5		
		N		

19:8 50:1 neurology/neuro... 194:2 neuroma 104:13 148:20 neuromas 35:18 neurophysiologist 152:5 neuroradiologist 171:10,11 172:4 neuroradiologists 171:25 172:23 neuroradiology 171:2,2,24 neurosurgeon 4:17 5:12 6:19 6:21 7:22 8:11 13:25 14:4 19:23 27:15 38:12 48:11 49:25 51:14 52:16 77:6 97:22,24 100:19 100:24 101:5 104:24 140:20 147:3,25 153:13 159:25 170:22 171:24 173:24 192:7,12,17,19 neurosurgeon's 105:21 neurosurgeons 5:24 13:4 21:23 48:9,22 49:5 122:3 139:1 151:1,3 153:2 169:4 171:16 199:24 neurosurgery 2:23 5:18,19,23 6:10 6:13 9:16 10:5 13:12,13 15:24 17:6 20:18 24:1 25:11,12 36:16 36:19 37:24 38:8 39:24 40:9 41:8 42:8 45:11 46:19 47:4 48:19,22 49:8,9 50:2,8,10 50:11 85:21	91:14 99:15 106:5 108:9 109:22,25 126:17 129:17 159:6 164:11 165:3 169:4,9,11,13 172:24 173:18 174:5 179:4 182:6 191:10 193:9 197:17 200:24 204:8,25 neurosurgery's 204:13 neurosurgical 1:7 5:7 6:16 7:5,20 9:6,25 14:18,20 20:2,5 22:12,17 26:3 27:2,21 28:4 29:8,18,24 30:21 32:8 39:10 39:19 41:1 45:19 47:21 58:15 69:15 70:4,5 75:18 90:6 91:13 110:12 162:8 172:18 180:2,22 181:11 183:19 187:16 194:3,4,8 202:15 203:14 204:2 neurotransmitter 37:14 never 61:1,2,3,5 61:14 130:6 new 34:17,22 78:8 93:7 110:13 125:14,17 133:15 133:18,21,23 135:3,7,25 136:5 174:24 NHS 7:13 79:10 91:19 96:18 168:25 180:11,13 199:24 200:13 202:6,7 night 30:19 31:13 34:10 35:9 69:18 191:25 nights 34:13,14	nine 42:23 43:7 Ninewells 8:12 14:1,21 20:23 noble 78:5 nominated 3:1 17:17 non-instrumented 35:23 non-ruptured 171:7 non-specialist 35:10 non-surgical 81:11 139:14 non-urgent 166:18 norm 104:3 normal 6:13,17 20:6 39:18 64:22 68:15 116:10,11 123:25 141:25 144:19 145:12 155:11 188:2 normalises 155:10 normally 106:18 116:3 118:16 137:12 142:17 144:20 145:1,14 149:9 154:7,21 155:10 156:7,23 181:6 187:9 196:18 198:22 199:15 200:4,7 nose 149:3,25 note 71:12 84:17 144:16,19 184:14 notes 71:16 86:25 144:15 185:1,1,4 185:8 186:4 199:20 notify 186:19 Nottingham 47:6 notwithstanding 150:20 novel 125:14,17 129:17,18,19 130:6,18 131:1 132:2,15,21 133:2,7 novelty 130:22	131:18,23 nowadays 108:10 110:9 117:7,18 118:16 139:18 141:10 149:24 198:21 number 9:10 13:3 14:17 20:19 23:15 24:2,3 32:13,20 38:10 55:14 60:17 85:9 96:2 119:2 125:21 134:13 135:23 143:9 152:22 158:1 183:17 188:19 193:12 201:17 204:24 numbered 17:18 numbers 22:12,19 32:25 94:15 204:7 numbness 138:21 155:20 191:14 numerous 61:15 nurse 86:19,20 168:20 196:6,20 196:20 nursing 188:9 196:19 nutrients 147:13 nutrition 147:22 O o'clock 31:23 32:1 88:20 191:16 oath 17:3 objective 37:22 51:16 202:18 203:23 objectivity 186:17 obligation 11:9 181:23 obliged 16:25 observational 130:14 observe 1:20 90:19 observing 136:20 175:7 obsessed 100:3	obsessive 160:6 obviously 33:8 43:17 46:13 48:16 60:3,22 65:13 78:24 81:18 92:10 140:9 153:8 192:24 198:14 occupies 157:2 occur 191:19 occurred 67:21 68:14 180:9 190:16 occurring 111:16 occurs 152:13 odd 63:23 200:20 offending 54:17 65:5 66:10 69:3 100:1 offer 23:16 24:12 26:24 27:10 31:8 38:4 39:18 41:25 42:1,3,8,12 43:3 47:11 57:15 58:23 81:22 84:25 90:23 93:6 108:22 194:20,21 201:11,18 203:10 205:8 offered 26:3,8,23 28:4 38:10,20 39:1 43:10 81:12 83:10 111:20 125:24 158:7 159:13,14 184:7 200:24 201:2,4 204:23 offering 30:8 42:5 80:20 106:12 158:9 201:7 offers 30:22 39:15 office 96:13 officer 46:2 75:20 officers 48:4 officially 73:12 oh 61:10 76:1 108:14 137:1 Okay 38:14 45:7 71:24 76:10
---	---	--	---	---

108:15 115:12,21 118:2 131:16 153:12 193:23 old 93:13 133:22 156:1 159:19,23 older 51:13 55:6 137:6 Olympics 34:6 41:22 on-call 6:10,14 28:21 30:18 31:10 50:9 69:11 88:19 94:8 97:2 97:7 182:14,22 183:2,11 199:10 199:12 once 34:19 73:25 87:9 95:8 109:16 160:18 177:15 180:9 181:12 oncological 59:20 oncologists 153:25 oncology 169:23 172:3 173:15 one's 77:16 81:3 169:9 one-off 161:21 one-unit 47:4 ones 126:16,20 176:20 oneself 85:24 onset 99:5 onwards 58:3 77:15 80:18 125:2 open 35:4 64:3 117:6 140:24 142:17 151:18 187:23 opened 65:8,19 178:8 opening 141:3,8 142:18 154:12,13 155:12,13 openings 141:6 156:5,7,10 openness 186:16 opens 63:8 operate 34:20 38:3	62:19 73:18 75:1 80:8 102:9 124:13,15 operated 42:16 62:21 104:23 178:11 operates 199:17 operating 34:15 44:5,6 51:22,23 55:12 56:17 61:1 61:2,18 62:10 65:19 67:22 71:17 73:14 74:11 77:24 95:19 108:3 120:9 124:12 128:18 167:3 177:16 181:2 182:22 196:5,9 202:2 operation 54:6,7 56:16,17,22 60:15 62:17 65:11,12,20 67:18 68:16,16 68:18 72:19 73:12 79:22 80:20,20 81:17 84:7 87:13 100:1 102:4,23,24 108:10 113:5 114:8,12 120:19 121:22 122:2,12 125:23,25 126:21 127:8 128:19 140:4 141:14 144:16 148:5,20 149:23 157:19,20 175:11,12 176:10 176:17 177:11,17 179:13,18 187:16 192:18 197:18 198:24 199:19 operations 35:17 35:18 60:11 67:1 114:15 121:1,14 122:4 123:17 126:10,19 149:24 158:23 180:22	195:25 operative 185:1 opine 192:20 opined 192:21 opinion 4:8 11:10 11:16 83:7 191:3 192:20 opinions 4:5,6 8:24 9:18 11:8,8 15:20 192:25 opportunities 17:20 22:8,16 33:5 81:2,3 opportunity 48:12 48:14 186:24 193:7 194:20,21 198:17 opposed 29:6 34:13 123:17 126:20 opposite 66:24 optimisation 166:7 optimise 170:1 172:10 optimising 170:5 option 51:7 81:22 127:1 175:15 options 57:2 58:23 58:25 81:11,11 87:12 168:18 169:21,22 176:8 order 21:9 24:3 28:25 39:5 43:3 91:3 113:23 118:10,11 organisation 47:24 47:25 184:2,7 200:21 organises 48:10 organism 149:10 organisms 142:6 origin 151:20,24 original 3:13 191:24 192:1 originally 62:19 orthopaedic 41:4 41:7 46:16 orthopaedics 19:8 41:6	ought 78:25 130:9 out-of-hours 6:15 outcome 56:1 60:15 72:14 80:9 82:13 124:19 131:6 161:15,16 191:2 204:10 outcome-based 203:24 outcomes 72:21 76:20 82:11 outdated 78:7 outer 51:9 outlandish 126:7 outliers 203:12 outline 77:21 outpatient 20:3 174:23 176:3 182:19 outpatients 182:18 outset 10:8 168:24 outside 61:12 113:11 117:4 142:5,5 outweighs 78:24 outwith 66:21 119:2 overall 11:20 27:6 51:16 overlaps 122:13 122:14,14 overly 85:8 overriding 11:21 overseeing 91:18 oversees 48:8 oversight 49:8,11 overwhelming 158:19 oxygen 147:14	18:18 162:21 163:10 165:23 166:24 167:12 181:17 182:10 183:16 185:5 186:7 207:2 pages 163:21 paid 202:8 pain 35:25 51:24 52:17,17 57:8,9,9 65:17 82:16 84:4 84:5 89:12,12 94:6 98:1,5,8,9 98:11,15,16,16 98:17,17,20,21 99:21,23,25 100:18,18 101:2 102:11,18 126:5 134:3,4 138:19 138:20 155:20 157:8,14 171:21 175:10 painkillers 82:16 pair 116:22 paper 112:8 196:4 196:4 paperback 193:11 paperwork 200:25 paracetamol 191:18 paragraph 17:12 17:14 18:4 70:24 71:24 79:3,8 182:12 194:9 paralysis 157:15 paramount 168:24 parent 96:10 parents 42:19 Parkinson's 37:9 39:25 40:2,3,5 107:20 111:23 112:18 115:13 parlance 84:6 Parliament 190:2 part 10:4 27:20 38:11 39:7 51:20 51:25 57:10 61:3 73:12 90:16 91:21 98:1,3
--	--	--	--	--

