IN THE HIGH COURT OF JUSTICE
QUEEN`S BENCH DIVISION

Claim No HQ15C05257

BETWEEN

PATRICIA AUSTIN **Claimant**

-and-

SOUTH CENTRAL AMBULANCE SERVICE NHS FOUNDATION TRUST **Defendant**

Hearing: 4 - 7 and 10 - 12 June 2019

JUDGMENT
delivered on 31 July 2019

Introduction

1. After attending an exercise class on the morning of 8 August 2012 Patricia Austin [`the Claimant`], who was then aged 71 years, but is now aged 78 years, sustained a minor injury to her right upper arm. Some hours later she developed pain at the injury site and in her back. The pain seemed disproportionately severe and she felt generally unwell. Analgesia was ineffective. She began to vomit and have diarrhoea and became confused. Several requests for advice from the Out-of-Hours general practitioner service [`the OOH service`], visits by general practitioners and an ambulance, and intra-muscular injections of analgesics, non-steroidal anti-inflammatories and anti-emetics failed to control her symptoms. She was admitted to Stoke Mandeville Hospital [`SMH`] at 0629 on 10 August 2012.

2. It was not until the early afternoon of 10 August 2012 that a diagnosis of necrotising fasciitis [`NF`] caused by Group A Beta-haemolytic Streptococcus [`GASNF`] was considered and subsequently made. Antibiotic medication was not prescribed until about 1500 on that day, by which time the Claimant was in septic shock. She was transferred to theatre at about 1630 and underwent an amputation of the right arm as the most effective way of controlling the source of the infection. By the time of the amputation there was dead muscle in all compartments of the right arm.

3. As hereinafter appears, the Claimant claims damages against South Central Ambulance Service NHS Foundation Trust [`the Defendant`], the statutory body established to manage medical emergencies in the community and to transport patients suffering from acute medical problems to hospital. As hereinafter appears both breach of duty and causation are in dispute.

4. The Claimant initially brought proceedings against other parties which are no longer pursued. Proceedings against Buckinghamshire Healthcare NHS Trust [`the Trust`], who were responsible for the management of SMH, Buckinghamshire Urgent Care Alliance and Dr Zaib, a general practitioner, were discontinued on 23 November 2016 before the Claimant served her Particulars of Claim. Although proceedings were initially pursued against both the Defendant and Dr Dias, they were discontinued against Dr Dias on 7 May 2019 after the exchange of the joint statements of the parties` experts. Although Mr Baker, on behalf of the Claimant, contended that there was evidence of breach of duty by Dr Dias which further delayed the Claimant`s admission to hospital, he conceded that he could not establish that such delay had necessitated the amputation.

The pleaded case against the Defendant

5. The Claimant alleged that the Defendant, its servants or agents, including Rachel Brooke, a paramedic [`Paramedic Brooke`], were in breach of the duty owed to the Claimant in that they:

5.1. failed to obtain an accurate or adequate history from the Claimant in that the PRF inaccurately recorded that:

5.1.1. the Claimant had been suffering symptoms for two hours when Mrs Newman had telephoned the OOH service at 0702 that morning and in her 999 call had stated that her mother had been suffering from symptoms the whole day;

5.1.2. the Claimant`s primary complaint was `generally feeling unwell with d&v today` when in fact she was suffering from excruciating pain in her right arm and had recently collapsed, having lost control of her bowels and bladder; and

5.1.3. the Claimant's pain was 0/10 and failed to record the location or nature of the pain or that the Claimant was `delirious`.

5.2. failed to examine the Claimant's arm, adequately or at all.

5.3. failed to transport the Claimant to hospital for assessment, given that her condition was serious and mandated assessment at hospital. Alternatively, if it was not practicable to arrange for an assessment at hospital, failed to contact a general practitioner to arrange a home visit and examination.

5.4. failed to arrange for the Claimant to be seen by a doctor, given that her condition and history mandated such an assessment.

6. The Defendant denied breach of duty and in para 29 of its Defence set out a response to the allegations of breach of duty. In particular the Defendant alleged that:

6.1. The Claimant herself told the ambulance staff that the presenting complaint was that she was still feeling `unwell with diarrhoea and vomiting`.

6.2. The Claimant did not tell the ambulance staff that:

6.2.1. she was suffering ongoing pain in her right arm, let alone `excruciating pain`, or that this was the reason for calling an ambulance in which circumstances there was no indication that the ambulance staff should examine her right arm as part of their assessment; or

6.2.2. she had recently collapsed or had had lost control of her bowels and bladder. Per contra the Claimant told the ambulance staff that she was `passing urine ok` and her complaint was that she had been passing `loose stools since this morning`.

6.3. The Claimant was not delirious. Per contra she was `alert and orientated` with a Glasgow Coma Score [`GCS`] of 15/15.

6.4. On the basis of the information provided by the Claimant and the findings and observations made by the ambulance staff there was no indication that the Claimant needed to be taken to hospital, either for further investigations or treatment.

7. It is common ground between the parties firstly that, in general terms, the role of a paramedic is not to form a precise diagnosis of a patient`s presenting condition but is solely to determine whether a patient should be admitted to hospital and secondly, that such represents a fairly low threshold.

8. The Claimant`s pleaded case on causation was that, but for the Defendant's breach of duty, the Claimant would have been admitted to SMH and seen by a doctor by 2200 on 9 August 2012 and that doctors would have diagnosed her as suffering with NF, would have treated her with surgery to remove the infected material and antibiotics and that she would not have needed to undergo an amputation of her right arm.

9. In their letter dated 8 December 2016 the Claimant`s solicitors indicated that the Claimant`s case on causation was that:

9.1. no later than 2½ hours after arrival at SMH the Claimant should have been diagnosed with severe sepsis / septic shock;

9.2. a skin and soft tissue source for the infection, ie NF, should have been anticipated given the Claimant`s severe pain;

9.3. within 1½ hours she should have been in the anaesthetic room for intravenous access, monitoring and preparation for surgery; and

9.4. surgery should have commenced within 30-60 minutes thereafter.

10. As to causation, the Defendant denied that an earlier admission of the Claimant to SMH would have resulted in an earlier diagnosis of NF than that which was in fact made at 1350 on 10 August 2012 when the Claimant first developed changes in the skin on her right arm which were suggestive of NF and that even if an earlier diagnosis should have been made, on the balance of probabilities the amputation of the Claimant's right arm could not have been avoided.

The issues to be decided

11. The three principal issues which I have to decide may conveniently be summarised thus.

12. Firstly, whether the paramedics, who included Paramedic Brooke, who attended at the Claimant`s home at about 2058 on 9 August 2012 in response to a 999 telephone call made by the Claimant`s daughter, Mrs Julie Newman [`Mrs Newman`], were in breach of their duty of care owed to the Claimant in failing to arrange for her to be admitted to hospital. It is common ground that Paramedic Brooke was by far the most senior paramedic present, that she dealt with this incident and that all observations were made and recorded by her on the patient referral form [`PRF`].

13. Secondly, whether the Claimant`s admission to SMH by about 2200 on 9 August 2012 would have enabled the Claimant to avoid the amputation to her right arm.

14. Thirdly, what residual disability, if any, would the Claimant have had in any event even if she been able to avoid the amputation of her right arm.

The legal framework

15. The legal framework for breach of duty is uncontroversial. Both Mr Richard Baker who represented the Claimant and Mr Bradley Martin QC who represented the Defendant agreed that I should be guided by the dicta of Lord Browne-Wilkinson in *Bolitho v City & Hackney Health Authority* [1998] AC 232, applying the test in *Bolam v Friern Hospital Management Committee* [1957] 1 WLR 582, in which he stated:

> `My Lords, I agree with these submissions to the extent that, in my view, the court is not bound to hold that a defendant doctor escapes liability for negligent treatment or diagnosis just because he leads evidence from a number of medical experts who are genuinely of opinion that the

defendant's treatment or diagnosis accorded with sound medical practice. In the *Bolam* case itself, McNair J. stated [1957] 1 W.L.R. 583, 587, that the defendant had to have acted in accordance with the practice accepted as proper by a "*responsible* body of medical men." Later, at p. 588, he referred to "a standard of practice recognised as proper by a competent *reasonable* body of opinion." Again, in the passage which I have cited from *Maynard's* case, Lord Scarman refers to a "respectable" body of professional opinion. The use of these adjectives - responsible, reasonable and respectable - all show that the court has to be satisfied that the exponents of the body of opinion relied upon can demonstrate that such opinion has a logical basis. In particular in cases involving, as they so often do, the weighing of risks against benefits, the judge before accepting a body of opinion as being responsible, reasonable or respectable, will need to be satisfied that, in forming their views, the experts have directed their minds to the question of comparative risks and benefits and have reached a defensible conclusion on the matter.`

16. I will apply this test in determining whether there was any breach of duty by the Defendant.

17. However as to causation there is dispute between counsel.

18. Mr Baker submitted that the issue of causation was multifactorial and required the court to consider various counter-factual scenarios depending on the findings of fact made. In such circumstances he advanced the Claimant`s case on the basis of but-for-causation and causation based upon material contribution to harm and relied on dicta of Lord Toulson in *Williams v Bermuda Hospitals Board* [2016] AC 886 in which he stated:

`39. The sequence of events may be highly relevant in considering as a matter of fact whether a later event has made a material contribution to the outcome (as *Hotson* illustrates), or conversely whether an earlier event has been so overtaken by later events as not to have made a material contribution to the outcome. But those are evidential considerations. As a matter of principle, successive events are capable of each making a material contribution to the subsequent outcome.

40. A claim will fail if the most that can be said is that the claimant's injury is likely to have been caused by one or more of a number of disparate factors, one of which was attributable to a wrongful act or omission of the defendant: *Wilsher v Essex Area Health Authority* [1988] AC 1074. In such a case the claimant will not have shown as a matter of probability that the factor attributable to the defendant caused the injury, or was one of two or more factors which operated cumulatively to cause it. In *Wilsher* the injury was a condition known as retrolental fibroplasia or RLF, to which premature babies are vulnerable. The condition may be caused by various factors, one of which is an over supply of oxygen. The claimant was born prematurely and as a result of clinical negligence he was given too much oxygen. He developed RLF, but it was held by the House of Lords that it was not enough to show that the defendant's negligence added to the list of risk factors to which he was exposed. The fact that the administration of excess oxygen was negligent did not warrant an inference that it was a more likely cause of the RLF than the various other known possible causes. The House of Lords distinguished the case from *Bonnington* in which the injury was caused by a single known process (the inhalation of dust).

41. In the present case the judge found that injury to the heart and lungs was caused by a single known agent, sepsis from the ruptured appendix. The sepsis developed incrementally over a period of approximately six hours, progressively causing myocardial ischaemia. (The greater the accumulation of sepsis, the greater the oxygen requirement.) The sepsis was not divided into separate components causing separate damage to the heart and lungs. Its development and effect on the heart and lungs was a single continuous process, during which the sufficiency of the supply of oxygen to the heart steadily reduced.

42. On the trial judge's findings, that process continued for a minimum period of two hours 20 minutes longer than it should have done. In the judgment of the Board, it is right to infer on the balance of probabilities that the hospital board's negligence materially contributed to the process, and therefore materially contributed to the injury to the heart and lungs.

19. Relying on such dicta and dicta of Picken J in *Dr Sido John v Central Manchester and Manchester Children`s University Hospitals NHS Foundation Trust* [2016] EWHC at paras 82-101, Mr Baker submitted that the Claimant`s case could be put on two alternative bases:

19.1. that had the Claimant been conveyed to hospital she would have been diagnosed with NF and undergone surgery before her arm became unsalvageable and before amputation became likely on the balance of probabilities; or

19.2. that the Defendant`s breach of duty caused a delay in providing the Claimant with treatment namely [a] treatment with broad spectrum antibiotics [which slows down the process whereby NF caused damage to the Claimant`s arm] and [b] surgical debridement [which halts the progression of NF if undertaken in time]. In such circumstances the delay in providing treatment contributed to the progressive harm caused to the Claimant`s right arm and materially contributed to the damage that caused her to undergo the amputation thereof.