99:9,21 105:5,20 111:14 113:17 114:21 120:10,18 122:24 125:1 130:9,17 143:22 152:3,8,15 183:11 184:6 188:15 197:6 participation 7:6 particular 5:14,24 5:25 6:10,14 8:8 11:7,9 12:15 18:11,11 25:5,20 26:15 27:7 29:14 32:7 33:13 38:9 39:4,5,16 41:17 46:25 75:2 76:20 83:21 85:10 86:3 90:6 94:3,5,10,18 97:2,17,19 99:9 99:25 102:16 103:13,14 105:24 109:23 111:11 112:20 119:20,20 125:12 126:16,18 127:11 129:2,15 129:23 134:2 145:14 149:10 162:22 164:20 165:16 170:20 172:10,17 173:24 174:5,13 183:7 186:2 189:2 196:23 197:18 203:14,25 particularised 169:2 173:22 particularly 13:9 14:19 27:12 32:18 36:21 43:18 74:16 75:13 83:12 104:5,11 105:14 115:5 123:22 138:8 142:7 150:13 157:1 161:17 164:10 165:7,15 169:3 171:5 175:1	201:14 parties 195:8 partly 66:4 201:12 parts 123:8 152:17 party 86:19 pass 84:17 138:14 passage 27:10 176:23 197:1 passages 173:7,21 173:23 passed 180:23 passes 154:14 passing 27:11 73:1 98:25 patch 143:10 paternalism 83:19 path 92:13 pathological 51:6 54:24 137:14 pathologies 100:9 pathology 58:6,7 58:20 59:10,18 60:2 62:22 63:3 65:5 66:10 73:5 100:1 101:21 102:5,16 116:17 pathophysiology 101:19 pathways 152:18 patient 19:22 23:12,20 27:4 30:1,2 38:1 53:7 55:5 56:2 57:3 58:24 59:1 61:2 63:2,8 64:4,10,11 64:15 65:8,15 66:1,6,22 67:8,10 67:13,24,25 68:7 68:17 71:3,16 72:4 73:11,19 74:16 75:22 79:13,15,21 80:15 81:12,17 82:13,24 83:3,7 83:11,16 84:12 85:2,15,24 86:5,8 86:12,17 87:1,2,6 87:20,25 88:4,10 88:15,21 89:17	89:21,25 91:9,20 91:22 100:11,16 100:19 101:20 102:3,10,22 109:25 110:2 111:4 112:15 113:10 115:25 124:19 126:24 127:10 128:15,25 132:4 134:24 135:12,15 137:15 137:21 141:25 142:12 149:19 150:12 153:24 155:8 157:18 158:14 164:12,14 164:23 165:2,11 165:12 166:4,10 167:4,11,13,15 167:16 168:1 169:17,18,19 170:5 173:24 174:3,25 175:3 175:15,19,21,24 176:4,5,7,24 177:10,12,14,16 178:5,22,23 179:3,7,23,25 180:11,14 181:1 181:25 182:16,24 183:4 184:18,22 185:2,10 186:16 187:5 188:7,11 189:3,6 190:13 190:18 191:12,20 191:22 192:3,4 192:17 198:11,17 198:20 199:4,7,9 200:1,4,15 201:21 patient's 57:19 66:17 67:18 73:15 82:21 84:23 85:10,19 86:10 102:18 107:9 108:4,5 143:1 150:3 164:17 167:15,18 167:21 178:3,14	178:17 179:11 180:24 184:12 191:9 196:5 197:25 patient-centred 187:16 patiently 49:20 patients 16:22 17:5 20:20 28:10 33:10 34:17,25 35:3 36:3 37:6,8 54:2 55:10 61:24 62:4 69:21 72:23 77:13 78:23 79:14 82:1,11 83:18,20 84:6 92:1 94:9 96:18 101:24 102:1,13 106:8 109:18 110:3,8 112:5 126:3 129:25 130:1,11,15 135:25 136:10 137:7,9 139:15 139:19 149:8 150:15 151:17,22 155:14 156:25 157:10 160:5,9 161:16 164:8,20 165:4,5,8 166:2 166:17 167:8,23 168:21 172:6 173:3 174:1,14 174:24 176:10 180:19 181:15 183:13,24 184:4 186:11 187:1 189:1,6 190:25 191:4 193:12 198:23 199:13,14 199:25 202:7 patients' 80:23 158:24 164:2 Paul 160:3,14 paying 77:23 81:6 peers 192:22 pelvic 100:16 121:19 pelvis 100:6,8,9	102:4 people 9:12 10:5 17:4 20:19 25:7 28:5,25 29:14 32:25 33:3 36:11 39:14 41:22 47:1 48:21 55:8 56:12 58:6 61:18 72:20 75:6 78:1 80:13 85:6 89:15 98:16 99:3 100:3,5 103:11 116:18 121:15 122:22 124:12 125:14,16 125:23 131:21 132:1 133:13 137:6,18 139:22 145:17 150:14 176:9 185:18 187:24 188:13 193:20 202:17 203:2 people's 81:8 82:17 124:16 percentage 112:20 percentages 148:22 perception 54:3 98:5 percutaneous 135:9 perfectly 125:6 perform 199:17,18 performance 187:2 performed 152:2 192:18 pericranium 145:1 period 9:8 13:8,19 13:20,24,24 14:7 14:11 20:24 32:2 32:3 38:15 44:3 44:20 50:7 57:25 61:9,12 68:21 70:6 72:2,20,22 76:10,10,11 79:6 80:16 81:14,20 83:12 84:15 86:7 104:2,17,22
--	--	--	---	---

106:4 108:13 110:3,16 113:17 125:12 141:11 149:15 150:1 165:5 172:17 173:5,6,13 180:22 183:12 198:19 199:6 periods 14:12 79:24 163:7 peripheral 21:1 25:2 111:16 permanent 41:23 person 57:7 86:24 86:25 87:15 88:11 91:19 97:9 97:14 132:13 155:11 188:6 personal 9:2 10:17 27:17 42:11 43:8 43:17 45:8 159:8 190:13 191:5 203:13 205:10 personalities 158:24 personally 8:12 144:20 175:17 176:6 178:3 perspective 41:8 68:3,4 132:9 183:19 persuasive 78:15 78:17 pertain 148:2 pertaining 11:8 13:12 24:9 131:17 pertains 120:23 Peter 1:8,12,24 39:24 204:3 207:3,12 petrous 104:9,9 149:6 phase 118:11 phased 80:2 PhD 4:22 phenomenon 27:18 29:9 30:6 43:18 98:19	phone 35:11 88:20 195:2 200:13 phrase 67:5 106:21 108:25 physical 84:21 physicians 19:5,13 physics 171:12 physiological 79:19 112:3,13 151:20,24 physiologically 68:2 112:24 pick 25:17 38:25 70:18 92:13 94:7 97:19 170:8 picked 38:19 picture 168:23 170:14 piece 32:11 37:20 77:23 78:4 113:20 129:8 136:6 142:16 pieces 78:19 172:12 pinball 147:9 pink 116:16 pint 142:2 pioneer 40:2 pituitary 35:17 36:11 104:1,3 place 8:19 15:4 23:12 39:2,5 71:6 74:1 76:5 86:5,7 92:21 107:21 120:3 125:5 130:4 133:14 143:4 158:4 159:24 187:7 197:25 placed 12:11 14:16 36:5 63:24 158:17 places 45:3 156:21 plan 60:8 166:10 175:5,5 176:25 179:1 182:5 184:24 plane 107:8,8,8 planes 107:7	planet 136:23 planned 66:16 planning 32:24 48:23 plant 153:17 plastic 148:14 plate 75:22 plates 114:14 please 1:11 3:8,11 3:22 4:24 7:2,24 10:19 18:16,18 28:2 33:12 46:10 50:18 71:1 79:4 97:3 101:17 111:1,9 120:24 152:11 162:13,14 163:10 165:22 181:17 183:16 186:7 plugging 155:13 Plymouth 4:20 47:9 pm 70:16 119:7,9 162:1,3 195:12 195:14 205:25 206:1 pneumococcus 149:9 point 9:20 10:15 27:14 30:14 46:6 46:17 65:24 76:24 92:3 100:23 112:21 128:2 143:24 156:14 167:12 172:24 173:10 181:20 185:18 191:9 pointed 10:13 13:7 16:3 90:8 139:12 points 167:7 policies 187:4,8 poor 35:7 186:20 pop 159:3 population 20:25 21:4,8 24:24 34:11 portable 75:21 76:6	position 3:1 14:3 33:20 63:23 70:2 105:11 107:6 178:1,2 190:7 positive 181:22 possibilities 72:3 possibility 8:16 55:15 65:13 66:6 66:7,25 73:4 101:3 147:23 150:9 177:6 178:25 possible 16:19 17:8 28:23 30:7 40:11,18 41:25 54:5,12,23 61:23 62:8 63:7,13 68:25 74:11 113:10 120:9 139:15 167:18 possibly 52:13 76:15 85:11 96:16,17 138:21 post 39:12 40:8 160:1 post-operative 68:13 126:5 148:4,5 179:23 180:1,2,5,25 posterior 104:24 121:6,7 122:11 141:8,19 postoperative 166:7 167:9 184:19 postoperatively 166:16 posts 39:10 potato 117:4,5,6 117:10,10 potential 56:1 72:9 77:21 84:9 87:12 97:24 127:4 133:19,24 184:23 potentially 20:20 66:13 72:11,13 106:7 138:22 150:17 power 48:21	164:13 165:17 powerless 88:24 practical 43:23 85:18 93:4 practically 28:23 43:7 practice 5:15 6:7 12:24 13:8,25 14:18 15:10,21 15:24 16:7,22 18:16,23 19:4,7 19:12 24:12,23 28:8 32:8 33:18 35:17 36:21 41:11,16 44:10 49:21 58:5 65:15 66:5 68:15 71:22 71:25 81:16 83:11,25 88:2 96:11 111:23 124:16 153:11 162:8,9,12 163:6 163:13,20,24 164:1,4,20 165:25 166:1,20 183:25 185:13 190:8,8,11,12 197:1,7 199:22 199:25 200:16 202:25 203:6,11 203:15 204:24 practices 7:20 19:3,3,20 practised 13:14 19:4 110:14 practising 40:8 practitioner 86:19 practitioners 86:20 168:20 pre-existing 124:21 pre-incision 74:14 pre-op 108:7 pre-operative 57:10 70:25 71:2 72:1 170:5 179:15 precipitant 148:24 précis 18:19 30:16
--	--	---	---	--

precise 37:20 114:23 precisely 67:16 110:17 precision 105:4 113:21 precursor 82:3 predict 112:19 predictions 191:2 predictor 124:20 predominantly 5:15 6:8 12:24 13:11 79:14,16 prefer 114:17 175:17 preferably 184:25 preference 36:3 116:19 143:2 preferences 82:21 pregnancy 156:9 preliminary 2:19 premature 25:15 preoperative 166:6 preoperatively 166:15 prepared 1:18 3:5 3:9 205:3 presence 172:18 present 23:18 87:7 139:19 presentation 53:6 64:16 80:25 84:23 191:24 192:1 presentations 54:9 204:5 presented 30:1 63:8 85:22 197:13 presenting 52:16 presents 104:15 140:6 191:12 preserve 123:24 124:7 preserved 53:16 65:10 preserving 124:17 president 47:20	48:4 president-elect 48:4 press 100:15 141:17 203:4 pressing 30:4 51:23 140:11 pressure 23:9 51:22 53:3 90:7 142:12 148:17 155:2,9,10,10 176:13 pressures 174:22 174:23 presumably 57:1 64:13 115:7 131:25 145:17 150:19 197:12 199:18 pretty 78:15 103:20 112:1,5 114:1 145:12 151:13 156:19,21 200:10 prevalence 55:16 prevalent 55:19 prevaricate 176:13 prevent 72:13 150:5 previous 100:12 161:14 previously 89:11 primarily 12:19 59:2 primary 19:3,25 20:4 59:21 153:15 186:10,15 principle 107:18 114:16 115:8 151:7 principles 21:11 163:3,21 164:4 print 197:21 printed 185:25 prior 7:8 72:1 167:24 174:1 prioritisation 182:20,21	priority 166:3 183:6 pristine 139:21 140:14 private 96:11,20 96:21 164:19,21 164:22 165:7 182:3 183:8,10 183:13 199:22,25 200:5,10,16,23 201:1,7,10,15,19 201:25 202:3,6,6 202:7 privately 200:4 proactively 100:22 probability 112:23 probably 9:6,10 10:7 37:2 38:18 43:11 45:1 60:24 95:11,19 108:16 108:18 109:19 118:12 124:20 127:1 130:12 131:3,14 140:19 144:2 164:19 173:12 190:10 193:23 198:9 200:9 probe 107:20 111:25 112:4 113:14 114:5 115:10,12,19 118:3 135:10,16 140:24 158:17 probes 113:10 probity 163:25 164:9 problem 23:20 41:9 43:24 53:13 63:11 64:16 83:14 85:17 100:4 151:22,23 152:5,14 189:4 189:10 194:10 problem-based 193:9 194:6 problems 27:21 79:18,19 128:8 154:23,23 155:19	187:24 189:1,5 189:12,12 procedure 37:11 66:20 67:24 73:3 83:21 84:2 89:18 110:9 112:6 129:23 135:8,13 135:23 136:1,6 151:18,25 152:12 154:3,4,9 160:18 160:21 161:4 167:1 170:10 175:9,9,10 176:22 177:13 185:1 196:5 197:20,23,25 198:2,10,14 199:8 procedures 34:15 50:19,20 52:1 110:8 121:14 141:2 152:23 159:7,11 160:17 166:18,21 167:25 171:4,4 174:2,8 188:16 199:11,12 201:3,5 203:25 proceed 66:16 195:11 proceeded 67:14 67:24 proceedings 1:3 189:24 193:8 195:9 process 18:6 21:11 21:24 26:20 28:13 29:2,8 41:20 58:21 60:13 76:3,9 82:19 83:19 84:13 86:12,18 86:24 87:5,10 88:1 89:9,16,18 90:16,25 91:18 107:23,25 115:17 118:2 129:17 133:18 136:25 137:3,8,14 139:7 139:7 147:19	158:6 160:4,19 177:18 180:10 197:14 200:7 203:9 processes 51:6 54:24 85:19 92:21 procuring 77:12 produce 125:8 150:19 produced 18:12 162:9,17 171:13 190:1 produces 76:7,8 150:23 producing 204:1 product 205:2 production 150:23 products 196:15 profession 164:3 192:8 professional 2:15 4:6 7:6 11:8 15:20 45:6,9 164:1 165:1 169:15 professionalism 163:19 186:9 professionals 169:6,8,13 professor 1:12,24 2:7,8,13,16,22,22 2:25 3:16,18 4:11,12,16,16,18 7:18,23 9:5,8 10:14 12:6 13:5 14:2 15:17 17:24 33:12,19 40:1 44:17,22 45:2 46:18 49:7 57:5 69:6,9 94:20,22 96:3 101:9 103:5 103:17 113:15 119:12 120:12 129:1,5 132:8,10 135:14 136:13 140:21 141:5 150:21 158:3 162:14,17 174:18
---	--	---	--	---

194:25 195:1 205:13 207:3,11 professorship 4:19 prognosis 184:22 190:17 191:2 programme 95:17 programmes 47:8 progress 65:4 160:20 progression 157:15 project 119:23 154:21,22 projection 104:8 projections 154:20 projects 48:25 prolapse 139:4 177:25 prolapses 54:10 55:9 proliferation 38:7 prominence 153:11 prominent 169:10 promptly 167:10 179:24 181:24 186:19 prone 122:15 150:18 propagation 152:13 proper 128:4 197:12 properly 18:9 57:1 156:10 proposal 132:1 propose 175:4 proposed 167:24 174:2 177:2 protect 142:9 protection 147:11 184:8 185:12 protective 147:2 protocol 130:12 protrudes 154:12 protrusion 58:11 proved 131:11 proven 155:24 provide 2:24 4:3	8:5,20 9:18 11:4 15:1 23:25 29:1 35:5 39:19 128:17 166:5 167:23 192:25 194:17 provided 7:3 22:13 23:24 36:22 54:2 58:19 79:2 106:22 162:15 165:22 169:12 189:22,25 provides 137:2 providing 14:10 17:20 43:25 166:17 189:23 190:24 provision 4:4 163:24 173:25 psychiatrist 160:2 160:14 psychological 84:22 psychosocial 79:20 80:6 81:25 psychosurgery 158:7,21,21 159:1,7,17 psychotic 158:25 public 190:22 203:10 public's 164:2 publication 80:12 published 193:10 pull 136:23 purchase 78:4 purchasing 78:25 purpose 53:12 73:8 86:10 160:4 purposes 18:1 22:21 50:17 98:11 99:12 197:9 pushing 78:2 98:22 99:8 155:3 put 12:20 15:13 21:18 32:24 52:7 56:14 66:14 67:1 73:18,19 74:14	75:22,25 77:19 92:21 107:15 110:9 114:12 116:7 120:16 131:13 135:16,16 137:4 141:11 142:8 147:16 148:13 161:1 163:11,15 172:10 172:11 176:13 179:5 186:11 187:1,23 190:3 193:23 203:18 putting 43:5 53:3 54:14 114:5,6 128:1,11 140:25 143:10 157:12 171:6 pyramidal 104:8 Q qualification 5:18 qualifications 4:22 6:24 qualified 46:5 83:5 189:22 qualify 100:2 qualities 39:17 quality 58:4 179:11 186:21 question 14:16 22:12 59:9 62:24 63:18 64:9 70:24 76:25 79:5 84:20 93:4,12 94:14 96:1 120:4 160:3 172:21 192:2,22 192:24 194:9 195:20 197:16,19 questions 1:17 2:2 2:19 12:19 13:3 13:11,21,23 14:12,17 15:14 15:23 18:16 24:7 44:16 49:21 70:19 96:2 101:10,13 103:6 103:8 109:19 119:12 125:11 162:6 189:13	194:19 195:8,16 199:22 204:17 207:15 quicker 128:2 quickly 188:20 quiet 34:14 202:25 quite 22:14 23:24 28:3 32:3,10 35:20,22 45:7 50:15 51:12 59:22 61:21 69:11 71:11 72:13,17 73:5 74:17 75:11 81:5 85:22 95:20 103:22,25 104:22 110:11,15 113:18 113:20 116:14,14 121:10 123:20 124:17 125:3,20 126:2 131:3 134:18 138:11 142:10,18 143:7 144:15 147:21 148:20 149:10,17 150:2 154:3,24 155:22 157:20 161:10 177:6 179:1 194:5,11 203:15 R radiates 99:24 radicular 84:4 radiological 102:21 204:6 radiologically 69:1 124:5 135:16 radiologist 100:22 149:21 170:22,24 171:17 radiologists 34:19 69:17 171:3 172:7,19,22 173:14 radiology 60:14 75:24 112:22 161:12 171:1 172:12 173:11,19 radiotherapy	118:12 153:19 169:24 railway 100:7 raise 47:19 62:23 91:7 186:24 187:10 188:4,13 raised 43:12 186:17 189:2,14 189:19 raises 7:10 raising 42:2 78:3 187:8,22,24 188:3 ramifications 129:2 ran 24:23 random 22:22 23:18 randomise 130:13 range 11:7,10 13:11 22:16 25:11 26:3,8 36:17 39:18 42:4 50:7 59:19,25 60:2 94:9 103:15 124:4 126:4 166:19 198:8,9 204:4 rapid 68:10 95:20 139:6 141:18 rapidly 26:17 99:7 109:12 110:11 155:11 rapport 90:19 178:22 rare 59:22 66:16 78:15 148:22 156:12,13 rarely 159:12,14 rarity 105:13 rat 40:5 rates 148:21 ratio 188:10 rattle 150:17 re-issue 162:24 reabsorbed 63:16 63:16 reaction 102:20 143:13
--	--	--	---	---

read 173:7,22 188:18 202:20 reading 167:7 171:15 ready 119:10 161:25 195:10 real 82:5 realisation 26:12 27:1 29:12 32:19 realise 65:2 157:13 200:2 realised 42:14 43:23 realistic 176:2 realistically 81:19 realities 85:18 reality 9:5 25:1 28:11 31:12 really 25:1 30:8 36:15 39:11 47:17 51:21 52:9 69:1 73:25 78:22 78:25 79:12 95:20 96:25 106:1 114:1 116:1,14,24 124:10,23 130:9 132:20 142:22 155:14 156:8,20 159:7 163:19 164:16 170:14 172:1,9 179:19 183:3 187:21 190:11 realtime 76:8 reason 13:22,23 15:18 17:2 23:17 24:7 36:25 45:4 48:10 87:22 88:11 89:23 91:9 129:8 131:23 140:11 141:13 185:15 187:1,2 reasonable 65:7 68:5 72:24 81:11 83:7 89:9 129:24 130:16 131:4 168:17 177:8 186:25	reasonably 90:13 reasons 93:25 120:8 126:25 131:19 155:23 198:5 reassurance 203:10 reassure 130:2 reassured 92:16 92:20 recall 83:24 receive 167:8 received 3:4 190:21 191:5 receives 179:23 receptive 151:25 recheck 63:1 reciprocal 95:3 recognisable 74:5 recognise 30:5 116:9,16 186:15 recognised 178:9 recognising 163:13 recollection 35:3 recollections 71:16 recommended 127:12 reconstructive 121:14 record 160:25 183:21 184:2,2 184:17,20 195:23 195:24 recorded 167:10 179:24 184:24 199:19 records 180:11 183:23 184:9,10 197:8 recovering 81:5 recovery 166:7 179:7 181:1 185:2 rectify 186:19 189:4 rectifying 186:20 recurrent 84:7 165:8	red 82:3,4,8 Redfern 1:9,14,21 1:23 2:4,6 3:12 3:15 4:9,10 6:18 6:20 8:8,14 10:16 13:7,16 14:15,23 18:19 18:21 19:2 33:15 33:23 39:22,23 42:22 69:22 77:4 83:8,17 97:18 98:3 101:14 105:17 106:14 112:8 119:6 132:25 133:6,15 134:20 135:15 152:25 159:18,19 172:14 194:23,24 202:12,16 204:20 205:15 207:7,9 reduce 37:7,15 98:18 reduced 27:16 135:20 refer 4:7 20:1 21:2 21:16 98:8 106:16 166:20 180:5 199:24 reference 1:17 7:16 11:22 12:15 74:6 referral 20:3 58:16 referrals 19:2,10 19:20 20:6 34:14 200:10 referred 3:25 25:24 34:17 73:6 84:5 85:15 93:14 93:25 95:12 98:7 98:20,21,21 133:12 136:19 139:15 188:15 referring 21:3 58:12 67:12 72:21 120:22 197:5 referring-in 58:13 refers 180:1	reflected 28:24 182:4 reflecting 103:13 reflection 203:11 203:17 204:12 reflections 83:9 204:24 reflective 202:24 203:6 refractory 160:8 refused 43:4 refusing 43:5 refute 59:6 regard 8:9 14:11 129:3 179:17 regardless 186:10 regards 77:2 133:16 regimented 160:19 161:19 region 85:12 98:9 148:15 161:6 regional 7:7 19:15 202:4 register 14:6 registrar 35:8 39:9 39:14 40:6 45:23 46:7,17 75:19 93:15 94:25 95:12 181:6,9 regress 157:23 regresses 156:16 regular 119:1 203:21 regulate 49:10 regulations 160:16 regulator 187:12 regulatory 49:6 reiterate 91:15 related 12:19 16:18 79:18 101:10 112:12,21 126:9,18 141:3 168:7 170:19 196:23 201:12 relates 60:10 106:14 126:15 170:16,21 197:16 relating 12:25	14:17 60:9 79:5 126:19 163:22 170:23 relation 12:25 24:1 70:20 71:11 76:19 97:17,24 101:11 108:6 115:6 120:7 140:22 158:10 164:10 relationship 90:8 91:4,8 165:2,10 165:17 170:22 173:23 relationships 165:13 relatively 5:2 9:6 10:6 29:9 31:14 47:5 72:12 73:15 95:1 179:18 188:6 195:17 relatives 68:7 179:13 relevance 33:14 44:19 126:13 201:20,23 relevant 7:12 9:8 13:19 15:2,10 17:21 18:17 38:15 45:9 68:20 72:2,5 76:10 80:22 81:21 98:3 104:2,17,22 106:4 110:3,16 113:17 120:23 122:7 141:11 149:15 150:1 165:21 167:9,10 167:17 173:5,6 173:13 175:3 179:24,25 183:12 198:19 199:6 reliably 62:15 reliance 91:16 reliant 147:14 relief 134:3,4 relieve 54:21 99:21,23 relieved 98:17
---	--	---	--	--