20. Mr Martin agreed that the but-for-test applied in this case but submitted that the pleaded allegation of material contribution was unlikely to assist the Claimant. He submitted that in reality the issue of causation would be resolved by the parties` expert evidence and that although the experts might have disagreed about the latest time when the Claimant`s right arm could have been saved from amputation, the court`s resolution as to which expert evidence was to be preferred would in effect determine such issue. Moreover, in his Closing Submissions Mr Martin noted that that no causation expert had been unable to express a conclusion as to the latest time when the Claimant`s right arm could probably have been saved. He submitted that in such circumstances the Claimant`s case could not properly be advanced on the basis of material contribution.

21. As appears below, it is correct that all the causation experts were able to opine as to the latest time when the Claimant`s right arm could have been saved from amputation and I think that there is much force in the submission made by Mr Martin on the issue of material contribution. This was why in *Bailey v The Ministry of Defence* [2009] 1 WLR 1052 Waller LJ had stated, at para 46:

`If the evidence demonstrates on a balance of probabilities that the injury would have occurred as a result of the non-tortious cause or causes in any event, the claimant will have failed to

establish that the tortious cause contributed. Hotson's case exemplifies such a situation. If the evidence demonstrates that 'but for' the contribution of the tortious cause the injury would probably not have occurred, the claimant will (obviously) have discharged the burden. *In a case where medical science cannot establish the probability that 'but for' an act of negligence the injury would not have happened but can establish that the contribution of the negligent cause was more than negligible, the 'but for' test is modified and the claimant will succeed.*' [emphasis added]

22. However, if necessary, I will return to this issue when addressing the Claimant's case on causation.

Some preliminary observations

23. Although the non-expert evidence adduced in this case was relatively brief, it should be noted that the expert evidence adduced by both parties was both detailed and extensive. I heard evidence from a total of nine experts with expertise in paramedics, acute and emergency medicine, microbiology and hand surgery. In respect of each set of experts there were joint statements prepared in response to agenda produced by each of the respective solicitors which probably added, unnecessarily, to the totality of the expert evidence so that there was before the court almost 400 pages of expert evidence /joint statements adduced by the experts. The complexity of the issues raised at this hearing are also probably indicated by the fact that the parties' opening and closing submissions were in excess of 100 pages.

24. A number of preliminary matters should be recorded at the outset.

25. Firstly, it should be recognised at the outset of this judgment that NF is a very rare condition. It is seen only very infrequently and it usually requires a combination of radical surgical debridement or possibly amputation and intensive intravenous antibiotic therapy to control it, usually with a combination of penicillin and clindamycin. The latter prevents protein, and thus enzyme and toxin production, in the bacterium and acts on non-growing bacteria. It has a high mortality rate. In cases of GASNF there a reported mortality rate of 30-40% but this can rise to up to 80% if there is streptococcal myositis [involvement of muscle in addition to skin and fascia]. Early diagnosis and treatment are crucial to a patient's survival. Later in this judgment I will spell out in greater detail the issues raised in the diagnosis and treatment of NF by reference to the expert evidence which was adduced by the parties.

26. Secondly, it is probably common ground that the Claimant was infected with NF at the time she suffered a relatively minor non-penetrating trauma to her right arm during the exercise class on 8 August 2012 and that she had a transient bacteraemic episode with this organism shortly after sustaining the injury. Thereafter bacterial replications would then have become rapid and exponential with the organism tracking through the fascial planes of the connective tissue of the affected arm, aided by the proteolytic enzymes and toxins produced by the streptococcus. Typically, this will produce pain which is disproportionate to the severity of any

initial injury and toxaemia which causes vomiting, diarrhoea and later, circulatory collapse and multi-organ dysfunction.

27. Thirdly, I record out the outset of this judgment that the Claimant`s case against the Defendant cannot be judged with the benefit of hindsight. Moreover, the fact that all the symptoms experienced by the Claimant were consistent with a diagnosis of NF, a very rare condition, does not *necessarily* mean that the treating doctors at SMH, against whom no claim is pursued, would or should have made such a diagnosis when there were other possibilities for diagnosis which were more obvious or would or should have done so if, as the Claimant contends, she had been admitted to SMH at an earlier time.

28. It is thus necessary that I address each of the issues identified above in turn and I will do so.

29. However, it is common ground between both counsel that the Joint Statement of Michael Jackson and Dr Julian Mark, the paramedic experts of the Claimant and Defendant respectively, that if the Claimant's presenting complaint, condition and presentation were as described in the PRF, Paramedic Brooke`s decision not to take the Claimant to hospital was one which would be supported by a responsible body of paramedics so that in that eventuality the Claimant`s claim for damages would inevitably fail.

The relevant background

30. However, before I can address any of such issues identified above, a detailed explanation of the factual background is necessary.

31. On the morning of 8 August 2012, the Claimant attended an exercise class at her local church. Her exercise involved the use of resistance bands which she had previously used but she did not experience any pain in her arms or back either during or immediately after the exercise class and indeed was able to assist in moving chairs to their normal position. In the early evening she was able to go shopping with her daughter, Mrs Newman, and was able herself to carry her shopping home using both hands without experiencing any pain in her arms or back.

32. Later that evening the Claimant started to feel cold and was shaking from head to toe. The next morning the Claimant told Mrs Newman that overnight she had developed a pain in her right arm, had needed to take paracetamol and ibuprofen at about 0400, that such had not had any effect and had kept her awake and that at 0702 she had telephoned the OOH service. She had reported to them that she thought that she may have strained a muscle in her back and that the pain had developed during the night. The Claimant had been advised to contact her own general practitioner during surgery hours if she did not improve.

33. The Claimant`s pain did not improve and she booked an appointment to attend the surgery but because she vomited twice, Mrs Newman arranged for a home visit from Dr Zaib.

34. Dr Zaib saw the Claimant at home at 1415 on 9 August 2012. He advised her to take painkillers and use gel to reduce the muscle pain in her arm. The latter was not possible because when Mrs Newman attempted to put gel on the Claimant`s arm she complained that her arm was too painful to touch or rub. The Claimant remained in bed, had a high temperature, had started to suffer from diarrhoea and needed assistance in getting to the bathroom.

35. At 2015 Mrs Newman telephoned the OOH service. The Claimant had become progressively nauseous, was experiencing excruciating pain requiring pain relief, continued to suffer from diarrhoea, felt sick and had vomited. She looked ill and her pain seemed to have worsened since she had seen Dr Zaib. Mrs Newman requested a home visit but, upon being told that one OOH general practitioner was covering the whole of Buckinghamshire that night, she agreed to bring the Claimant to an appointment at the OOH clinic at SMH at 2130.

36. Unfortunately, as Mrs Newman was getting the Claimant ready for such appointment, her condition appeared to deteriorate further and she lost control of her bladder and bowels, began sweating profusely and collapsed and did not appear to be aware of anything other than her pain and her need for pain relief. It was in such circumstances that Mrs Newman, being concerned about her mother`s condition, telephoned 999 at 2056.

37. I have seen a transcript of such telephone call and I have also heard a recording of such call. The relevant parts of such transcript [in which F1 is the ambulance emergency call-handler and F2 is Mrs Newman] are:

> `F1 Ambulance emergency tell me exactly what`s happened.
>
> F2 Oh hello it's my mother she`s 71 years old. She`s had the doctor round today who said that she`s got a torn muscle in her arm and her back. We`ve just, actually it`s more than that she`s lost control of her bowels, her bladder. She`s really in a state of collapse. …
>
> ...
>
> F1 Is it the bowels that you`re calling about
>
> F2 No, no. My mum`s in an absolute state of collapse. …
>
> F1 … Is she, has she lost consciousness.
>
> F2 `Well she hasn`t but she`s well I mean more or less I would say more or less she has I mean she`s not.
>
> F1 Is she having pain

F2 She`s got a lot of pain in her arm and her back which is from the torn muscle but we thing she`s get something I don`t know some type of virus or something.

...

F1 ... And is she awake.

F2 Well she`s awake.

F1 Is she conscious.

F2 Well alright dad, alright dad, alright, sorry, sorry, alright dad you`re alright no.

...

F2 ... No, I mean my mum isn`t she`s not not conscious but she`s I mean she`s in a state of collapse I mean.

F1 okay .....

F2 [She can`t actually get herself up]

F1 Is she breathing.

F2 Yes, she is breathing yes.

...

F1 When did this start.

F2 Last night.

F1 The back pain.

F2 Oh yes last night.

F1 ... What caused the back pain.

F2 Well my mum went to her keep fit class and did the oh some resistant bands but she was okay in the afternoon but then last night she took a fit I mean shaking from head to toe.

F1 Okay and did she have difficulty breathing.

...

F2 I was only going to say over the course of the day it`s been sort of shallow breathing I would say not laboured but just shallow if that makes.

F1 Did she have difficulty breathing.

F2 No I don`t know I don`t believe so, no. She hasn`t no, actually no she hasn`t.

F1 Did she have chest pain as well.

F2 No, no chest pain. Mum you've not got chest pain have you.

F1 And she is completely alert. Is that her responding in the background.

F2 It is, yes, she is [alert] and no, it's just lost control of.

F1 Okay is she able to describe the pain.

F2 Mum can you describe the pain. Excruciating`

38. The conversation ceases at this point because the ambulance arrived at 2058. It is not suggested by Mr Baker that the contents of such conversation were or should have been passed on by the call-handler to the paramedics.

39. It clear from listening to the tape that when asked:

39.1. by the call-handler whether the Claimant was alert, Mrs Newman replied `Yes, she is alert`. Hence this has been added to the agreed transcript in parentheses;

39.2. that, having described her mother in a state of collapse, Mrs Newman said `she can't get herself up`. This too has been added to the agreed transcript in parentheses; and

39.3. when asked by Mrs Newman to describe the pain, the Claimant replied `excruciating` which was then repeated by Mrs Newman to the call-handler.

40. As hereinbefore appears, in such telephone call Mrs Newman had stated that although her mother was conscious she was in `an absolute state of collapse`, she had recently lost control of her bowels and bladder, her breathing was or had been shallow, on the previous night `she took a fit well I mean shaking from head to toe` and that the pain in her arm and back was excruciating.

41. I am bound to observe, having listened to the recording of such telephone call, that notwithstanding the concern she must have had in relation to the Claimant's condition, Mrs Newman spoke in very measured and careful terms and without any degree of exaggeration, and seemed very anxious to convey to the call-handler the urgency of her mother's situation and her need for prompt care.

42. Those in the ambulance who attended to the Claimant were Paramedic Brooke and others. Paramedic Brooke was an enhanced paramedic with about 18 years` service. She was accompanied by a far less experienced emergency care assistant trained in taking observations who may well have assisted in taking observations and an even less experienced community responder. Paramedic Brooke agreed that all the clinical responsibilities were hers, but she could not say which of them had completed the PRF [although the free text section as set out immediately before was in her handwriting], nor who had done which of the observations.

43. In the free text section of the PRF Paramedic Brooke recorded the following information:

> `PMH (*past medical history*)
> Normally fit and well - pt torn tendon in R arm. Seen by GP today for generally feeling unwell
>
> PC (*presenting complaint*)
> Pt continued to feel unwell with D+V (diarrhoea and vomiting) today
>
> SH (*social history*)
> Pt lives at home with husband, fully independent
>
> O/E (*on examination*)
> AVPU, alert and orientated. No SOB. No CCP. Pt has nausea + vomited with loose stools since this am. No abdo pain. Pt PU ok. No evidence of GI bleed. Abdo soft not distended. No guarding/rebound. All observations taken recorded within normal ranges
>
> PLAN
> Advice given to continue paracetamol and take fluids. Pt and family to contact GP if symptoms persist + to call us back if concerned.`

44. The PRF also recorded that at 2200 (although it is conceded that this was a mistake and should read 2100) there were the following observations:

> `Alert
> Airway clear
> Heart rate 94
> Respiratory rate 20
> Blood pressure 125/80
> SPO2 on air 93%
> Temperature 37.0
> Glasgow Coma Score 15
> Blood sugar 6.7
> Capillary refill less than 2 seconds
> Pain score 0/10`

45. The PRF also recorded that at 2215 (although it is conceded that this was a mistake and should read 2115) there were the following observations:

> `Alert
> Airway clear
> Heart rate not recorded
> Respiratory rate 16
> Blood pressure 125/80
> SPO2 on air 95%
> Temperature 37.0
> Glasgow Coma Score 15
> Blood sugar 6.7
> Capillary refill 2 seconds
> Pain score 0/10`

46. The PRF also recorded that the `duration of symptoms` was 2 hours.

47. Paramedic Brooke agreed that some of the information on the PRF would have been recorded contemporaneously and some at the end of the consultation with the Claimant.