reluctance 106:8	14:10,19 16:24	researches 131:2	revalidation	rigid 52:3 53:13
rely 58:17 170:17	17:16,18 18:9,10	resect 116:18	202:14	95:15
175:21	18:18 21:12	118:6,18 169:24	reversing 110:11	ringing 195:2
relying 18:11 58:9	25:14 32:7 36:18	resecting 152:3,18	review 7:11 17:21	rises 155:9
169:8	36:20 40:22	resection 118:13	175:7	risk 75:3,5 78:22
remaining 124:3	50:16 56:14	118:14,19 152:1	revision 134:11	78:23,23 79:20
remains 155:13	70:21,23 75:15	153:18 154:4	rib 61:25 62:1	84:3 110:24
remediable 139:17	79:3 93:14 96:19	reservoirs 146:4	ribs 61:25 62:4	117:16 118:8
140:9	100:20 105:2	resolution 58:4	rich 205:5	134:25 135:1
remember 76:17	136:16 138:4	resolve 129:12	right 1:5 2:9,10	142:24 148:8
90:16 135:13	143:24 147:23	resources 167:5	3:2,6 5:12 6:1,12	201:6
147:2	162:16 169:3	186:21 187:3,8	6:22,25 7:22,23	risks 77:21 83:21
remnant 156:23	171:24 202:11	respond 181:24	8:6,17 9:7 10:8	84:1 87:12
removal 141:9	203:17 205:3	186:8	12:8,16,21 13:1	127:13,16 128:9
remove 51:25 52:4	reported 100:15	responds 120:2	15:4 18:7,20	128:13 152:24
54:13,17 55:16	137:19	responsibilities	20:10,15 22:18	166:12 167:25
66:18 68:25	reports 126:3	182:3 183:8	23:21 24:5 27:25	168:19 174:2,9
113:19 115:18	represent 4:5	responsibility 88:7	28:1 30:23 31:2	176:22 177:14
129:11 154:5	representative	89:24 91:21	31:5,11 33:10,18	186:8 201:11,12
179:5	162:10 200:19	166:4,6 168:8,23	33:21 39:20	risky 79:21
removed 14:6 54:4	reprinted 193:11	178:13 186:2	44:21 46:8 47:2	road 88:22 176:14
54:5 69:4 129:8	reputational 78:22	187:6 200:21,23	47:21 49:22 50:8	ROBERT 1:14,23
removing 51:20	request 189:15	responsible 55:5	52:19,23 53:21	207:7,9
54:20 151:11	requests 167:16	65:15 67:9 80:13	53:24 55:20 57:3	rock 104:9
renewal 78:14	require 11:12,15	84:15 86:24	60:4 62:16,20	rod 73:19 126:23
renowned 45:13	11:17,20 23:21	89:19 91:20 97:6	64:6 66:23 69:17	rods 55:23 127:24
repair 142:13	28:6 39:3 65:14	186:20 196:8,9	71:18 73:6,21	128:1,17
148:11,11 149:14	105:23 149:16	198:7,24 199:3	74:23 75:9 76:2	rogue 136:9
149:15	174:15	responsibly 42:3	76:5 82:25 90:1	role 50:10
repeat 1:22	required 25:24	43:11	90:9 92:6 93:23	roles 7:7
repeated 76:3	56:5,7 78:18	responsive 153:22	96:1 97:9,15	room 70:13 106:2
189:1	167:5 180:3	rest 13:10 32:2	99:16,22 104:25	141:14,16 150:17
replaced 34:4	186:14	147:16	105:15,16 106:21	157:21 204:22
141:10	requirement 30:21	rests 103:20	107:11,22 108:11	root 54:17 84:5
replacement 41:6	47:18	result 7:5 9:15	108:19 111:9,19	98:22 99:8,9
53:17 119:21	requirements 28:9	53:9 74:18 84:9	112:10,18 113:5	139:1 140:3
120:1,2 123:14	requires 11:4	131:21 148:25	113:6,14,23	rootlets 139:11
123:17,22 124:17	38:12 39:19	204:1	114:17 118:22	roots 55:10 138:14
124:23 125:3	51:19 77:6 139:2	results 66:13	119:21 122:16	139:5 140:2,12
126:23 133:16,24	147:15 192:14	175:25	123:1,11 125:7	rota 30:16,17 33:1
replacements	requisite 9:17	resume 70:12	130:25 132:6,12	33:2,3
53:18,19 125:25	rescue 201:13	161:25	136:17,18 144:4	rotas 48:13,13
134:14	research 40:5 48:7	resuscitated 25:19	150:6 154:17	rotate 45:24 47:8
replacing 37:13	53:18 96:9	retains 89:24	157:8 165:18	93:22,25
report 1:17 3:6,9	119:25 124:11	141:23	168:17 172:24	rotation 31:15
3:25 4:4,21 6:6	130:10,12 132:20	retractors 74:1	177:3 178:1	45:23,23 94:12
7:3 8:1,5,21,24	134:21	return 80:1,3	186:5 188:21	94:14,23
9:2 10:18,19,24	research-type	119:11	197:4,10,15	rough 73:21
11:3 12:4,8,19	96:13	reused 184:4	205:16,23	roughly 142:2

round 31:25 91:8 181:7 204:6	satisfy 88:14	66:15,24 67:16	sections 12:14	selective 152:2
route 19:25 117:24 132:25 188:2,2	saw 114:11 160:9	89:2 138:3	17:18,19 18:1	self-evident 134:1
188:13	saying 18:4 43:5	school 133:20	70:20	self-welding
routes 123:9	66:1 70:1,4	schwannoma	sector 165:8 182:3	143:13
routine 28:17	71:23 75:6 88:6	104:12,14 109:7	183:8,10,13	send 23:7 30:2
84:17 122:2	90:3 91:15 92:22	sciatica 84:5 97:21	201:25	173:3
166:20	105:7 106:16	98:20 99:3	sedated 110:10	sending 112:4
Royal 4:25 5:4 6:3	144:17 162:21	101:22 138:20	see 5:21 16:25	192:11
6:25 45:21 48:18	199:9 205:16	191:14	28:19 46:23 64:4	sends 152:15
48:21 49:12,14	says 3:22 49:7,12	Scotland 21:16	69:2,3 80:11	senior 34:6 39:14
162:17	76:21 79:20	22:2 46:11 79:10	85:18 87:24 99:8	40:6 46:1,7
rules 71:22 185:14	163:23 165:24	106:6	100:5,19,20,25	75:19 88:20 95:8
186:5	179:22 183:20	Scottish 7:14	102:13,16 103:24	97:14 184:18
run 78:11 91:12,15	185:7 186:7,14	146:6 190:2	112:3,14 115:21	188:6 199:11
141:1 150:24	197:8	Scottish-specific	117:1,23 122:13	seniority 186:10
running 34:7	SBNS 27:2	15:8	124:5 130:14	sensation 138:21
69:18 70:8 94:8	scale 41:23 45:13	scratch 139:22	136:24 137:7,9	138:22 157:14
runs 78:2	scalp 143:3 144:22	screen 3:8 188:6	137:12,16 140:9	sense 50:17 82:23
ruptured 171:7	144:23	screw 126:23	150:14,15 151:21	105:19 109:22
rural 21:5,7	scan 55:4,4,12	128:11	153:24 156:13,23	146:1 193:20
	58:18,21,22 59:5	screws 55:22	162:7 163:21	202:18
	61:19 63:14 64:3	127:14,23 128:1	164:20 170:24	sent 25:19 113:11
	67:4 69:12,13,20	128:16	171:19,19 173:18	167:17
	81:1 99:4,4,7	scroll 3:16,22	175:2 181:1,14	separate 144:11
S	100:4,10,14,25	scrub 196:6,6	183:3 190:15	177:10
sac 27:2 121:9	101:21,21 102:6	scrubbed 196:20	194:14 195:18	separates 156:3
138:17	102:21 112:21,22	196:20	200:17 202:21	separating 117:2
sacral 60:21 62:6	137:10,21 138:1	seal 143:5,13	203:25 205:24	September 1:1
75:10	139:18 140:14	144:9,10	seeds 153:17 161:3	206:2
sacrum 61:22	170:25 175:2,7	sealant 143:14	161:5	sequences 137:21
safe 43:6 92:1	177:24 191:21,25	sealing 144:6	seeing 34:17 96:17	series 171:23
166:21 170:15	192:3	seam 205:5	97:23 183:13	serious 72:11,13
186:22 205:11	scanned 55:8	sec 43:11	184:18	85:22 141:18
safeguards 130:4	scanner 55:9	second 31:17	seek 39:5,7 83:7	188:25
safely 184:4	58:14 69:14,24	39:13 62:1 73:25	seen 28:16,22	serves 147:1 164:7
186:17	202:3	152:8 154:9	78:22 85:21	service 14:20 19:5
safer 44:15 170:10	scanners 58:5 70:3	167:12 176:11	100:10 116:7	19:16,18 20:5,7
safety 186:8,11	scanning 60:6 63:6	191:6,22 192:2	134:1 144:15	21:3 22:13 23:9
187:6	170:19 191:17	secondary 19:5,9	153:12 160:11	23:10,13 24:4
sagittal 146:24	scans 35:11,12	21:2 98:18	181:11 190:22	26:22,24,25 28:6
Sainsbury's	58:6,9 59:11,11	157:19	sees 59:17 61:19	30:23 31:8 33:9
159:22	59:11 69:10	seconds 155:16	106:21 108:25	33:24 35:6,14
sake 12:1 14:3	101:25 107:10	secretary 48:5	seize 134:14	38:3,7 40:14
Sam 7:9,21	108:7 115:1	49:5 200:5,14	seizure 152:13	41:12 42:4,8,12
sample 115:15	116:1 117:21,23	section 12:18,21	seizures 37:7	43:3,25 50:9
118:9	137:19 170:23	12:25 32:7	151:14,15 152:13	77:7 78:6,14,23
satisfactory	171:5,12,13,13	109:20 136:14	select 85:2	89:15 91:9,13,22
135:22 167:8	171:15,16,18	168:2 180:6,6	selection 39:13	97:5 106:12
179:23	scenario 64:13	202:13	48:7 85:2	108:22
satisfied 132:3				
187:13				