48. Paramedic Brooke decided that it was not necessary to take the Claimant to hospital. She advised that the Claimant should continue taking paracetamol and rehydration fluids and that the Claimant or her family should contact her general practitioner if the symptoms persisted or to call the ambulance back if they were concerned.

49. The Claimant`s husband signed the PRF to signify that the advice had been given and understood and that the Claimant was being left in the care of a responsible person.

50. When the ambulance left, Mrs Newman went to purchase dioralyte from a local pharmacy, as Paramedic Brooke had suggested, but the Claimant was unable to take such fluids.

51. The Claimant`s condition did not improve and at 0008 on 10 August 2012 Mrs Newman again telephoned the OOH service. Dr Dias, the on-call doctor, telephoned back 10 minutes later.

52. I have a transcript of the conversation between Dr Dias and Mrs Newman. Mrs Newman said that the Claimant was in `absolute agony` with pain and asked if she could have a painkilling injection for her arm. She also stated that the Claimant had lost control of her bowels and bladder, had a fluctuating temperature and had been shaking from head to toe, that the pain had got steadily worse, such that she was `almost delirious with pain`, and that she had been sick. Asked by Dr Dias whether the Claimant could come into the OOH clinic, Mrs Newman said that she could not and that she had been `in a state of collapse for hours` which was why she had telephoned 999 some hours earlier. Dr Dias said that he would attend but warned that it would be at least two hours before he could attend.

53. Mrs Newman stated that subsequently the Claimant `took a turn for the worse` and had increased pain.

54. Dr Dias attended at 0255 and was with the Claimant for about 10 minutes. His notes recorded the following:

54.1. History : History as per triage. Has had 1-2 episodes of loose stools tonight, no blood Several episodes of vomiting as well no blood.

54.2. Examination: afebrile, in pain, not pale not dyspnonic, not cyanosed, heart rate -76, Lungs - NAD [nothing abnormal detected], respiratory rate - 16, abdomen soft non tender, bowel sounds - exaggerated. R shoulder - no tenderness in the shoulder joint but on the biceps muscle. R elbow - NAD.

54.3. Diagnosis: Gastroenteritis. Injury to biceps muscle in R arm due to exercises.

54.4. Treatment: injections of Voltarol, Tramadol and Cyclizine and advised the Claimant to continue to take dioralyte.

55. The injections given by Dr Dias had no effect on the pain in the Claimant`s right arm. Since Dr Dias had advised that the injections would work within half an hour, Mrs Newman again telephoned the OOH service at 0356.

56. Dr Dias telephoned her back at 0410. Mrs Newman explained that the injections had had no effect but Dr Dias said that the he had no other painkillers which he could give to the Claimant and he advised that an ambulance should be called to take her to hospital where other painkillers could be given to her.

57. Almost immediately thereafter Mrs Newman telephoned 999. She explained that she had spoken to Dr Dias five minutes before and that he had said that he had no other painkilling medication which he could offer the Claimant and that she should telephone 999. In answer to a question by the call-handler as to whether the Claimant was `completely alert`, Mrs Newman replied `She is` but added that she was very weak and was dizzy because she had gastroenteritis. The call-handler said that she would pass on the information to a qualified clinician who would telephone back.

58. Shortly before 0444 the Claimant *herself* telephoned 999 and said that she needed an ambulance to go to hospital. She acknowledged that she had had a visit from the OOH doctor who had given her a painkilling injection, when `she wasn`t so bad`, but they had not worked and her current pain was `absolutely intolerable, unbearable`. One of the nurses telephoned her back at 0444, was told by the Claimant that she was `in terrible pain` and was absolutely desperate, that she had had injections of Tramadol and Voltarol which had been ineffective and was advised that an ambulance would be sent as soon as possible.

59. The actual recording of such 999 call was played in court. I recognise that at the time of the making of such telephone call the Claimant must inevitably have been in excruciating pain and I accept that she *herself* was probably making the call to emphasise her belief that she was in desperate need of being admitted to hospital. I note that in cross-examination Mrs Newman said that the Claimant made the call in `sheer desperation` and saying `if they hear me … they may do something`. I thus make appropriate allowances for such matters. However, I am bound to say that, even making such allowances, I found her presentation to be calm, rational and alert and she was fully able to explain her condition and predicament and on the basis of this evidence, taken in isolation, I would find it impossible to conclude that *at that*

precise time she was suffering from delirium. However, I will revisit that issue below when reaching my final conclusions on this issue.

60. The ambulance arrived at 0511 and at 0605 took the Claimant to hospital where she arrived at 0615.

61. The paramedics recorded in the free text of the PRF:

> `PC (*presenting complaint*)
> Limb injury. [Female aged] 71
> Pt diagnosed with torn ligament in R arm. Unwell. Was diagnosed with gastroenteritis. Had 999 crew out at 2000 followed by OOH GP, GP gave tramadol and diclofenac and an anti-emetic. Unable to cope so called 999 again
>
> O/E (*on examination*)
> GCS 14. ABC ok. Pt extremely distressed. No SOB (*shortage of breath*). No CCP. Pt has extremely loose stools and is vomiting. Pt is also dizziness. No swelling or visible bruising in arm, able to mobilise
>
> PLAN
> Observations √ → SMH for treatment`

62. The observations recorded on the PRF at 0530 were:

> `Alert
> Airway clear
> Heart rate 99
> Respiratory rate 16
> Blood pressure 112/90
> SPO2 on air 99%
> Temperature 35.8
> Glasgow Coma Score 15
> Blood sugar 5.6
> Capillary refill less than 2 seconds
> Pain score 10/10`

63. The observations recorded on the PRF at 0600 were:

> `Alert
> Airway clear
> Heart rate 98
> Respiratory rate 16
> Blood pressure 110/86
> SPO2 on air 98%
> Temperature Not recorded
> Glasgow Coma Score 15
> Blood sugar Not recorded
> Capillary refill less than 2 seconds

Pain score 10/10`

64. Looking at the OOH service records it would seem that they were at the Claimant`s home so long because there were communications with the OOH service in which at 0533 the paramedics were indicating their belief that it was `not appropriate` to take the Claimant to SMH where there was already a 6 hour wait in Accident and Emergency [`A&E`], notwithstanding that she remained in pain, and that at 0538 Dr Dias reported back that he had already given painkilling injections and that there was no other stronger painkiller he could prescribe. Such fact alone seems to have prompted the Claimant`s admission to SMH where she could be given stronger painkillers.

65. The Claimant was admitted to the emergency department at SMH at 0629.

65.1. At 0630 her blood pressure was low at 74/41 and she had severe pain in her right arm.

65.2. At 0645 she was given intravenous fluids, an anti-emetic and paracetamol.

65.3. At 0720 her blood pressure remained low at 71/40.

66. At 0730 the Claimant was seen by Dr Careless, a junior [FY2] doctor, who recorded that:

66.1. Yesterday noticed right upper arm pain+++ approximately 2 hours after attending Pilates class where she was using a resistance band.

66.2. Claimant had pain of `10/10 severity located over anterior aspect, lower third of the upper right arm`. She had no shoulder or elbow pain but pain was exacerbated by extension of the elbow. She had been seen by an OOH general practitioner who had diagnosed a likely tendon injury but pain had persisted despite paracetamol, ibuprofen and tramadol.

66.3. On examination she was `afebrile, albert and orientated, in pain`. Her blood pressure remained low at 71/41.

66.4. The right arm was held with elbow in flexion. She was unable to extend the elbow due to pain. There was bruising over the anteromedial upper arm.

66.5. Having discussed with the A&E registrar, the plan was `admit medics for hydration. A&E will follow up arm X-ray.`

67. At 0810 the Claimant was referred to the Acute medical team for admission.

68. At 0900 the Claimant was seen by Dr Shaw, a junior [FY2] doctor, who recorded that:

68.1. The Claimant`s presenting complaints were severe pain in right upper arm and numbness from elbow distally, diarrhoea and vomiting, confusion and urinary incontinence.

68.2. Examination revealed `Tone ↓ ; power 5/5 however weakness due to pain; coordination normal; sensation numbness below elbow; reflexes biceps, triceps and supinator normal`. There was `bruising++ over elbow and upper arm`

68.3. Impression / differential diagnosis: Rhabdomyolysis (muscular damage, confusion, diarrhoea and vomiting). ?Gastroenteritis

69. At a time between 0900 and 1100 on a ward round by Dr Shahidi, consultant physician, he noted that the Claimant reported `not being able to feel arm`.

70. At 1100 Dr Shaw saw the Claimant and reported that he had:

70.1. been asked to see the Claimant for increasing pain in the right arm and noted `Peripheral pulses present in right arm. Patient`s arm cooler than previous. Arm is floppy below right elbow - unable to keep it up. Numbness in right arm.`

70.2. spoken to the plastics SHO who would review.

71. At 1230 the Claimant was seen by Dr MacLeod, a [CT2] plastic surgeon, who reported that:

71.1. History was `?soft tissue right upper arm injury` sustained two days before which over the day had resulted in `↑ pain, uncontrollable. Today ↑ bruising, swelling. ↓ Function of arms, No exacerbating feature. Also complaining of diarrhoea and vomiting. Used hot water bottle last night - large blister today`

71.2. A diagram showed the right upper arm annotated `extensive swelling + bruising` and on one aspect of the upper arm an area annotated `large blister with serosanguinous fluid`.

71.3. Examination showed `Power 0/5 - hand, wrist, elbow all movements. Reluctant to move shoulder. Sensation ↓globally distal to injury. Radial pulse present but weak. Capillary refill time approximately five seconds.`

71.4. ? Compartment syndrome.

71.5. Plan. Registrar review. Discuss with orthopaedics

72. At 1300 the Claimant was seen by Dr Khan, a plastic surgery registrar, who reported that:

72.1. History and examination as above. Arm not tense.

72.2. Impression ?Ruptured biceps. No sign of compartment syndrome.

72.3. Plan. De-roof blister, strict elevation, stay under medics for now, orthopaedic review.

73. At 1350 the Claimant was seen again by Dr Shahidi who reported that:

73.1. History was `Swollen, bruised right arm. Losing sensation in the arm, unable to move it. Well perfused + warm. Skin starting to blister. ?Scalded skin. ?Necretising fasciitis. Hypotensive, in lots of pain.`

73.2. Plastics CT2 reviewed with registrar felt there was no compartment syndrome.

73.3. Patient sweaty, obviously ill.

73.4. A diagram of the right arm showed arm above and below the elbow annotated `right arm plantar surface severe bruising`. On the radial side of the plantar side was an area annotated `blistering`.

73.5. Examination showed `no power at elbow or wrist`.

73.6. Impression. `Severely septic secondary to right arm with underlying haematoma causing nerve compression and loss of power at that`

73.7. Plan - urgent orthopaedic review, Bloods, cultures, Speak to micro.

74. At 1500 the Claimant was seen by Mr Riley, an orthopaedic registrar, who reported that:

74.1. Claimant was `very unwell. Hypotensive, tachycardic.`

74.2. History was that `two to three hours after exercise class developed pain in forearm. That night had rigours. Was able to move hand and elbow at this point. Over … the next three to four days pain worsened and swelled and patient deteriorated.`

74.3. `Now - very swollen arm. ?Fixed skin changes. Large blister medial aspect of arm and forearm. Unable to palpate radial pulse. Hand insensate.`

74.4. `Of note – skin changes are progressing rapidly. ?Necrotising fasciitis.`

74.5. A diagram showed skin changes in the right arm above and below the elbow and large blisters above and below the elbow.

74.6. `Discussed with Mr Heywood in theatre and will send his senior registrar to review → ? for theatre today.`

75. At the same time the Claimant was seen by Dr Shahidi who reported that:

75.1. `Reviewed and agreed infection is more likely than ruptured biceps tendon`.

75.2. Received advice from microbiologist and prescribed tazocin and clindamycin.

75.3. `Currently awaiting further plastic surgery input re need for debridement` but ITU consultant `agreed that she should go for surgery as soon as possible.`

76. An untimed entry, no doubt shortly afterwards, by the plastics registrar, recorded that:

> `?Necrotising fasciitis right arm. Rapidly progressive erythema right arm. →↑ numbness. →now unable to move arm.`

77. At 1630-1700 the Claimant underwent surgery. Having discovered that the skin was circumferentially necrotic and that the triceps were dead it was decided to disarticulate the right arm and to amputate at the shoulder joint.

78. It is common ground that a histopathology report recorded that at such surgery two specimens were taken:

78.1. A specimen taken from the right biceps muscle was necrotic with scattered colonies of coccoid bacteria.

78.2. Although the other specimen was said to come from `infected tissue right *arm*` and the conclusion was that such tissue was consistent with NF, the macroscopic appearance referred to `infected tissue from right *hand*.` In his cross-examination, referred to below, Mr Russell referred to this as a transcription error and expressed the view that this specimen came from the right *arm* and that the right *hand* was relatively spared. I will refer to this again below.

79. Although, strictly speaking, it is unnecessary to consider what happened after such surgery it may be noted that:

79.1. Thereafter the Claimant was admitted to the Intensive Therapy Unit. She suffered an overall deterioration, multi-organ failure and dysfunction and further debridement and definitive wound closure was delayed until 18 August 2012 by which time the Claimant was stable. She spent the next 6 weeks in critical care making a slow recovery, but ultimately recovered from the infection.

79.2. On 13 September 2012 the Claimant was seen by Mr Heywood, who had undertaken the surgery, and he noted that the wound was healing well, without any phantom limb pain although I note that subsequently the Claimant did experience some phantom limb feeling although it was not particularly painful.

The Complaint Investigation Report

80. Subsequently, on the Claimant making a complaint to the Trust, there was a review of the medical care provided to the Claimant before and during her attendance at the A&E department at SMH on 10 August 2012. Such report was referred to by Mr Baker when cross-examining Dr Campbell-Hewson . In such report Dr Triscott, the Emergency Medicine Specialist Registrar, apologised for the delay in diagnosing NF and, whilst recognising that NF was as rare life-threatening condition which was difficult to diagnose, stated:

> `With Mrs Austin`s severe pain, there should have been some thought processes around pain disproportionate to injury (without fracture), possibly being compartment syndrome or necrotising fasciitis. Further, with the presence of low blood pressure and being unwell, doctors should consider sepsis and therefore the earlier delivery of antibiotics - as per the Trust`s sepsis guidelines. I wonder if antibiotics were not considered due to the thought that the diagnosis was viral gastroenteritis.`

81. I bear in mind that these comments were made with the benefit of hindsight and, albeit with some hesitation, I have concluded that it would be inappropriate to adjudge that they advance the Claimant`s case in any way.

The first issue: was the Defendant in breach of its duty of care in failing to arrange for the Claimant to be admitted to hospital

82. On the facts of this case I think it is convenient to first consider the expert evidence directly relating to this issue, namely of the experts in paramedic practice and pre-hospital care who were Mr Michael Jackson [Claimant] and Dr Julian Mark [Defendant].

83. Both experts gave oral evidence before me:

83.1. Mr Jackson was a consultant paramedic employed by the North West Ambulance Service. He had qualified as a paramedic in 1987, became Chief Consultant Paramedic in 2008 and he worked one 12 hour shift each week providing direct patient care as a paramedic.

83.2. Dr Mark was a qualified doctor; whose basic clinical specialty was in anaesthesia. He had been employed by the Yorkshire Ambulance Service since 2007 as its deputy Medical Director and was now its Executive Medical Director. He maintained his clinical practice by joining a paramedic team as an additional paramedic/doctor once a month.

84. In his report Mr Jackson had stated that:

84.1. observations as to the Claimant`s respiratory rate and heart rate were not within normal range, that any report of pain should have prompted inspection, palpation and

assessment of movement, and that the Claimant had developed an infection and was suffering from sepsis and that all these matters mandated that the Claimant should have been transported to hospital for further assessment and treatment.

84.2. the fact that the Claimant`s husband signed the PRF indicated to him that the Claimant was either not fully alert or did not have capacity to understand what was being said.

84.3. the Claimant should have been en route to SMH by 2130 at the latest and, given the proximity of SMH, that she would have been at SMH by no later than 2140.

85. When cross-examined by Mr Martin, Mr Jackson stated:

85.1. he would have expected Paramedic Brooke to have considered any pain experienced by the Claimant, particularly if it was described as excruciating, and was disproportionate to the injury diagnosed earlier because her condition might have deteriorated since such diagnosis was first made.

85.2. he agreed that in relation to a loss of bowel and bladder control it was significant that the PRF did not record that the Claimant was incontinent and did record that she was able to pass urine.

85.3. whilst in his report he had stated that having decided not to convey the Claimant to hospital it was substandard care not to make arrangements for the GP to be contacted, he conceded that such was not mandated albeit that it was reasonable practice. For the avoidance of any doubt I understood Mr Jackson to be conceding that he was not suggesting that a reasonable body of paramedics would have made such arrangements.

85.4. he agreed that if all the information recorded on the PRF was accurate such did not mandate the Claimant being taken to hospital.

86. In his report Dr Mark had stated:

86.1. there was no reason to suggest that the findings recorded in the PRF were inaccurate notwithstanding that such conflicted with Mrs Newman`s witness statement which described her mother in so much distress and pain that she was unable to speak for herself.

86.2. the recorded pain score of 0/10 in the PRF suggested that pain in the arm was not a feature of the Claimant`s presenting complaint and that it was thus reasonable for Paramedic Brooke not to examine the Claimant`s arm.

86.3. the Claimant`s physiological observations recorded on the PRF were essentially normal and that the GCS at 15/15 indicated that the Claimant was alert and coherent.

86.4. a capillary refill time of less than 2 seconds and the record that the Claimant was continuing to pass urine suggested that there was no concern regarding dehydration or sepsis.

86.5. the observations recorded on the PRF would be inconsistent with Mrs Newman`s description of her mother as weak, lethargic, in severe pain who had lost control of her bowels. Such a description would result in several of the observations being outside normal ranges and a GCS of less than 15/15 which would mandate that the Claimant be transported to hospital.

86.6. there was no indication to transport the Claimant to hospital for assessment.

87. When cross-examined by Mr Baker, Dr Mark stated:

87.1. he agreed that the role of a paramedic was to decide whether a patient needed to see a doctor and that the role of the paramedic was not to make a precise diagnosis. In such circumstances he agreed that there was a `relatively low threshold` for deciding whether a patient should be admitted to hospital.

87.2. a patient who was in pain and distressed might well rely on a relative to communicate her history to paramedics.

87.3. his conclusions as set out in his report did not take into account the witness statement of Mrs Newman but had focussed solely on what was written on the PRF. He believed that if there had been a report of a collapse or loss of control of bowels and bladder, he would have expected such to have been recorded on the PRF.

88. In re-examination by Mr Martin, Dr Mark emphasised his understanding of `true incontinence` was where a patient lost complete control of their bowel and bladder functions and was unable to make an attempt to try and stop being incontinent.

89. However, the position of these experts became much clearer in their Joint Statements.

90. The material part of their Joint Statement on the Defendant`s agenda read as follows [with the experts` views in italics]:

> `20. If the Court finds that the Claimant`s presenting complaint, condition and presentation, were as described in paragraphs 8 to 16 inclusive and in paragraphs 28 to 35 inclusive of Ms Newman`s witness statement, was Ms Brooke`s decision not to take the Claimant to hospital
> (a) a decision which would be supported by a responsible body of paramedics, or
> (b) a decision which would not be supported by any responsible body of paramedics?
>
> *It is our opinion that the decision would not be supported by any responsible body of paramedics.* `

91. Such Joint Statement was somewhat ambiguous because it did not identify particular matters referred to in Mrs Newman`s witness statement but it was amplified in the Joint Statement on the Claimant`s agenda, the material parts of which read as follows [with experts` views in italics]:

`2. If the Claimant, or her family present at the house, reported that the Claimant was suffering from excruciating pain in her arm, would all reasonable and responsible paramedics:
(a) Have examined the Claimant`s arm. If so, what examination would you have expected them to carry out?

If the Claimant had been complaining of excruciating pain in the arm then an examination of the arm would have been expected. This would have included inspection, palpation, movement and neurovascular status distal to the site of injury.

(b) Have recorded that examination and its findings within their notes?
Yes

(c) Have recorded a pain score of 0/10?
No

3. Assume for the purposes of this question that the Claimant, or her family present at the house, reported that the Claimant was suffering from excruciating pain in her arm. Would that symptom, individually or taken with one or more of the following symptoms have mandated transportation to hospital:
(a) Had been feeling unwell, shaking/shivering, from the previous night;
(b) Had previously had a high temperature;
(c) Had appeared to be delirious;
(d) Suffered from diarrhoea and vomiting;
(e) Had recently lost control of her bladder and bowels;
(f) Had the appearance of shallow breathing (even if this symptom was no longer present at the time of the paramedic`s assessment);
(g) Appeared to be weak and lethargic.

Pain in isolation would not mandate conveyance to hospital.

Irrespective of the presence or absence of pain in the Claimant`s arm, conveyance to hospital would be expected if the Claimant had appeared to be delirious and/or had lost control of her bladder and bowels. None of the other presentations, singularly or in combination, would mandate conveyance to hospital.

Dr Mark wishes to note that the assumption does not accord with the facts recorded in the patient report form, and that Ms Newman`s statement does not report that this information was provided to the attending paramedics.

[This latter observation is incorrect as in her witness statement Mrs Newman had expressly stated that she had to speak on behalf of her mother, that she was surprised to read in the PRF that the Claimant was alert and orientated "when clearly that was not the case" and that she had lost control of her bladder and bowels.]

...

6. If a reasonable and responsible body of paramedics would not have transported the Claimant to hospital based upon the signs and symptoms described above, would they have nonetheless contacted an out of hours GP? In other words, would a reasonable and responsible body of paramedics leave the Claimant`s home without either transporting her to hospital; or, making contact with an out of hours GP?

If the Claimant had presented with delirium and loss of control of bladder and bowels then we would expect a reasonable and responsible body of paramedics to have conveyed the patient to hospital.`

92. Neither of the experts resiled from the Joint Statements set out above in their evidence.

93. It is important to emphasise that the paramedic experts agree that `pain taken in isolation would not mandate the Claimant being taken to hospital. The key trigger factors are delirium and loss of control of bladder and bowels.

94. Moreover, given such agreed Joint Statements, I do not believe that the cross-examination of either Mr Jackson or Dr Mark took matters significantly further and I do not think it is necessary to decide, in the event of any conflict between their respective evidence, whose evidence I might prefer. However, if I had felt it necessary to prefer one expert`s evidence, I would have preferred that of Mr Jackson for two reasons:

94.1. firstly, I am satisfied that he had far more practical experience as a paramedic whereas it seemed that Dr Mark experience was really as an observer than as a paramedic, and

94.2. secondly, the conclusions expressed in Mr Jackson`s report were balanced and fairly expressed whereas it is, in my judgment, a legitimate criticism of Dr Mark was that in his report he seems to have unquestioningly accepted the accuracy of the PRF completed by Paramedic Brooke and effectively ignored the contents of Mrs Newman`s witness statement, which is not the role which an independent expert should adopt.

95. It will be noted that there is a possible inconsistency between the answers to questions 3 and 6 in that the answer to question 3 is that either delirium *or* loss of control of bladder and bowels would mandate admission to hospital, whereas the answer to question 6 suggests that both delirium *and* loss of bladder and bowel control were necessary to mandate the Claimant`s admission to hospital.