services 6:16 19:10 23:17 26:3 26:8 27:10 28:4 29:3,8 30:8 32:5 32:19 38:4 39:19 41:20 42:1,5,6 43:10 91:10 164:7,18 186:23 201:1	shortfalls 186:21 shortly 109:20 195:11 shoulder 31:21 show 70:13 81:1 101:21 106:10 184:14 192:5 showed 134:2 177:24 showing 58:10 shown 59:14 153:22 172:25 shows 43:8 59:16 shrinkage 142:20 shunt 129:9 179:6 Sid 40:1 side 61:1 63:2 71:4 71:4,9 72:4 74:2 77:18 96:3 101:10,12 103:6 117:23,24 119:13 144:1 146:5 161:4,5 sides 188:10 sign 64:5 85:1,10 85:13 signature 3:14,17 3:19 185:22,23 185:25 signatures 185:22 signed 10:24 184:14 significance 64:9 70:22 93:5 146:1 151:1 153:10 183:19 significant 23:24 28:3 120:17 180:14 significantly 27:17 151:13 signing 18:6 168:2 signs 82:5,8 84:20 84:21 85:6 196:21 silastic 148:14 similar 21:5,11,24 22:1 48:18,20 72:5 74:24 75:11	76:7 95:2 100:10 108:18 129:15 144:11,22 145:19 159:11 similarity 2:13 similarly 22:3 183:14 simple 26:22 57:15 72:17 157:20 simplex 140:1 simply 118:8 190:5 singer 159:3 single 46:9 sinus 146:24 sinuses 149:2 sir 1:6 70:10,18 118:21 119:11 161:22 162:4 194:19 195:15 205:20 sit 116:22 205:22 site 72:4 75:1 146:23 149:22 sitting 16:11 19:22 49:19 111:22 205:17,18 situation 20:1,6 23:14 26:10 28:12 29:6 52:15 52:16,21 53:6 75:2 77:1,5 87:4 88:18 89:6 93:10 94:21,22 95:3 97:2,3 99:18,20 115:13 118:15 140:6 155:3 175:8,20 178:9 179:8 183:3 188:24 192:20 198:8 199:10,14 200:1,8,20 201:21 situations 6:10,15 85:22 90:11 131:2,17 132:3 178:14 191:5,12 192:21 193:2 198:4	six 22:6,7 28:15 33:3,4 34:5 44:2 44:4 94:2,2 117:14 156:9 160:22 192:1 six-month 200:2 size 24:1 107:4 114:4,5 156:19 191:4 sizes 172:15 skill 174:13 skill-based 31:9 skilled 176:18 skills 16:23 17:1 25:6 31:19 38:11 38:19,21 40:11 47:1 56:12 95:9 164:7,18 166:25 167:6 169:8 170:17 skin 68:24 71:7 74:18 109:16 144:23 145:2,3 145:11 153:21 157:13 skull 35:18,19 36:12 94:4 103:11,18,18,21 103:23,24 104:1 104:4,6 109:8 114:2,9,21 141:23 145:7 149:1,2,8 150:5 154:13,13 161:2 sleep 31:24 slice 156:18 slide 156:18 slight 68:20 slightly 2:14 55:2 57:6 63:22 76:6 76:25 118:24 122:11 196:1 200:20 205:20 slurred 111:15 small 9:7 23:4 44:8 54:17,18,20 55:24 56:9,10 68:24 74:17 95:14 106:3	115:5 118:7 146:6,13 156:19 156:21 179:18 191:13 197:21 smaller 22:10,15 56:19 58:13 106:6 201:18 smallest 114:18,19 smell 157:13 SN 4:23 so-called 190:12 society 27:3 47:21 48:4 49:2,5 soft 51:10 softer 51:9 solely 104:23 solidly 128:4 solution 43:23 57:16 somebody 23:7 28:21 75:25 78:22 91:17 93:22 137:25 140:6 someone's 42:25 61:4 85:12 86:1 somewhat 161:11 soon 8:15 21:23 99:5 sooner 126:6 sorry 45:23 95:22 173:9 sort 9:10 15:2 20:18,21 23:20 29:23,23 31:8 32:2 33:24,25 37:1 51:1 52:5 53:20 55:17,19 56:4,6 57:10 59:14 62:17 63:25 64:1 65:22 67:6 68:24 74:14 76:5 79:18 81:12 82:2,4,4,16 85:14 85:23 96:6 108:12,18 113:21 116:4 120:21 123:15 125:7,11 125:13 129:2
--	---	---	--	--

131:6,10 133:9 137:8 138:6,6,9 140:25 143:14 148:1 158:22 180:23 190:24 193:20 202:11 203:16 sorts 9:14 52:25 53:12 80:12 87:8 126:13 129:9,15 133:8,13 155:18 163:12 192:25 193:2 204:9 sound 194:7 sounds 26:5 43:10 78:5 90:3,5,11 source 127:20 sources 163:1 Southampton 45:10,16 46:14 46:18 47:6 Southern 45:19 space 54:16 74:22 125:6 135:21 146:19 spaces 56:21 114:6 149:2 spasm 98:18 speak 17:8 177:9 186:12 speaking 12:13 77:10 specialisation 36:7 172:16 specialise 5:25 6:8 36:21 specialised 19:11 19:17 41:12 104:5 specialising 36:13 specialism 104:2 104:16,18 specialist 5:16 19:3,19 25:1,16 27:8,14 29:3 30:3 49:25 105:14,24 133:12 173:19 specialists 34:18	37:1 speciality 5:5 6:14 specially 173:14 specialties 20:7 45:25 47:2 91:14 94:1 specialty 27:23 28:7 38:22 46:9 49:15,16 77:16 91:16 103:14,16 168:16 182:1,6 204:9 specific 15:20 17:13 48:18 specifically 15:14 72:4 120:2 157:10 specifics 10:12 15:25 77:1 spectrum 109:14 speech 111:14,15 speeds 76:8 spell 144:23 spend 94:2 spending 80:23 81:1 spent 44:5 46:15 46:21 193:23 sphere 110:1 spina 156:11 spinal 5:12,15,17 5:17,20 6:8 12:24,25 20:3 33:17 35:22,22 41:3 49:22 50:1 50:13,19,21,21 50:22 51:4 55:22 58:6 59:10,16 60:11,19 70:21 71:11 72:5 79:6 79:17 94:5 97:24 99:19 101:11 102:4 119:14 120:6,14 122:3 128:11,12,16 136:12,14 142:1 146:15,17,17 149:19 152:25 154:15 155:6,21	155:21,22,25 156:4,14,18,19 157:3,6,6 162:5 165:6 169:19 173:16 201:5,6 spine 36:14 52:2,3 52:18 53:13,17 53:19 58:12 60:18,19,20,21 61:5,13,16,17 62:9,9,10,12,13 62:13,14,15,18 64:20 65:3 66:14 66:19 68:22,22 71:13,15,17 73:15,18 74:3,19 75:13 98:2,4,8,25 100:2,3,6,12,12 100:13 102:17 120:10,15,18 121:4,6,10,11,13 121:15,18,23 122:12,18,20 123:5,9,23,24 126:11 128:17,22 134:21 137:15 138:15,17 139:9 139:9,21 148:14 149:19 171:6 175:1 203:20 spirit 71:8 spleen 61:4 split 12:14 116:3,5 splitting 116:6 spoken 11:25 202:17 spondylitis 137:16 137:18 sponsored 78:2 spontaneous 140:10 148:3,24 spontaneously 149:14 spread 26:4 28:5 59:23,24 152:16 153:16 spreading 30:7 stabilisation 52:2 121:17	stabilise 157:22 stability 128:17 staff 21:19 24:3 26:16 86:21 91:17,23 186:18 191:17 196:19 stage 7:21 8:10 21:14 25:17 39:8 39:13,14 41:24 45:21 47:20 50:14 52:12 55:1 55:15 65:2 73:25 86:21 120:12 147:8 193:7 194:20 195:6 stages 73:10 stairs 82:15 stakes 92:14 stand 1:21 standardised 71:22,25 81:13 standards 131:12 166:1 183:25 standing 116:21 staples 145:3 stark 28:11 31:12 start 2:3 25:7 40:14,24 75:9 76:12 118:23 119:3 133:15 136:7 203:21 started 21:20 24:15,20 28:12 33:16 34:3 75:18 110:7 124:22 135:7 158:22 starting 68:1 194:23 205:17 starts 111:15 state 88:24 158:25 statement 4:8 7:3 143:20 185:24 189:15,16 199:23 status 82:18 statute 83:25 steady 25:25 stem 141:18 146:11 154:15 155:5,18	stems 124:10 stenographer's 157:25 step 132:16 182:18 185:19 stepped 194:14 steps 176:20 stereotactic 106:22,24,25 107:22 108:11 112:9 114:24 161:4 stereotactical 107:7 sterile 131:12 steroids 180:20 stick 111:10 stimulated 112:25 stimulation 112:3 112:14 stitch 143:4 stitches 142:22 stitching 143:11 143:22,22 Stoke 47:9 stop 111:17 142:19 149:13 152:12,16 180:19 stopped 42:13 170:12 180:17 stopping 203:2 story 59:3 straight 118:6 straightforward 84:4 122:5 straining 142:13 strand 190:12 192:16 strands 190:11 strange 125:22 strategically 48:23 strategy 117:16 stretched 33:10 stretching 31:7 strict 160:15 strictly 160:5 strong 90:8 struck 190:20 structural 79:19
--	---	---	--	--