96. However, in respect of such possible inconsistency, I understood the evidence of both experts to be that either delirium *or* loss of control of bladder and bowels mandated the Claimant`s immediate admission to hospital and in their closing oral and written submissions both counsel addressed me on that basis: see para 47 of the Claimant`s Closing Submissions and para 18 of the Defendant`s Closing Submissions which did not suggest that both delirium and loss of control of bladder and bowels were necessary to mandate admission to hospital. It thus follows that in deciding whether the paramedics were in breach of duty in failing to transport the Claimant to hospital I must decide whether at the time when she saw the Claimant she should have realised that the Claimant was suffering either from delirium *or* from a loss of control of her bladder and bowels.

97. However, in resolving that issue it is important to consider the totality of the evidence, to which I now turn. In particular I will focus on evidence relating to delirium and loss of control of bladder and bowels.

98. The Claimant did not give oral evidence. Her witness statement was agreed. In such statement she stated that she remembered attending the exercise class on the morning of 8 August 2012 which involved the use of resistance bands but did not experience any pain in her arm or back. She went shopping with Mrs Newman that evening but had no further recollection of subsequent events.

99. Mrs Newman gave evidence in accordance with her detailed witness statement. In particular, she stated that because her mother was so distressed and in severe pain being `unaware of anything other than her pain and desperation for relief`, she had to speak on behalf of the Claimant. She had told the paramedics that the Claimant was in severe pain, was at times disorientated and confused and had lost control of her bladder and bowels shortly before the ambulance arrived [having been suffering from diarrhoea from the previous evening]. Although her witness statement only referred to the Claimant`s loss of control of her bowels and not her `bladder and bowels ` she corrected this in her evidence in chief and although Mr Martin reminded her that she had referred to loss of control of bowels five times in her witness statement, she responded that in explaining the symptoms at the time to the call-handler and the paramedics she was being `very exact`. Mr Martin did not pursue the matter further. I am sure that he was right to do so, given that in the 999 telephone call immediately prior to the ambulance attending Mrs Newman had expressly referred to a loss of control of *both* bladder and bowels.

100. When she subsequently saw the PRF she was surprised that there were inaccuracies, namely that:

100.1. the presenting complaint was not, as recorded in the PRF, that the Claimant had continued to feel unwell with diarrhoea and vomiting but was, according to Mrs Newman`s evidence, that the Claimant was suffering severe and disproportionate pain in her right arm.

100.2. there was no record pain in the PRF and the recorded score of 0/10 for pain was wholly inconsistent with the pain Mrs Newman had described to the paramedics.

100.3. the duration of the Claimant`s symptoms was not 2 hours because the history of her developing pain was for much longer and indeed the Claimant herself had telephoned the OOH service at 0702 on 8 August 2012 because of the degree of pain she was suffering, she had been seen by Dr Zaib at 1415 that afternoon, and the PRF itself recorded that `she had had nausea and vomiting with loose stools today`.

100.4. she did not believe that the Claimant`s breathing was normal.

101. I add that if, for whatever reason, the paramedics had not understood that the Claimant`s severe pain had been the reason for them being summoned to attend, this might explain why Mrs Newman was left with the impression that the paramedics `were not interested in` the Claimant because that they may have regarded the Claimant as an older lady who was making rather more of her symptoms than was objectively justified. Of course, with the benefit of hindsight, we now know that she was experiencing exquisite pain from NF.

102. In her evidence Mrs Newman told me that her father, who was some 10 years older than her mother, suffered from dementia, signed the PRF and that PRF must have been signed at the time when she went to the door to admit her daughter whom it had been arranged would take her grandmother to the 2130 appointment and to whom she needed the explain the presence of the ambulance. I accept Mrs Newman`s evidence on this issue because:

102.1. firstly, I accept that she was the person who was answering the paramedics` questions, and that she was temporarily absent from the room at the time Paramedic Brooke concluded that there was no need to take the Claimant to hospital; my reasons for so concluding are set out below; and

102.2. secondly, during the 999 telephone call made at 2056, the Claimant`s father can be heard making a number of interruptions whilst Mrs Newman was speaking to the call-handler.

103. Inevitably, this calls into question the appropriateness of Mr Newman signing the PRF. Although I accept that the Claimant`s husband had dementia, such may not have been obvious to the paramedics who would have been concentrating their attention on the Claimant`s condition, although I note that Mrs Newman said that he was very confused and was calling out. That should really have alerted the paramedics to the inappropriateness of him signing the PRF. However, whilst I am satisfied that this matter does not have direct relevance as to the major issue between the parties as to whether the Claimant should have been admitted to hospital immediately after this visit by the paramedics, it may well indicate a less than appropriate or rigorous approach to the completion of the PRF.

104. When cross-examined by Mr Martin, Mrs Newman stated that:

104.1. at the time when she made the 999 call the Claimant had relentless and disproportionate pain in both her back and arm.

104.2. while her daughter was on her way to take the Claimant to the OOH clinic at SMH for 2130 the Claimant lost control of her bowels and bladder and collapsed as Mrs Newman was getting her out of bed.

104.3. when seen by the paramedics the Claimant was alert.

104.4. she did not say that the Claimant had been unwell for two hours because she had been in severe pain throughout the day.

104.5. the paramedics did not examine the Claimant`s right arm.

104.6. although the PRF recorded that the Claimant had torn a tendon in her right arm, such did not derive from her because she was clear that Dr Zaib had said that she had torn a muscle and she recalled saying this to the paramedics. [I note that Dr Zaib`s own notes refer to `sprain, biceps tendon`]. Although she conceded that in a subsequent telephone call to the OOH service, she had initially said that the Claimant had torn a ligament in her right arm, she immediately corrected this to say that she had torn a muscle.

105. Paramedic Brooke had no recollection of events but relied on what she had recorded in the PRF and her practice of taking a history from the patient and not a relative. She expressly stated that if the Claimant had:

105.1. demonstrated delirium, this would have been recorded on the PRF if this had been told to the paramedics and she would have had a reduced GCS.

105.2. reported any pain in a limb it was her standard practice to assess the limb by palpation, examining and inspecting the limb, assessing motor, sensation, circulation and range of movement.

105.3. reported a pain score above 0/10 she would have administered pain relief and did not do so.

105.4. demonstrated delirium this would have reduced the GCS, as it would have at the very least affected her verbal response score.

106. Moreover, Paramedic Brooke stated that if the Claimant`s husband had been too confused to discuss the situation and understand the safety advice and be able to sign the PRF on behalf of his wife, she would not have sought his signature.

107. When cross-examined by Mr Baker, Paramedic Brooke stated that:

107.1. she could not say who had had supplied information or who had undertaken the observations on the Claimant but she knew that she would have undertaken the abdominal assessment because others present were not permitted to undertake such an assessment.

107.2. although her initial question would have been something akin to `what has brought us here to you today`, at some stage she would have asked whether the Claimant was in pain and, if so, the location and severity of such pain.

107.3. her only explanation for the recorded pain score of 0/10 was that she may have assumed that because the Claimant`s arm had been assessed by the general practitioner and that the reason for the paramedics` attendance was because of diarrhoea, vomiting and a collapse, that she was focussing on the abdomen when she asked about pain.

107.4. she did not agree that she had not examined the Claimant`s arm although a thorough examination would not in her view have been required because of the prior assessment by the general practitioner. However, she agreed that if she had carried out `much of an assessment` such would have been recorded on the PRF.

107.5. When asked about the significance of a loss of control of bladder and bowels Paramedic Brooke did not understand that loss of control of bowels and bladder was significant.

107.5.1 She said this:

`Q. Do you see any significance in the fact that the claimant had recently lost control of her bladder and bowels before you attended?

A. Any significance?

Q. Significance

A. That was the main reason that we were called.

Q. Well, you know that from having heard the evidence, it`s not part of your note.

A. Sorry, what was the question?

Q. IF a patient who has got, let`s assume for a moment you assume they have gastroenteritis, would you see any significance in the fact that the patient had lost control of their bladder and bowels?

A. No

Q. You wouldn`t?

A, No

Q. To be clear, if you were given the history `The patient has just lost control of their bladder and bowels when I was trying to get them dressed to go to the out-of-hours service`, you would not have regarded that as being something that was significant and mandated transport to hospital?

A. No`

It may be noted that in so far as Paramedic Brooke was saying that the loss of control of her bladder and bowels was the main reason why the ambulance attended such represents the Claimant`s case and not the Defendant`s case which was that the presenting complaint was that the Claimant had continued to feel unwell with diarrhoea and vomiting.

107.5.2. Similarly, after reading the transcript of the 999 call at Mr Baker`s invitation, there was the further following exchange:

`Q. Having read through that transcript is there anything written in there that you feel now would have caused you to take Mrs Austin into hospital if you`d known about it?

A. No'

Of course, it is now agreed by the paramedic experts that had Paramedic Brooke been told of a loss of control of bladder and bowels, which was referred to in the transcript of such 999 call, there should have been an immediate transfer to hospital.

108. In re-examination by Mr Martin, Paramedic Brooke, with what seemed to me like a little gentle prompting, explained that she now understood that what she had been asked by Mr Baker in the passages cited above was in reality to explain what was meant by loss of control of bladder and bowels and she answered that there was a difference between incontinence caused by accident and not having the capability to have any control of bowels and bladder. I was unimpressed by this further evidence. It seemed to me that in her evidence, as set out above, Paramedic Brooke had clearly acknowledged that she did *not* regard a loss of control of bladder and bowels as significant but realised in re-examination that she ought not to have made such concession because such concession would support the Claimant`s case on breach of duty.

109. Mrs Newman was, in my view, an impressive witness. Her evidence was carefully expressed, focused, detailed and given without any degree of exaggeration. She spoke of her telephone call to the 999 service which resulted from her mother being in a state of collapse, being `not conscious in the true sense of the word`, and that she had lost control of her bladder and bowels.

110. I am thus faced with two conflicting accounts of what occurred when Paramedic Brooke attended at the Claimant`s home and it is difficult, if not impossible, to reconcile them. Having carefully considered the evidence of Mrs Newman and Paramedic Brooke I reconcile them by making the following findings of fact.

111. I accept that Mrs Newman answered all of the questions which Paramedic Brooke raised because the Claimant was in no fit state to do so. Although I bear in mind that the Claimant had been able to describe the degree of her pain as `excruciating` to the 999 call-handler via Mrs Newman, having seen the way in which Mrs Newman gave her evidence - clearly and confidently - I am satisfied that, given the degree of pain which the Claimant was suffering and her overall distressed condition, the Claimant would have been more than willing to let her daughter speak on her behalf and that Mrs Newman would have been more than willing to do so because of her obvious concern about her mother`s condition. I do not find it in the slightest surprising that Mrs Newman should speak on behalf of her mother in such circumstances, nor do I find it surprising that Paramedic Brooke is unable to recollect that such occurred. Although Paramedic Brooke says that her practice is to take the history of events from the patient, that is not always possible and in my judgment it is not compelling evidence which would justify my not accepting Mrs Newman`s evidence on this point.

112. I am sure, particularly bearing in mind the careful, measured but forceful way in which Mrs Newman spoke during the 999 call that it is inconceivable that she would have said

anything in answer to Paramedic Brooke's questions which was inconsistent with the concerns which she had expressed in the 999 call which took place immediately before such visit.

113. Even if I were wrong to conclude that Mrs Newman answered all questions as above and that the questions were answered by the Claimant, I have no doubt if the Claimant had deviated from the account which Mrs Newman had given to the 999 call handler in her mother's presence, Mrs Newman would have forcefully corrected her and would have reminded her of what she had told the 999 call-handler.

114. I have no doubt that the Claimant`s presenting complaint was not just that she had pain in her arm and back. It was *also* that she had lost control of her bladder and bowels [which had been acknowledged by Paramedic Brooke in cross-examination] and was in a state of collapse. That was what Mrs Newman had said when asked by the 999 call-handler `tell me exactly what`s happened?` She had replied:

> `... she`s got a torn muscle in her arm and her back. We`ve just, actually it`s more than that she`s lost control of her bowels, her bladder. She`s really in a state of collapse.`

115. I cannot accept that, having told the 999 call-handler of all these matters in terms, Mrs Newman would not have repeated each of them to the paramedics immediately thereafter. Indeed, I accept Mrs Newman`s evidence, repeated on a number of occasions during her oral evidence, that she told the paramedics that her mother had collapsed and had lost control of her bladder and bowels and I am satisfied that she was not simply describing the Claimant as having suffered an accident associated with diarrhoea. As to the Claimant`s collapse, I note that during the 999 telephone call Mrs Newman had said `she can`t get herself up`, referring to the Claimant, and, given that Mrs Newman continued such call until the ambulance arrived and her elderly father suffered from dementia, I think it is highly unlikely and improbable that by the time the paramedics arrived the Claimant had been assisted in getting up.

116. Although Paramedic Brooke recorded the presenting complaint on the PRF that the Claimant `continued to feel unwell with diarrhoea and vomiting today`, I am satisfied that, for whatever reason, Paramedic Brooke did not understand the significance that a complete loss of control of bladder and bowels necessitated the Claimant`s immediate admission to hospital and, notwithstanding her long experience as a paramedic, made a mistake in failing to record this. She acknowledged this in the clearest possible terms at the two parts of her cross-examination referred to above. I am thus satisfied that Paramedic Brooke made a mistake in understanding the presenting complaint to be as she had recorded it. It may also be the case, as was submitted by Mr Baker, that such mistake derived from the fact that since 2012 there had been changes in protocols relating to the administration of painkilling medication which meant that the treatment of the Claimant`s pain would now be addressed differently. As hereinafter appears, this mistake had a consequential significance in terms of examination of the Claimant`s right arm, the recorded duration of the Claimant`s symptoms and the recorded pain score of 0/10.

117. There is a dispute as to whether Paramedic Brooke examined the Claimant`s right arm. Mrs Newman says that she did not [and must have found it extraordinary that she did not do so] whereas Paramedic Brooke did not agree that she had not examined the Claimant`s arm although she conceded that if she had carried out `much of an assessment` it would have been recorded on the PRF which it was not. In truth, she would have been duty bound to record the results of such assessment. Given that Paramedic Brooke did not regard pain in the right arm as part of the presenting complaint and believed that a thorough examination would have been unnecessary because of the general practitioner`s previous diagnosis, I am satisfied that Paramedic Brooke did not examine the Claimant`s arm. Given the history of pain, it was in my judgment not reasonable for Paramedic Brooke not to examine the Claimant`s arm.

118. Although the PRF records the symptoms as being of two hours duration, I think that this was based on a misunderstanding on the part of Paramedic Brooke. Her immediate concerns were the Claimant`s diarrhoea and vomiting which had probably begun the previous evening. However, since I am satisfied that the Claimant`s presenting complaint was pain in her arm and back and a loss of control of her bowels and bladder, this was an error. In fact, the Claimant`s symptoms had begun in the late evening of 8 August 2012.

119. I am absolutely certain that Mrs Newman spoke, probably at some length, about the degree of pain which the Claimant was experiencing in her right arm and I am satisfied that she told Paramedic Brooke that the Claimant`s pain was `excruciating`. However, I think that Paramedic Brooke disregarded such pain because she believed that this had already been addressed by the general practitioner and concentrated upon the Claimant`s abdomen which she believed was the reason why the ambulance had been summoned. In such circumstances I am satisfied that Paramedic Brooke was focussing solely on the abdomen when she asked about pain. Given that it is no doubt correct that the Claimant had no pain in her abdomen the score was recorded as 0/10. This was the way in which Dr Mark sought to reconcile the score of 0/10. Although I accept that the Claimant`s condition will inevitably have deteriorated over the next 7-8 hours, it is noteworthy that at 0530 and 0600 the recorded pain score was 10/10.

120. I am satisfied that, when examined by the paramedics, the Claimant was alert and conscious, albeit that the Mrs Newman described her as being disorientated and confused and having collapsed. She conceded that the Claimant was alert in cross-examination. I note that the Claimant was able to participate in the 999 telephone made by Mrs Newman shortly before 2058 and moreover, I can see no reason to doubt the accuracy of the GCS scores of 15/15 at 2100 and 2115 on 9 August 2012 or at 0530 and 0600 on 10 August 2012 and such readings would not be consistent with a patient who was not alert.

121. Although there is a dispute as to whether there was reference to the tear of the tendon or a tear of the muscle, I am just persuaded that Paramedic Brooke is probably correct in stating that Mrs Newman referred to the tendon. Although I have not found this an easy issue to resolve, I find it difficult to accept that Paramedic Brooke would write down `tendon` on the PRF if Mrs Newman had used the word `muscle` to her. Moreover, although it is correct that in her evidence Mrs Newman was convinced that in speaking to Paramedic Brooke and that in a subsequent telephone call to the OOH service she had used the word `muscle` [the latter of

which is certainly correct], I note that Dr Zaib's own notes refer to 'tendon'. I thus think that on this issue Mrs Newman is probably mistaken, particular as to her it probably would have mattered not whether the injury to the Claimant's arm related to a muscle, ligament or tendon.

122. Bearing in mind the agreed expert evidence set out above, I now address the question of whether at 2058 the Claimant was suffering from delirium or a complete loss of control of her bladder and bowels, both of which the experts agree would mandate her immediate admission to hospital.

Delirium

123. Although 'delirium' is defined by *Black's Medical Dictionary* as 'a condition of altered consciousness in which there is disorientation (as in a confusional state), incoherent talk and restlessness but with hallucination, illusions or delusions also present' the evidence of Mrs Newman referred to her mother as not being 'conscious in the true sense of the word', disorientated and confused. In deciding whether the Claimant was delirious, I will apply a test of whether, at the time of the paramedics' attendance at 2058 on 9 August 2012, the Claimant was in a condition where she had altered consciousness, disorientation and confusion rather than the somewhat wider test set out in the above dictionary definition.

124. Having considered all the evidence I am satisfied on a balance of probabilities that during the visit by the paramedics which began at 2058 the Claimant was not delirious. I reach this conclusion for the following reasons.

125. Firstly, whether a person is delirious requires an assessment of the degree of altered consciousness, disorientation and confusion which it would be easy for Mrs Newman to misjudge. Whilst the Claimant might have appeared markedly different from her normal mental state and was believed by Mrs Newman to be 'in an absolute state of collapse', I am not persuaded that Paramedic Brooke incorrectly recorded in the PRF that the Claimant was both 'alert and orientated' and had a GCS of 15/15 at both 2100 and 2115. Such observations would have been wholly inconsistent with the existence of delirium and I accept Paramedic Brooke's evidence that a patient who has delirium would have a reduced GCS, although I note that GCS is a test of consciousness and [per Dr Mark] a person could be distressed and in pain or 'at times disorientated and confused' and yet still have a GCS of 15/15 even though [per Mr Jackson] the Claimant could not have had a GCS score of 15/15 unless she was fully conscious.

126. Secondly, having carefully listened to the Claimant's telephone call at 0444, I believe that her presentation during such telephone call was inconsistent with her *then* suffering from delirium: see above. Whilst I recognise that it would have been possible for the Claimant to be suffering from delirium at 2058 but not at 0444 and subsequently, I have concluded that such would be highly unlikely. Indeed, one might have thought that her delirium would have been more likely to increase with time rather than decrease.

127. Thirdly, I note that during the 999 telephone call immediately prior to 2058 Mrs Newman was able to interact with her mother, by asking her the degree of pain she was suffering. To me that does not suggest the existence of delirium.

128. Fourthly such conclusion is in my view supported by the fact that *different* paramedics attending at 0511 also recorded the Claimant as being `alert` and with a GCS of 15/15 at 0530 and 0600.

129. Fifthly, I do not accept Mr Jackson`s opinion expressed in his report that the fact that the Claimant`s husband had signed the PRF indicated to him that the Claimant was either not fully alert or did not have the capacity to understand what was being said. There are other reasons why he might have done so, for example the Claimant`s inability to sign the PRF.

130. I reach this conclusion notwithstanding that in Mrs Newman`s first call to the OOH general practitioner at 2015 she described her mother as `almost delirious` and a record of `delirious` appears in the OOH service records at 2015 and subsequently at 0008. However, per contra, I note when at the time of the ambulance visit at 2050 and when Dr Dias visited at 0255 there was no recorded finding of delirium.

Loss of control of bowels and bladder

131. Mrs Newman told me that when they attended the Claimant`s home she told the paramedics that her mother had lost control of her bladder and bowels shortly before she had made the 999 call and that her condition had deteriorated since Dr Zaib had examined her. In cross examination she was convinced that such loss of control was not simply an accident but was a complete loss of control.

132. I do not doubt that some of the observations recorded on the PRF by Paramedic Brooke were accurate but, as hereinbefore appears some were not. In particular, I am absolutely convinced that the PRF failed to record *all* the matters which Mrs Newman had told the paramedics. I cannot explain why that should be the case but, for example, as hereinbefore appears, I have no doubt that Mrs Newman told Paramedic Brooke that her mother was in excruciating pain, particular since both the Claimant and Mrs Newman had expressly so described the Claimant`s pain to the 999 call handler immediately as the ambulance arrived at 2058 and yet Paramedic Brooke failed to accurately record such fact by giving a pain score of 0/10. It seems to me that the only logical explanation for this omission was that Paramedic Brooke was concentrating on the fact that the Claimant had continued to be unwell with diarrhoea and vomiting.

133. In such circumstances I ask myself whether I accept that Paramedic Brooke was told by Mrs Newman that her mother had lost control of her bladder and bowels. Although Mrs

Newman and Paramedic Brooke disagree on this fundamental issue, I am satisfied that Mrs Newman did refer to a loss of control by the Claimant of her bladder and bowels for the following reasons.

134. Firstly, given that almost the first thing that Mrs Newman said in the 999 telephone call immediately prior to paramedics arriving at her parents` home, was the Claimant had `lost control of her bowels, her bladder` and had collapsed, I am satisfied that it is inconceivable that she would not have expressly said this to Paramedic Brooke. Any contrary conclusion would require me to accept that Mrs Newman gave one account to the 999 call-handler shortly before 2058 and then minutes later gave a different account to the paramedics. In my judgment that is not realistic, particularly given the reliance I have placed on the careful way in which Mrs Newman gave her evidence without any degree of exaggeration.

135. Secondly, it is inherently unlikely that the Claimant would have made the 999 telephone call to summon an ambulance if she had thought that the Claimant had *accidentally* lost control of her bowels or bladder. I am sure that Mrs Newman would well have recognised the difference between accidental loss of control of bladder and bowels and uncontrolled incontinence caused by a loss of control of bowels and bladder. I am satisfied that if the Claimant had so lost control of her bowels and bladder Mrs Newman would have enquired of her *before* she telephoned 999 for the first time, whether the loss of control was accidental, as sometimes occurs, or was incontinence caused a total loss of control.

136. Thirdly, I note that Mrs Newman gave the same history that the Claimant had lost control of bladder and bowels and had collapsed subsequently to the OOH service call-handler at 0008 and to Dr Dias some 10 minutes later.

137. Fourthly, although I cannot explain why the loss of control of bladder and bowels was not recorded on the PRF, on the balance of probabilities I accept Mr Baker`s submission that Paramedic Brooke probably did not record this on the PRF because she did not then understand that a loss of control of bladder and bowels was significant and required the Claimant`s immediate admission to hospital.

138. In reaching such conclusion I have not ignored that the PRF records that `Pt PU ok`, which I understand to mean that the Claimant was able to pass urine, and I note that there was no record in the PRF that the Claimant was incontinent. I find it difficult to explain this because, although I cannot understand why Paramedic Brooke would record this if she had not been told it by Mrs Newman, I am satisfied that, given Mrs Newman`s previous conversation with the 999 call-handler and what she describes in her witness statement, I cannot and do not accept that she would have told Paramedic Brooke that the Claimant was able to pass urine. I am satisfied, on the balance of probabilities, that this matter notwithstanding. Mrs Newman did relate to the paramedics that her mother had lost control of her bladder and bowels and had collapsed.