structure 95:15 112:16 146:10 156:6,22 157:5 202:24 structured 161:20 structures 72:6 109:6 117:15,17 122:1 128:8 171:9 struggle 2:11 struggled 2:12 student 147:3 students 194:2 studies 82:12 134:2 study 130:14 sub-serve 157:8 sub-specialisation 22:9 29:13 35:16 36:10 38:5 173:12 sub-specialised 23:10 sub-specialist 49:10 sub-specialty 24:11 sub-types 171:1,3 subarachnoid 146:19 subcaudate 160:25 161:6 subcutaneous 145:10 subdural 88:23 subject 123:14 138:11 subjective 161:12 subsequent 181:5 subsequently 134:11 substance 109:5 146:12 substantially 54:5 substitute 142:25 successful 192:4 203:13 succinctly 195:17 sucker 116:5	suction 117:7 suctions 117:9 suddenly 43:25 62:4 99:6 sued 42:20 suffered 160:12 sufficient 54:21 89:3 185:3 sufficiently 87:18 185:8 suggest 29:5 75:16 suggested 76:23 83:13 193:12 suggesting 190:4 suggests 67:4 suitable 56:12 121:13 143:8 186:22 suite 38:11 181:1 summaries 180:7 185:9 summarising 176:7 superbly 117:2 superior 187:10 supervise 31:22 supervision 161:9 198:23 supplant 143:16 supplied 18:19 supply 127:22 155:18 support 91:25 93:2,3,3 175:21 186:16,23 supported 92:16 175:17 supporter 184:22 supporters 167:11 167:15,24 174:1 180:1 suppose 9:5 123:14 130:20 suppress 37:21 158:19 Supratentorially 142:10 sure 9:2 25:16 34:3 35:2 38:23	91:14,23 95:2 103:17 112:1,5 115:3 125:10 133:3 136:2 141:5 143:2 157:25 162:19 163:1 171:22 174:14 186:4 189:8 199:6 200:10 surface 88:23 114:7 115:22 116:11 117:2 156:4 surgeon 5:12 25:2 26:14 36:11,12 36:13 62:19 67:9 67:22 71:5 79:23 80:13 83:4,4 84:15 85:1,25,25 86:4,9,15 88:1 97:8 104:21 105:12 107:5 115:2 123:10 129:22 145:14,20 149:23 151:8 153:24 160:15 161:21 164:12,14 165:11,12 175:19 176:2 178:13 180:25 182:25 184:18 186:10 190:6 196:9 197:18 198:6,6 200:12 surgeon's 164:15 surgeons 4:25 5:5 6:4,25 22:3 26:16 37:17,19 40:23 41:3,4 47:21 49:12,14 61:24 68:25 80:7 81:6,21 83:6 95:1 104:4 112:1 113:18 121:13 122:3,24 141:10 141:12 143:14 151:12 162:18,18 163:16,18,25	173:1 176:2,17 177:15 183:12,22 198:21 203:20,20 surgeons' 163:24 surgeries 52:25 53:12,22 54:1 83:10 153:1,2 197:3,9 201:6 surgery 5:17,20 6:8 12:20 13:1 19:8,11 35:21,21 35:22,22 36:25 37:3,5,6,6,8,10 38:19 40:2,4,7,19 41:3,13 42:14 45:24 46:16,16 47:16,17 49:22 50:1,13 51:7,7,15 51:19 55:17,19 56:5,7,13,24,24 58:25 60:11,15 60:17 61:6,13 62:16 64:18 65:24 66:7,9,13 66:15 67:3,6,11 67:13,13 68:1,5,6 68:12,14,22,23 69:10 70:21 71:6 71:10,11 72:5,6 73:4,21,23 76:20 77:10 79:6,17 81:22 83:14 84:25 85:23 86:5 86:6,7 96:24 97:25 98:14 99:19 100:12 102:7 103:12 104:3 106:22,24 106:25 107:19,22 108:11,12 110:15 111:2 112:9 113:9,12,21 119:15 120:6,8 120:14,21,24 121:11 127:15 129:3 134:11 140:25 143:23 144:6 151:4,5,6 152:6 158:6,14	159:4 162:5 163:15 165:4 167:24 170:4,11 170:12 174:1 177:2,2,6,19 180:19 181:2 191:23,23,25 196:16,16,23 198:7,18 199:4 200:3 201:8,16 201:19 202:1,8 surgical 5:3,5,15 5:19 19:7 26:14 32:19 45:25 51:16 52:1 53:10 54:9 57:16 60:25 69:2 71:8 74:1 81:11 91:14,16 98:4,10,12 101:23 102:22 103:16 111:3 127:2 139:3,17 153:11 162:12 163:12 165:16 166:5,12,21 168:9 170:9 184:13,21 185:13 195:23 197:1,7 surprised 200:11 surrounding 128:7 susceptible 127:20 suspect 93:17 173:3 183:11 196:20 suspensions 131:22 sustained 190:14 sutures 145:2,8 suturing 143:11 swallowing 155:19 Swansea 18:25 20:10,25 28:14 40:15 69:22 77:5 95:2 swell 141:15 swelling 141:16 swells 141:17 Swiss 189:9,9 swollen 141:14 sword 96:6
---	--	--	--	--

sworn 1:24 2:1 207:12,14	115:7,15 117:13 117:13 118:9	targeted 151:25	30:17 43:8 47:23	19:9,18 20:7
Sydney 34:6 41:22	121:15 122:7	targeting 37:25	50:18,21 57:14	21:3
Sylvius 146:10	123:1 124:4	55:24 112:14	68:17 70:25	textbook 194:8
symphysis 50:25	128:4 130:16	152:17 164:19	79:10 80:14	thalamotomy
symptom 99:5,5	133:13 150:3	targets 108:2	93:11 94:20	112:18
161:18	154:1 161:23	112:17 160:24,24	103:12 106:23	thalamus 112:22
symptomology	163:19 166:4	161:13	107:13 108:6	thank 1:5,10 3:11
63:6 64:3	172:17 175:3	task 16:17	138:5,5,7 145:25	4:15 5:11 6:18
symptoms 37:21	176:16 178:1	taught 133:22	153:10 158:8	7:2 9:5 10:14
54:19,21 55:1,5	182:23 183:6	Tayside 7:13	162:14 194:12	11:3,20 13:17
55:11 57:6,19,20	184:6 186:12	teaching 45:18	199:7	14:10 15:6,12
71:4 82:6 85:9	187:5 197:25	team 58:16 104:20	telling 26:6 27:18	16:14 18:15
86:11 100:10,17	200:13	111:3 118:17	30:25 74:21 75:3	19:21 20:9 24:18
102:6 134:4	taken 9:1 27:24	166:5,9,14	104:25 133:3	26:1 27:9 29:4
138:19,24 139:13	34:1 41:4 58:18	167:16 168:9,12	170:24	29:21 30:14
139:20 140:7,12	61:13,20 75:8,21	168:12 184:13,21	tells 60:7	44:11,16 46:10
140:15 154:24	75:23 80:11,13	teams 78:12	temperature 157:9	49:19,19 60:4
157:11,22 160:11	117:12 128:21	167:10 179:25	temporal 104:7,8	61:11 68:19 69:5
172:11 178:10	160:1 187:7	tear 55:7 59:19	151:25 152:3	70:9,12,18 79:1
191:18	189:4 200:21,22	124:5,6 136:20	temporary 180:21	101:8 103:1,5
syndrome 138:18	takes 19:2 148:17	136:25 137:11	ten 35:4 131:8	106:14,21 108:15
139:12,14,16,21	talk 15:8 32:7	139:8 148:25	200:13	118:20 119:4,5,6
140:3,7 191:11	56:15 77:16	tease 44:17 52:13	tend 35:19 56:25	119:11 123:13
synostosis 25:15	91:13	168:5	tended 31:15	126:8 129:1,13
synthetic 143:15	talked 49:15 73:2	technical 30:14	tendency 55:16	132:7 136:12
syringomyelia	77:2 87:4,6,7	50:24 112:16	tendinous 145:9	140:21 144:15
157:3,19	88:19 105:17	162:5	tends 99:5	145:22 152:21
Syrinx 157:4	111:24 114:24	technically 104:14	tens 76:4	154:8,18 157:24
system 29:23 82:8	123:18 141:4	125:4	tensions 91:5	158:1 161:25
129:9 153:23	151:4 170:19	technique 56:3	term 20:19 24:10	162:4 165:20,23
184:2 188:2	172:14 176:23	126:18 127:3,12	88:2 97:20	173:6,21 181:17
189:7,8 202:14	204:3	129:19 135:7	109:11 161:20	182:9 183:16
systematic 171:18	talking 15:3 20:22	141:9 148:10,13	187:20,21	186:1 189:13
systemic 91:1	26:22 29:7 34:1	techniques 44:8	terms 7:16 11:22	193:5 194:16,25
systems 91:3,6	52:15,21,25 53:1	113:8 127:7	15:12 20:17 22:8	195:5,15 197:16
187:3	53:10 56:6 57:25	128:16 129:21	22:12,19 26:14	199:22 202:9
	60:6 62:17 73:3	133:7,15 141:3	27:4 32:21,22	204:16,16,17,19
	76:23 80:24	145:17,20	33:6 64:17 66:10	204:20,21 205:11
T	84:18 85:5 99:19	technologies 53:16	83:9 84:3,11	205:13,14,15,23
tail 138:15	107:16 108:13	technology 57:22	85:8 86:8,15,23	thanks 205:8,10
tailor 81:16,17	113:10 119:18	76:7 77:19,20,23	98:3 105:2	theatre 31:22 44:6
take 10:24 12:2	126:10 180:7	78:7 129:20,25	111:11,19 120:17	65:19 95:20
19:10 25:19	196:25 197:2	133:18,23 135:3	125:5 128:16	108:3 117:1
29:18 31:16	tap 85:10,12	telephone 35:10	130:21 133:25	181:9 182:17,19
38:22 52:4 54:12	target 39:15 64:25	152:14 167:20	134:3,4 160:20	182:24 195:21
55:18 70:11	71:6 107:15	183:14	161:18 193:19	196:3,4,19
73:20 74:4,7	111:24,25 149:23	telephoto 101:7	201:6 202:12	thecal 121:9
76:3 81:19 87:3	161:10	telescopes 149:25	203:2,5,12,19	138:16
90:18 107:10		tell 7:24 19:1 28:2	tertiary 18:23 19:1	theirs 190:20
110:23 114:20				

thematic 15:23	134:9 135:21	105:2,7 106:3,15	thinner 41:20,21	70:12 77:8,25
theoretical 123:23	136:12 137:19	118:7 119:16,17	142:16	79:25 80:23 81:2
124:7	140:2 141:3	119:19,19 120:5	thinning 170:12	83:17,18 84:19
theoretically 97:13	143:19,20,22,22	120:9,11,12	third 31:5 35:8	84:19 93:10,12
126:5	144:1,3,5 153:7,9	123:7 124:9,18	62:2 86:18	94:11,14 96:9,21
theories 155:23	153:12 157:12	125:17,20 126:2	124:15 146:7,7	97:15 108:18
theory 125:3	163:8,12,14	128:24 129:18,23	152:12 181:20	110:18 111:21
157:20	170:13 174:13	130:6 131:1,9	192:16	127:24 134:13,23
thereabouts 34:13	178:25 179:4,16	132:10,19,24,25	thoracic 60:20	160:21 163:7
110:7 172:6	186:3 188:19,19	134:12,20,21	62:14,15 75:13	165:5 167:23
thesis 195:18	188:20 203:8	136:5,9,15,18	98:9	168:14 171:16
they'd 31:18 85:10	204:8	137:5 141:10,12	thorough 190:25	172:17 173:25
95:9 110:6	think 1:15 6:6,21	143:19,24 144:2	192:14	174:16,20,23,23
113:19 160:18	7:24 10:7 11:18	145:15,16,19,19	thought 12:11	175:8 181:8
191:24	12:10,13 13:4	146:16 147:23	16:3 40:16 41:24	184:16 185:10,17
thicker 142:16	14:15 15:6 16:3	150:22 151:9	42:17,19,25	185:18 194:13
thigh 150:3	16:14 18:4 20:14	153:4 157:4	43:11 45:16	200:15 204:22
thin 26:5 116:4	21:10,12,15,16	158:5 159:4,15	96:17 133:20	time-based 31:8
142:15	21:19 22:1,7,15	160:22 161:8	153:3 189:17,20	time-pressured
thing 16:14 27:7	23:23 24:10 26:1	162:23,24 163:2	194:5,6 200:25	179:19
48:17 57:10	26:13 27:11 28:2	163:8,10 165:15	201:3	timeframes 17:16
63:25 64:1 69:18	29:11,16,17	165:21 168:7,10	threat 106:16	timely 166:21
72:12 108:12	30:11,21 32:6,18	169:1,23 170:16	three 11:15 17:23	times 5:25 28:7
119:19 129:2	32:23 34:12,19	170:18 171:16	21:24 22:2 28:20	73:23 97:11
132:20 136:3	34:22 38:18	172:14 176:18,23	28:22 29:18 31:4	103:11 145:22
137:18 142:25	40:21 42:3 43:6	177:1,12,15,21	33:4 34:20 46:5	169:5 181:15
144:19,22 154:24	43:8,20,20 44:20	178:3 179:1	69:24 95:14,18	timing 160:17
158:2 160:25	44:24 47:20	180:1,4,4 181:18	107:7 118:24	169:22
161:19 168:17	48:23,24,24	181:22 182:11,13	146:13 167:7	tip 149:19
177:25 190:24	49:13,15 50:4,6	182:20 183:6,7,8	172:6 181:15	TISSEEL 144:10
191:22 202:23	50:15,18 51:15	183:9 185:23	191:8	tissue 51:21,23
things 16:17 23:2	52:17 53:23 54:9	186:2 187:20	threw 147:7	52:18,22 110:24
23:3 25:8,15	55:18,21 56:4,5	188:15,18 191:7	throat 110:10	110:25 111:5
28:25 32:16	56:14 57:5,13	193:18 194:7,24	149:5,7	116:9 117:8
36:17 47:12	62:2,24 64:5	195:23 196:1,19	thrust 41:2	143:1,2,6,7
50:11 53:5,9,21	66:4,8 67:25	197:2,7,7 198:9	Thursday 172:5	144:10,24,25
55:10 56:10,20	68:15 69:7,22	198:19,21 199:7	tighter 56:21	150:3 158:19
56:21 59:14,25	70:1 71:21 72:23	199:8 200:6	time 13:8,14,17	tissues 143:16
63:21 72:10	73:1,2,5 75:3,15	202:12,13,23	14:13 16:4 19:14	titanium 129:7
74:21 77:3,25	76:12,17,21,22	203:10,13,18,18	20:24 21:21 22:5	today 1:6,19 12:2
78:2 80:12 81:5	77:3 78:15 79:9	204:8 205:16	23:7 24:14,15	16:12 17:1 50:17
82:1,5,20 84:20	80:7,11,21,22	thinking 49:1	25:6,9 27:6 29:7	194:23 203:9
85:5 92:14,23	81:5,7,15,20	80:14 81:21	29:20,25 31:2,5	204:23 205:1,9
95:24 96:3,15	82:12 83:3,17	111:22 114:17	31:10 32:9,11	today's 77:14
98:6 100:2 102:8	87:14 88:2,6	150:6,7,8 202:25	33:1,25 36:15	told 12:6,23 33:24
103:10 107:25	89:15,23 90:21	203:7	37:18 42:14	43:2,13 77:4
119:13 126:13	94:22,23,24,25	thinks 63:9 74:10	45:16 46:4 61:5	92:2 97:5 106:15
130:20 131:18	95:11,24 96:22	77:6 121:23	61:7,8,9,12 63:15	111:19 132:25
133:1,8,11,13	101:15 104:25	thinly 28:5 30:7	68:21 69:14	136:15 140:23

145:16 150:25 152:22 156:23 191:16 tonsils 154:20 155:3,5,12 157:21 tools 82:14 top 3:22 142:14 143:2 145:9 146:21 168:23 topic 129:14 totally 35:9 touch 8:16 touched 17:25 20:12 109:1 119:16 168:6,9 170:18 173:25 174:6 181:18 183:18 track 69:2 tracks 117:21 118:1 157:16 tractotomy 161:1 traditional 51:8 124:2 125:25 traditionally 109:13 121:5 traffic 82:7 tragedy 75:7 trained 22:5 24:22 25:10,12 36:8 37:4 40:2,7,18 41:15 44:20 45:13 89:19 121:13 130:3 160:2 168:11,15 trainee 38:17 39:17,25 87:17 88:20 89:1,19 90:13,19,21,22 92:4,5,9,23 93:24 95:1,13,16,16,23 96:5,24 159:20 168:15 181:6,11 198:9,15,21,24 199:13 trainee's 90:15 trainees 9:10 26:19,24 31:15	31:16 33:4,5 89:8 90:9,18 91:6 92:24 93:7 93:8 94:24 95:5 95:8 194:3,4 195:24 197:3 199:7,12,16 trainers 22:4 training 5:1,3,16 6:5 7:5 13:4 22:4 22:24 25:4,21 27:3 31:16 32:20 32:22 33:8 36:3 37:1 39:1,5 41:18 45:5 46:4 46:8,25 47:4,5,7 47:8,18 48:7,14 48:24 72:22 75:19 94:25 95:17 96:3 132:2 184:6,8 197:6,9 197:14 198:16 199:16 transfer 147:17 167:4 transform 109:15 transiently 155:9 trauma 27:12 36:1 148:24 149:7 150:14,18 traumatic 149:11 travel 28:18 treasurer 48:5 treat 140:13 154:2 170:9 treatable 140:8,16 treated 153:19 166:2 169:24 treating 170:3 treatment 37:12 37:13 57:2 80:15 98:10,12 101:23 102:1,12 105:9 153:23 160:7 166:10,13 176:21 176:25 179:9 184:23 treatments 37:16 80:21 154:2	tremor 37:21 trend 41:2 trial 130:9,11,13 trials 131:2 trickle-down 26:23 tricky 96:22 tried 14:24 15:1,7 16:20 125:15 133:21 161:7,9 trivialise 56:22 trouble 84:10 troubling 174:10 trough 156:3,3,6 true 4:2,5 10:7 19:19 truly 68:23 trust 43:24 86:9 91:24 92:24 132:14 164:2,3 164:13,17 165:12 178:22 truth 165:1 truthful 164:7,19 164:23 try 16:16,23 17:1 21:12 24:4,17 37:7,21 52:4,10 53:5,12,16 55:16 56:25 58:22 66:10 77:18 85:3 86:10 91:3 92:21 94:1 106:10 113:8 114:18 116:19 118:3,18 125:10 142:8 143:17 144:9 149:16,22 150:5 152:12 158:19,23 163:9 175:20 177:17 trying 7:24 15:8 15:25 16:22 28:5 40:20 44:6,17 45:22 50:20 54:12,12 56:2 65:16,17 80:22 82:17 85:14 92:11,12 99:12	99:14,20,23 100:23 110:22,23 113:3 115:7,8 123:7,15 144:7 144:12,12 151:20 151:24 160:9 189:6 200:24 tube 110:9 114:6 116:4 148:14,14 156:14,15,16 157:5,8,9 tube-like 156:6 tubular 157:5 Tuesday 205:17 tumour 107:3 109:12,16 110:22 113:3,18,20 115:4,7,7,16,18 115:25 116:2,9 116:18 117:3,6 117:12,21,22,25 118:6,7,13 128:20 137:1 148:6 151:10 153:14,16,18 169:25 179:5 tumours 27:12 59:20,21,22 94:4 103:24,25 104:1 104:11,18,23 105:8,9,10 109:3 109:3,4,5,5,9 113:15,16,16 114:25 115:5 116:15 118:6 153:19 165:6 173:15 turn 22:23 23:3 37:17 125:18 136:6 turned 10:11 twelfth 62:1 twentieth 156:2 twice 48:10,11 twice-yearly 9:11 twitch 112:15 two 10:9 19:16 21:22 24:20 29:18 30:25	31:24 32:16 34:3 34:7,16,20 36:11 44:24 48:15 50:23 69:23 73:10 74:16 75:8 90:25 93:24 100:11 114:1 122:23 126:8 130:20 131:3,9 141:5 145:4 146:4 151:9 153:4 158:12,16 160:24 168:16 171:3 172:6 180:4 181:15 183:4 190:11 191:24 200:15 203:4 two-edge 96:6 type 21:13,14 26:15 37:10 41:6 43:19 56:23 58:1 105:11,18 107:19 109:15 111:12 112:6 114:11,11 115:13 117:7 118:14 142:8 143:15,23 144:10 151:25 152:6 153:21,22 154:4 158:6,23 169:15 170:13 175:9 191:14 193:19 201:8 typed 184:25 types 6:9 10:1 26:6 51:15 54:6,7 120:24 126:10 133:10 169:6,12 169:25 172:15,19 178:14 198:4 203:22 typical 66:5 typically 60:20 77:14 104:14 121:6,16,24 139:18 U UK 7:22 9:7 48:11
---	---	--	---	--

156:13 ultimate 49:11 89:24 ultimately 51:6 65:11 86:13,24 91:17 97:6 148:10 ultrasound 117:8 unambiguous 71:6 uncomfortable 200:8,9,9 uncommon 23:2,3 139:19 150:2 undecided 176:8 176:11 undergo 51:7 undergoing 109:25 201:13 undergone 67:13 undergraduate 45:10 underlying 137:14 undermine 8:20 undermined 9:3 undermines 7:10 8:4 underneath 116:23 185:25 understand 2:22 3:4 4:2 5:23 8:10 10:20 11:3 13:22 16:23 17:7,24 21:25 22:14 23:13 33:20 60:12 71:5 74:20 80:8 88:17 97:17 103:9 110:20 111:1,9 113:12 133:17 144:3 153:8 161:9 163:11 174:14,21 178:18 183:18 193:22 understanding 12:13 14:2,8 15:15,18 16:1,10 20:24 21:8 82:19 87:19 90:20 91:25 97:3 99:13	113:2 122:25 158:9 159:5 169:21 171:12 177:1 190:5 understands 64:15 71:5 132:4 understood 15:24 49:13 56:11 61:14 70:9 88:10 90:24 95:7,10 115:14 118:20 136:2 143:25 152:11,21 154:6 161:22 193:25 194:16 202:19 undertake 64:19 65:20 68:16 73:24 96:21 104:5 115:17 123:22 200:3 undertaken 68:18 86:18 124:2 undertaking 71:10 80:20 126:21 129:23 undertook 5:16 14:19 unexpected 179:6 unfortunately 178:7 unification 106:5 uniform 69:18 uniformly 134:19 unimaginable 160:11 unintended 125:8 unintentionally 110:25 Union 32:12 unit 14:21 15:2 18:23 19:1,2,9,15 22:15 23:1,8 24:23 25:2,6,16 26:14 29:24 30:3 30:6,22 34:7 36:9 38:17,20 40:8 41:14 47:11 58:16 69:15 76:23 77:4,5	87:7 90:6 93:21 94:9 95:14 106:3 106:5 122:22,22 129:23 133:10,14 159:24 167:5 180:2 187:16 199:11 United 9:17 48:9 72:1 125:24 units 9:12,25 10:1 22:10 23:4 24:1 27:8 30:22 37:2 37:4 38:10 45:5 46:25 58:9 70:5 70:5 106:6 133:10 182:13 202:4 universal 163:4 university 4:20 45:17 unnecessary 72:14 unpick 56:4 unproven 124:18 unscientific 59:8 unstable 66:19 68:2 unusual 24:12,14 24:16 45:4 47:5 121:10 unwanted 111:7 unwritten 176:13 up' 186:12 up-and-down 107:8 updated 78:7 upper 156:11 urban 21:5 urgency 82:9 urgent 139:18 182:23 urgently 140:13 urinary 191:15 use 17:1 25:22 35:25 68:21 77:10 85:13 108:9 109:11 113:9 115:19 116:3,3 117:6,7 128:23 131:1	132:11,13 133:7 142:25 143:1,2,3 143:8,14 145:3 145:17 166:12,25 184:1 187:8 useful 114:5 198:16 uses 107:7 194:6 usual 19:21 144:17 145:11 usually 37:13,20 48:15 69:3 78:18 96:10 104:20 114:9 116:21 122:5 148:25 149:13 151:3 172:5 181:1 195:6 196:3 utilised 166:15 utilising 132:11 V vaccine 149:9 valley 115:24 variant 154:22 variation 145:20 variations 59:17 62:5 varies 158:12 variety 6:4,16 23:17 24:10,16 38:4 41:25 53:9 80:6 204:2,13 various 10:20 12:14 32:7 47:12 50:19,19 51:15 58:25 63:21 69:17 74:22 75:12 82:14 87:12 141:2,3 158:4 vascular 36:13 122:1 142:18 171:9 vast 60:3 vault 103:18 vein 142:3 146:21 veins 121:21 ventricle 146:7,8 146:11,13	ventricles 146:4,5 ventriculography 112:13 versed 184:1 version 162:22,23 versions 197:22 versus 125:25 126:25 vertebra 128:11 vertebrae 51:2,4,4 52:6,11 60:19,21 61:22 62:3,6,6 72:6 74:3 75:10 75:10,11 120:3 122:8,9 124:3,3 128:21 vertebral 50:23 vessel 35:21 146:25 151:10 vessels 60:1 117:17 121:20 144:13 171:8 vestibular 104:12 104:14 109:7 vicariously 88:3 view 8:23 92:3 93:6 124:23 203:13 views 83:16 202:21 violate 65:9 virus 140:1 visible 71:7 vision 117:22 155:20 visit 184:19 visiting 205:10 volume 150:15 voluntarily 14:5 volunteers 69:25 vulnerable 99:1 128:22 150:13 W Waddell 84:20 85:5 wait 102:13 149:13 176:16 waiting 176:15 200:2
---	---	--	--	---