139. On the basis of the agreed expert evidence referred to above, my finding that the Claimant had lost control of her bladder and bowels is sufficient to justify my conclusion that the paramedics were in breach of their duty of care owed to the Claimant by failing to arrange for the Claimant's immediate transfer and admission to SMH.

140. Following from my above finding of breach of duty, it is necessary that I should determine by what time the Claimant should have been admitted to SMH. It is common ground that the journey time between the Claimant's home and SMH was about 10 minutes.

141. The respective contentions of the parties were:

141.1. the Claimant's pleaded case was that she would have been seen by a doctor at SMH by 2200 on 9 August 2012: para 32 of the Particulars of Claim. Although in his Opening Submissions Mr Baker contended that the Claimant should have been admitted to SMH by 2200, which is slightly different, in his Closing Submissions Mr Baker contended that it was possible that the Claimant could have arrived at SMH at 2130 or at some point before 2200.

141.2. the Defendant's pleaded case was that if she had been admitted to hospital following the 2058 attendance by paramedics she would been seen by an A&E SHO by about 0045 on 10 August 2012: para 30 of the Defence. Although in his Opening Submissions Mr Martin contended that it was reasonable to suppose that the Claimant would have arrived at 2300 or thereabouts and certainly before midnight, in his Closing Submissions he contended that the best analysis was that the Claimant would have arrived at 2220, given that it took 1 hour 20 minutes from arrival at the Claimant's home at 0511 to arrival at A&E at 0629.

142. Whilst these analyses are of some help, it should be noted that the paramedics attending later delayed taking the Claimant to SMH because they too did not believe that it was necessary and because of the likely long wait at A&E. Moreover, they do not reflect the fact that after the first ambulance visit at 2058 the Claimant would have been admitted as a person who had had a loss of control of her bladder and bowels and needed to be seen by a doctor *as a matter of urgency*, whereas after the second ambulance visit at 0511 the Claimant was admitted as a person who required to be prescribed painkillers and was not did not require to be seen by a doctor with the same degree of urgency.

143. Doing the best I can I am satisfied that, having discovered the loss of control of bladder and bowels fairly soon after their arrival, the paramedics would have left the Claimant's home to take her to SMH by 2120, would have arrived at SMH by about 2130 and would have been seen by an A&E doctor as a matter of urgency, because of the loss of control of her bladder and bowels, by 2200. This is some 9½ hours *before* she was in fact first seen by Dr Careless at SMH at 0730 the next day.

144. Although the Defendant had originally contended that, had the Claimant been admitted at this earlier time, she would quickly have been discharged home, this contention was not pursued at the trial.

The second issue: would the earlier admission of the Claimant to SMH by about 2200 on 9 August 2012 have enabled her to avoid the amputation of her right arm?

145. Apart from my finding of fact that, but for the breach of duty by the Defendant, the Claimant would have been seen by an A&E doctor by 2200 on 9 August 2012, the issue of whether such an earlier arrival at SMH would have avoided the amputation of the Claimant`s right arm was not dependent on the evidence of Mrs Newman or Paramedic Brooke and turned solely on the expert evidence adduced by both parties.

146. In determining this issue I am satisfied that I should ascertain from such expert evidence a hypothetical timeline for the diagnosis and treatment of the Claimant`s NF and that I should not incorporate into such timeline any delays which in fact occurred in the actual diagnosis of NF because the earlier admission of the Claimant to SMH would have inevitably meant that different doctors would have been responsible for her care and the diagnosis of NF. It thus follows in that in my judgment I should ignore delays in diagnosing NF such as:

146.1. the failure by Dr MacLeod to realise the significance of the blister noted at 1230 which was potentially attributed to the use of a hot water bottle when the blister could only have appeared between 1100 and 1230; and

146.2. the delay between 1350 when the skin was noted to be `starting to blister` and 1500 when the Claimant was next seen by which time skin changes were `progressing rapidly`.

146.3. the diagnosis of a bicep strain, which criticised as misleading by Mr Heywood, the surgeon who carried out the amputation.

The expert evidence on causation

147. The expert evidence on causation relied upon by the parties was:

147.1. *Emergency / Acute Medicine*:

Professor Patrick Nee	Claimant
Dr Gregor Campbell-Hewson	Defendant
Dr Ross Murphy	Defendant

147.2. *Microbiology*:

Dr James Stone	Claimant

Professor Keith Cartwright	Defendant

147.3. *Plastic / Hand surgery:*

Mr Peter Russell	Claimant
Mr David Ward	Defendant

148. I now propose the summarise the evidence of each of the experts and then set out my conclusions on causation from the respective experts on both sides and, having considered the evidence from all of the experts, will thereafter set out my final conclusions on the totality of such evidence.

149. However, before so doing it is helpful to set out relevant observations made by some of the experts about the nature of NF and GASNF, its diagnosis, treatment and the risk of the disease proving fatal. These may be summarised as follows:

149.1. NF is a rapidly progressive inflammatory condition spreading from the skin to the deep subcutaneous tissues caused by bacterial infection, commonly GASNF. It is easily overlooked in its early stages as it may present as a relatively minor skin infection advancing to cellulitis. It presents with fever, pain, tenderness and redness over the affected area and the pain can be quite severe. The redness may spread quite quickly over hours and the patient becomes systemically unwell. Early recognition is important but may be difficult. Treatment is by intravenous broad-spectrum antibiotics and surgical debridement which sometimes involves multiple surgical procedures and is inevitably associated with massive tissue loss and the need for subsequent skin grafting. [Professor Nee]

149.2. NF is a rare and life-threatening condition, occurring as a result of infection of the soft tissues beneath the skin with bacteria. Usually such bacteria are mild and easily treated but in cases of NF such bacteria spread quickly and infect the fascia [bands of connective tissue that surround muscles, nerves, fat and blood vessels] and toxins produced by such bacteria destroy the tissue they infect, causing it to die. This can cause loss of limbs or death. There are about 500 cases each year in the UK. NF can be difficult to diagnose in its early stages and requires aggressive and early treatment. As the infection spreads into the blood stream and throughout the body the patient develops shock, disseminated intravascular coagulation and multi-organ failure. There is a very high and rapid mortality rate and by the time of diagnosis it can be too late to prevent death. Blood tests will show a raised white cell count and C reactive protein which are non-specific indicators of infection and inflammation. As the infection proceeds, other blood tests can be abnormal. [Dr Murphy]

149.3. NF can be divided into two main types: a polymicrobial infection comprising a collection of aerobic and anaerobic bacteria [NF] and an infection caused by a single organism [GASNF]. Both types usually require both radical surgical debridement and intensive intravenous antibiotic therapy to control them. Treatment of GASNF is best achieved by a combination of penicillin and clindamycin which served to switch off

enzyme and toxin production in the bacterium. Both types have a high mortality rate and in the case of GASNF a mortality of 30-40% is typically reported rising up to 80% if there is also streptococcal myositis (involvement of muscle as well as skin and fascia). The progression of the disease is typically measured in hours and early diagnosis and treatment are crucial to survival. [Dr Stone]

149.4. GASNF can occur without any antecedent symptoms or signs. Infection spreads in the tissue plane between the subcutaneous tissues and the fascia, involving first the latter and later the overlying skin with blistering, death and necrosis of skin. Cardinal early signs are disproportionate local pain and tenderness and generalised toxicity. Diagnosis may be very difficult to establish since it may progress very rapidly and at first there is little or nothing to see on examination of the overlying skin. Antibiotics alone do not control NF because antibiotic penetration into dead and dying skin is poor because of the absence of a viable blood supply. Hence the need for surgical debridement to remove all infected and necrotic tissue, preventing further dissemination of bacteria and their toxins. Antibiotics and surgical debridement give the patient the best chance of survival. [Professor Cartwright]

149.5. NF can be difficult to diagnose as it is uncommon and diagnosis is often delayed. Pain out of all proportion associated with blistering and mottling is a classic sign of NF. It is treated with intravenous antibiotics and surgical debridement of the affected area. [Mr Russell]

149.6. By far the most important part of the treatment for NF is radical surgical debridement of the infected tissues extending well beyond the area of induration and swelling into normal-looking and healthier bleeding tissue. This is necessary if surgery is to have a chance of being curative. Antibiotic therapy is important but a secondary part of treatment. [Mr Ward]

The evidence of the experts in Emergency / Acute medicine

150. In terms of the Emergency / Acute Medicine expert evidence, it will be noted that the Claimant relies on one expert, Professor Nee, an expert in Emergency medicine, whereas the Defendant relies on *both* Dr Campbell-Hewson, an expert in Emergency medicine and Dr Murphy, an expert in Acute Medicine. Mr Baker suggested that such reliance on two experts exploited the case management order of Master Roberts made on 1 February 2018, given that it was not suggested that there was any difference in the standards of care between Emergency medicine and Acute medicine and no such difference was suggested in the experts` reports or in their Joint Statements. In fact, Dr Campbell-Hewson said that in relation to the approach to diagnosing NF, the findings that would lead you to consider that diagnosis would be uniform between experts in Emergency medicine and Acute medicine. Although I will express my views about all the evidence given before me, the overlap between the evidence of Dr Campbell-Hewson and Dr Murphy will not add to the weight which I give to their cumulative evidence.

151. Professor Nee has been a consultant in A&E medicine since 1994 and is Visiting Professor of Emergency Medicine at Liverpool John Moores University. His opinions as expressed in his report may conveniently be summarised thus:

151.1. that considering the Claimant`s actual admission to SMH and her treatment, `on balance`:

151.1.1. there was sufficient evidence of a serious condition when the Claimant was first admitted to SMH;

151.1.2. evidence of hypotension, neutropenia, lymphopenia, acute kidney injury and lactic acidosis would have been available by say 0800; and

151.1.3. a diagnosis of severe septic shock should have been available by 0900 and it would have been reasonable to consider the diagnosis and begin treatment with antibiotics by approximately 0900. In fact, such treatment was not begun until 1500.

151.2. if the Claimant had been admitted to hospital earlier at about 2100-2200 on 9 August 2012:

151.2.1. it is likely that she would have had blood tests, the results of which would have been available within 1½ hours and would have alerted those looking after her to the presence of infection; and

151.2.2. the likely source of infection was the skin and soft tissues where the pain was which raised the diagnosis of NF and referral would then have been made to a plastics or general surgeon.

151.3. whether this `six hour delay` led to an adverse outcome is a matter for expert opinion by a plastic surgeon.

152. Dr Campbell-Hewson`s has been a consultant in Emergency medicine since 1998. For present purposes I have only included those opinions which relate to the Claimant being seen by a doctor in A&E by 2200 and have ignored assumptions made by Dr Campbell-Hewson, which it is common ground were incorrect, in particular that the paramedics were present at the Claimant`s home for 1 hour and 15 minutes. His opinions as expressed in his report may conveniently be summarised thus:

152.1. If the Claimant had been admitted at 2200 it is likely that she would have presented as an otherwise healthy 71-year-old woman who had apparently injured her right arm the previous morning and had then developed diarrhoea and vomiting that day.

152.2. The assumption that the Claimant would have been seen on arrival by a doctor is inaccurate since the only patients usually so assessed by a doctor are resuscitation patients about whom the paramedics have pre-alerted A&E. However, on the facts here, I have already found that the Claimant would have arrived at SMH by 2130 and would have been seen by an A&E doctor as a matter of urgency, because of the loss of control of her bladder and bowels, by 2200.

152.3. It is likely that when seen by a doctor the Claimant's physiological symptoms would have been unremarkable and unlikely that there would have been any major or significant abnormality on examination of her right upper arm. In such circumstances, the conclusion would have been that the Claimant had two separate conditions, a muscle or tendon tear in her right arm and gastroenteritis, it was unlikely that it would be considered that these two conditions might be linked, and it is likely that she would have been discharged home with symptomatic treatment and advice because of the reluctance to admit patients with infective gastroenteritis to hospital as most can be managed at home.