wake 110:8,11 177:12 179:7	way 5:14 8:4,20 10:5,25 12:3,21	50:6,15 62:17 65:10 66:24	whiteness 137:24 Whitfield 1:8,12	140:19 152:22 159:12 170:18
wakes 178:5	14:7 15:13 17:13	85:21 87:4 88:18	1:24 2:7,8,13,22	173:10 174:6
walk 23:20 28:10 82:15 136:22	18:11 19:21 21:5 21:18 22:20	91:1 93:13 95:12 98:7 110:7	2:22,25 3:16,18 4:11,12,16,18	177:5 195:3,4,23 196:25 197:5
walking 23:19 142:12	23:18 32:5 38:3 43:9 48:20 54:4	114:24 117:20 122:23 123:18	7:18,23 9:5,8 12:6 13:5,6 14:2	201:10 205:14 207:5,13
walks 45:3	54:5,8 63:10,13	126:10 130:6 131:16 141:5	15:17 17:24 33:12,19 44:17	Wigmore 2:16 wince 85:11
Walton 50:1	63:23 67:2 77:22	144:15 163:5 168:6,9 169:4	44:22 45:2 49:7 57:5 62:11 69:6	Winchester 46:13 46:13,14
want 7:19 39:22 49:6 52:2 57:8	80:5 87:6 88:25 90:25 91:8,18	170:21 178:9 194:24 196:12	69:9 94:20,22 96:3 101:9 103:5	window 114:8 115:3 141:6
71:15,18 74:3 82:6,24 83:2,5	92:4,13,23 102:2 103:22 111:5	203:3,8,18 weakness 100:18	103:17 113:15 119:4,12 120:12	wish 7:25 96:4 109:23 111:17
97:18 101:15 103:5 128:15	114:1 116:25 117:1 120:16	102:11 wear 55:6 59:19	129:1,5 132:8,10 135:14 136:13	189:18 205:11 wished 12:7 153:8
130:2 132:10 140:13 158:3	131:20 133:17 135:5 145:13	124:5,6 136:20 136:24 137:11	140:21 141:5 150:21 162:14,17	wishes 40:25 withdraw 43:25
173:9 175:21 176:1,2,9,10	156:20 173:18 184:3 187:23	139:8 wearing 124:8	174:18 195:1 196:3 197:20	withstand 131:13 witness 8:17 70:13
181:19 188:24,25 wanted 8:8 39:23	197:24 203:1 ways 19:23 60:17	website 164:22,22 websites 164:21	201:17 204:19 205:13 207:4,12	205:21 witnesses 1:10 7:9
47:19 69:6 101:19 102:24	114:2 145:16 175:11	week 34:9,16,20 34:20 180:18	wholly 40:13 wide 6:16 23:16	194:20 woken 112:5
173:10 183:18 wants 60:23 68:11	we'll 10:12 52:14 70:11 76:2	181:15 203:4 205:22,24,24	24:10,16 26:3,8 38:4 39:18 41:25	wonder 36:23 83:8 96:1 97:19 101:9
200:3 ward 31:25 181:2	109:20 118:23 119:3 161:24	weekend 30:20 weekends 28:20	42:4 wide-angle 101:6	103:12 106:23 139:23
181:7 185:2 wards 202:6	172:6 191:17 195:10,18 205:22	weekly 172:3 weeks 34:5 81:4	widens 156:21 wider 22:16 33:14	wondered 133:6 word 11:24 40:22
warn 84:8 warning 64:5 82:6	205:24 we're 13:8,14,17	156:9 160:22 weeks' 200:15	44:19 99:12 103:15 109:21	88:3 92:25 93:2 93:3 144:23
84:21 85:1 wary 199:9	21:3 25:9 57:25 64:13 65:17 66:8	welcomed 32:21 well-recognised	198:8,9 widespread	157:4 158:11 159:14
washed 71:7 washing 114:6	70:6 72:18 76:10 80:16 81:14,21	85:13 109:14 wellbeing 186:25	154:24 Wigfield 1:8,13	words 1:22 87:17 103:8 158:12
147:3,4 wasn't 24:15 36:1	83:12 84:15 91:13 99:13	went 17:13 32:9 34:6 40:5 42:12	2:1,9,10,14 3:19 3:21 4:13,14	work 7:12 28:17 28:18 29:25
37:4 40:7,9 41:16 44:12,13	106:12 108:13 118:22 126:14	42:18 44:2,4,4 94:24 134:9,20	5:11,13 12:23 13:2 49:4,18,19	31:20 32:14 35:15 38:17 39:3
67:8 69:18 104:5 111:5 117:19	130:1,7 142:4,23 150:6 156:1,1	176:23 weren't 22:9	59:9,16,24 60:17 62:12,21 70:7,19	50:7 53:17,20 56:25 62:2 79:25
136:3 161:17 173:13	159:11 163:7 171:17 180:12	153:13 west 46:11	71:1,2 83:13 87:7 99:19,22,23	80:1,3,4 81:4 82:14 87:8 92:4
waste 45:16 water 147:5,7	185:17 196:1 204:21	whilst 181:12 white 106:2	101:11 103:1,2 108:25 119:5,22	93:9 96:7,13,13 96:15,18,20,21
waterproof 142:8 watertight 142:11	we've 5:21 9:23 13:7 20:22 24:8	116:14,14,15 137:22	129:13,18 134:16 136:14,18 140:8	107:4,10 115:18 116:1 118:3
143:17 Watkins 40:1	34:1 48:13 49:21			

126:6 169:5 183:21 189:21,22 190:5 191:6 197:24 200:7 203:1 205:8 work-life 32:21 worked 8:11 20:9 39:25 40:10,16 41:1 43:19 45:17 105:19 133:14 159:16,20 160:2 202:14 203:15 workforce 32:24 48:23 workhorse 108:9 working 24:13 32:11 33:1,16,25 74:22 94:18 95:18 96:5 116:23 120:15 159:9 169:7 181:8 183:10,12 workload 182:1,7 workplace 80:1 works 22:15 133:18 world 45:13 129:21 worried 138:12 worry 106:6 worse 191:19 worth 108:23 would've 84:14 196:16 wouldn't 9:19 25:13,14 28:20 39:11 55:11 58:4 58:18 64:21,23 80:8 84:24,25 86:20 87:14 89:5 93:23 94:11,16 94:17 95:15 96:17 106:18 118:14 127:14 135:12,19 150:1 wound 56:20 67:14 68:17 127:8 145:14 148:7,18	wrapped 146:17 write 78:17 144:19 144:20 145:11 176:7 writing 96:14,19 written 193:9 197:21 wrong 2:17 7:25 26:2 28:2 42:18 43:9 57:15 60:3 60:16,18 61:1,3 62:22 64:6 65:2 66:6 72:3,4,4,6 75:1,7 92:14 97:4 111:10 125:5 131:18,24 134:9 137:5 178:2,2,8 wrong-level 61:5 61:13 62:16 wrong-site 60:10 73:4 120:8 wrote 112:8 X x-ray 61:20 73:9 73:11,20 74:4,8 74:14 75:21,22 75:22,25 76:1,2,8 76:11,12,16 122:6 178:1 x-rays 62:25 65:1 73:6 75:14 Y yeah 30:20 108:14 125:18 144:18 154:5,5 183:7 year 31:16,17,19 45:17 46:15,16 48:1,10,11,12 95:23 162:20 yearns 93:16 years 10:9 24:21 29:18 42:15,15 42:23 43:7 44:4 44:24 46:5,21 49:3 50:4 69:24 71:20 93:24 104:22 106:25	110:7 117:20 124:13,14 131:7 131:8,9 134:22 159:4,6 165:6 168:16 202:23 yellow 79:8,12 82:2,8 84:19 85:16 yellow-ish 116:11 yellowy 116:15 yesterday 162:10 young 137:21 younger 137:7 yttrium 161:3 Z Zavaroni 159:4 zoom 101:7 0 1 1 18:18 20:25 21:4 24:24 78:20 109:10,13 207:3 207:5,7,9,11 1.20 119:7 1.45 205:23 206:1 1:1 34:10 1:2 30:16 34:8,9 48:13 1:3 30:17 48:13 10 37:2 114:4 10.00 1:2 10.17 1:4 100 106:25 100,000 108:23 100th 48:1 11 62:4 11.52 70:14 11mm 114:4 12 37:2 60:20 61:25 95:21 12.09 70:16 12.12 79:3 13 165:23 15 70:12 110:7 161:24 193:24 15% 84:6 134:23 150 9:9	16 181:17 18 1:1 1890s 159:23 19 50:4 1940s 110:14 197 18:18 1990 29:17 1990s 76:13 81:9 114:23 187:19,21 1992 6:21 1993/4 108:8 1995 13:20 14:4 58:3,13 72:2,2 76:15 80:17 1996 27:15 76:15 1mm 107:17 2 2 7:2,3 88:20 109:13 207:13,15 2.1 17:12,14 2.15 118:23 119:3 2.23 119:9 20 24:21 146:3 148:23 202:23 20-year-old 137:12 2000 33:21 34:3 108:17 159:10 2000s 36:8 61:10 76:13 81:9 125:2 2002 34:23 2004 34:23 2005 80:17,18 2007 50:2 2011 193:10 2014 162:22 2015 13:20 14:6 72:2 2016 193:11 2018 6:22 61:12 2026 1:1 206:2 205 3:11 20s 137:10 21 182:10 183:16 206:2 24 70:8 167:19 24-hour 30:22 26 186:7 27 156:7	29 75:11 156:7 3 3 10:18 31:23 154:14 156:1 3.27 162:1 3.42 162:3 3.5.1 168:3 30 35:5 49:3 148:23 155:16 159:6 176:3 39.1 70:24 71:24 3D 108:5 115:1 4 4 31:23 109:12 4.30 195:12 4.41 195:14 4.55 204:21 4.56 205:25 450 21:9 450,000 34:13 49 163:10 5 5 42:16 145:6 191:16 50 172:6 500 146:2 500,000 21:9 500mls 142:2 50s 110:14 159:25 6 6/7mm 68:24 60s 160:1 7 70% 101:23 102:1 700,000 34:12 70s 40:1 75mls 142:1 8 8 32:1 80s 29:11,16 85% 134:22 86 69:16 87 69:16 88 44:25
---	---	--	---	---

9 9 190:8 90 44:25 90s 29:11 125:2 92 21:20 94 69:23 94/'95 21:23 95 69:23				
--	--	--	--	--