152.4. If the Claimant's condition had been as described in the Particulars of Claim [and by Mrs Newman]:

152.4.1. it would have been difficult to discharge her from A&E because of her severe pain and she is likely to have been referred to the Acute team for admission.

152.4.2. there would have been no obvious reason to request laboratory blood tests on arrival but it is likely that these would have been sought on such referral for admission.

152.4.3. it is likely that the blood tests requested at say 2400 would have been unremarkable, apart from a marginally decreased white cell count and not be as abnormal as those from 0630-0700 but it is likely that the CRP and creatinine levels would have been significantly increased.

152.4.4. it would be for an expert in Acute / General medicine to opine as to whether an earlier admission to hospital would have resulted in an earlier suspicion of NF. However, he opined that he would have expected the diagnosis to be suspected at about the same time as it was in fact suspected, as a result of the changes in the appearance of the skin of the Claimant's right arm which developed in the late morning and early afternoon of 10 August 2012.

153. Dr Murphy has been a consultant in Acute medicine and Emergency medicine since 2007 but was appointed the Professional Lead in Acute Medicine in 2009. He thus straddles both disciplines of Acute Medicine and Emergency Medicine. Again, for present purposes, I have only included his opinions which relate to the Claimant being seen by a doctor in A&E by 2200. Such opinions as expressed in his report may conveniently be summarised thus:

153.1. There was no indication to admit the Claimant to hospital earlier than she was so admitted and the diagnosis of NF would not have been made any sooner than it was. In many cases diagnosis only becomes apparent when a patient fails to respond to initial treatment and the skin changes such as blistering progress.

153.2. Diagnosis was made difficult by the following confounding factors: the diagnosis of a muscle or tendon injury, that diarrhoea and vomiting led to a diagnosis of gastroenteritis, the lack of a high temperature, the lack of a wound or break in the skin,

the relatively late development of skin changes such as blistering and the history of the Claimant`s use of a hot water bottle which could have explained the blistering.

153.3. When seen at 0730 on 10 August 2012 the Claimant had history and examination findings consistent with a soft tissue injury, gastroenteritis and dehydration. The injury to the Claimant`s arm could have been explained by a muscular injury. There were no signs of blistering and her temperature was normal. Such was insufficient to suggest NF and all her presenting symptoms and blood test results could reasonably have been attributed to the diagnosis of soft tissue injury, gastroenteritis and dehydration. If the Claimant had been taken to hospital earlier the clinical picture would have been even less suggestive of NF.

153.4. Blistering to the arm was first noted at 1230 and NF first considered as a diagnosis at 1350. The Claimant was moved to the Resuscitation area at 1400 and given more intravenous fluids and antibiotics. At 1500 following a discussion between Dr Shahidi and a microbiologist it was decided to start the Claimant on clindamycin and tazocin.

153.5. The change in the appearance of the arm would not have occurred any sooner if the Claimant had been taken to hospital sooner and antibiotics would not have been considered at any earlier time.

153.6. He did not think that NF would have been considered by a reasonable body of doctors working at the same level as the doctors involved until after 1230 when the Claimant had not responded to treatment and the blistering of her arm was first noted. Moreover, he opined that the same chain of events would have been likely to occur even if the Claimant had been admitted to SMH earlier.

153.7. He opined that NF would not have been considered at any earlier point as it was the changes that occurred in the external appearance of the arm from 1230 to 1350 which led to the diagnosis.

154. The Joint Statement on the Defendant`s agenda asked the experts to assume that the Claimant had arrived at SMH at 2200 on 9 August 2012 although I have determined above that the Claimant would have arrived at SMH *and* would have been seen by an A&E doctor at SMH as a matter of urgency by 2200. Their response was as follows:

> `The experts are agreed that on this scenario the timings referenced above would have been the same. Vital signs would have been the same. Interventions referred to above would have been the same. However, the threshold for drawing bloods for investigations and referring for admission would, on the balance of probabilities have been lower given the impact of the history set out in the witness statement of Mrs Newman.
>
> PN suggests that the claimant would have been admitted to hospital on this scenario. [NF] may not have been diagnosed immediately but a significant infectious disease mandating broad spectrum antibiotics should and would have been diagnosed.
>
> GCH summarised his view that the conclusion would have been that Mrs Austin had two separate conditions, that laboratory blood tests would probably not have been arranged initially and the likely outcome would have been attempted discharge. If this was not possible because

of the severity of Mrs Austin`s symptoms, then it is likely that she would have been referred to the Acute Medicine team for admission and further investigation and treatment.

RM agreed with this and was of the opinion that, on balance of probabilities, this earlier referral would not have led to [NF] being diagnosed at an earlier time than it was in the factual sequence of events and that this would not have been negligent.`

155. My instinctive reaction to Dr Murphy`s observation that an admission some 9½ hours earlier [at 2200 on 9 August 2012] would not have resulted in an earlier diagnosis of NF than that which occurred, is one of considerable surprise when the diagnosis of NF was in fact first suspected at 1350 [some 7½ hours after the Claimant`s admission to hospital] and seems to have been confirmed at 1500 [just over 8½ hours after such admission] but I will return to this later.

156. In the Joint Statement on the Claimant`s agenda the experts were asked `by what time would all reasonably responsible clinicians have referred the claimant to a surgeon or plastic surgeon` and answered as follows:

`The experts are agreed that it would have been reasonable to refer the claimant to a plastic surgeon on suspicion of [NF], at sat 1230 to 1350 hours. However, it would also have been reasonable to refer the claimant at this time to an appropriately trained surgeon upon suspicion of other cause for the painful arm including ischaemia, compartment syndrome, rhabdomyolysis, venous thrombosis or other soft tissue injury`.

157. It is clear that subsequent to Professor Nee expressing such views in the Joint Statements there was a meeting between him and the Claimant`s solicitors which gave rise to the Claimant`s solicitor sending an email to the Defendant`s solicitor in which the Claimant`s solicitor said this:

`The Claimant`s position on factual causation is that within one and a half hours of her arrival at hospital (at whatever time from 2200 on the 9th August) a sepsis screen would (or should) have been carried out and a diagnosis of sepsis made. Within six hours of her arrival [the Claimant] would or should have been seen by the surgeons to investigate her arm as the source of the infection. Six hours being the period between the Claimant`s arrival at SMH on the 10th August at 0629 and 1230 when she was seen by Plastics.

For the avoidance of doubt, it is not Professor Nee`s position that a diagnosis of [NF] could only have been made after 1230 on 10th August.

Mr Russell is of the view that [the Claimant`s] arm was viable (with pulse and full power 5/5) up until 9am 10th August. His view is that the mechanism of damage was likely to have been an infective process including the release of toxins and the systemic effects from the infection. `Systemic effects` incudes the contribution of ischaemic damage caused late on in the pathology of the disease as described by Dr Stone.`

158. Such prompted a letter of explanation to the Claimant`s solicitors dated 13 May 2019 in which Professor Nee gave further clarification. He stated:

`1. On every scenario it should have been possible to recognise that [the Claimant] was suffering from a serious infection, rather than two separate entities, and to have begun resuscitation with oxygen and fluids, as well as broad spectrum antibiotics within an hour and a half of presentation.

...

4. Surgery in sepsis is an important consideration. However, adverse outcomes are most often a result of delayed recognition of a septic illness and delayed resuscitation.

5. On every scenario it would be likely to have taken hours (perhaps 6, but one cannot be explicit as there are too many confounding variables) to have recognised that this was NF. To be clear that does not mean noon or thereabouts on the earlier scenarios.

6. On every scenario it would have taken hours, as above, to have contacted a plastic/orthopaedic surgeon. This is because the need for a surgeon would have derived from the diagnosis of NF.

...

8. It is the view of the defendant`s experts that [the Claimant] was not so ill at 6 am and therefore she would have been even less ill on the earlier scenarios. The Court will consider this proposition in the light of the evidence of [the Claimant`s] daughter.`

159. When cross-examined by Mr Martin, Professor Nee:

159.1. observed that skin blistering was quite a late development in NF and in answer to a direct question by Mr Martin unequivocally rejected the suggestion that skin blistering was needed for a diagnosis of NF. He said that if there were blistering skin lesions and septic shock any medical student would have referred a patient with such symptoms to a plastic surgeon. He added that the presence of skin blistering was a `barn door`, by which I understood to mean that at that stage NF would have been blindingly obvious and that a diagnosis of NF would have been available *before* them.

159.2. asked by Mr Martin to explain the Joint statements and his subsequent letter to the Claimant`s solicitors, he maintained that 6 hours was a reasonable estimate, but it was only an estimate. He opined that after 6 hours all reasonable clinicians would have diagnosed NF in the present case. He agreed that he had not referred to such a 6 hour period in the Joint Statements.

159.3. stated that he had treated many patients with NF and currently had a patient with NF under his care at the date of the hearing.

160. In re-examination by Mr Baker, when asked to consider the report of Professor Cartwright who had estimated that a diagnosis of NF could be made within 3-4 hours, Professor Nee broadly agreed with such opinion.

161. When cross-examined by Mr Baker, Dr Campbell-Hewson:

161.1. opined that he had only seen 3 or 4 cases of NF throughout his 35 years as a doctor.

161.2. believed that doctors in Acute medicine would typically have less experience of NF and there would be a greater awareness of NF in Emergency medicine, but he agreed that this was somewhat speculative as he did not work in Acute medicine.

161.3. opined that when she was admitted to SMH at 0630 on 10 August 2012 the Claimant had a markedly decreased blood pressure of 70/40 so that there was a `very clear objective marker of illness` on admission. However, he believed that the position would have been different had she been admitted to SMH at 2200 the previous day. He opined that, at that time, it is unlikely that bloods would have been drawn immediately on admission and that she would have been given intravenous morphine to address the pain.

161.4. accepted that his description of the Claimant in his report as `otherwise healthy today` had ignored the pain in her right arm and that she had developed diarrhoea and vomiting and probably did not reflect all that Mrs Newman had stated in her 999 call, including the fact that the Claimant was said to have collapsed, had lost control of her bladder and bowels, and was disorientated and confused.

161.5. accepted that shortly after admission to SMH at 0629 the blood tests showed that neutrophils [white cell count] at 2.8 was `on the lower side`, the CRP [c-reactive protein] at 260 was `very high` and a platelet count was 139, all of which were indicative of infection.

161.6. disagreed with Professor Cartwright, the Defendant`s own microbiologist, that at the time of the Claimant`s admission to hospital she fulfilled the criteria for toxic shock syndrome.

161.7. opined that the diagnosis of NF would not be made until the skin changes in the Claimant`s right arm had occurred. However, later he conceded that blisters do not need to be present in all cases but it was an unusual presentation of NF which did not have the obvious skin changes for a substantial period of time.

161.8. disagreed that if the Claimant had been admitted to SMH at 2200 on 9 August 2012 that a diagnosis of NF would have been reached within 6 hours.

161.9. conceded that a referral should have been made to a plastic surgeon for compartment syndrome at noon on 10 August 2012 and, after consulting the medical records, further conceded that a referral should have been made before 1100 when the arm was noted to be floppy. In making such concessions, he agreed, it appeared to me very reluctantly, that such concessions were contrary to that part of the Joint Statement set out above.

162. When cross-examined by Mr Baker, Dr Murphy:

162.1. recorded that he had seen only two cases of NF in his entire career.

162.2. opined that an acute medical doctor would not normally see patients with NF because such patients normally need care under the surgical team. Thus, emergency medicine doctors would have more exposure to and a greater awareness of patients with NF.

162.3. agreed that because he had been instructed as an Acute medicine expert, it was outside his remit to offer views on what an Emergency medicine doctor would have considered. However, he had done so because he thought `it would be useful because he had had experience as a consultant in both Acute medicine and Emergency medicine.

162.4. agreed that his report only set out `one side of the story` and had omitted any reference to the 999 telephone call made by Mrs Newman. Although he explained this by saying that his report only set out a summary of events and that it was difficult to set out `every single piece of information`, it was undoubtedly already a very detailed summary and I have no doubt that it could have been expanded to add those matters which he had consciously omitted, so as to give a fair overall summary of events. I am satisfied that, as an expert, it was his duty to do so. I found his explanation for this omission wholly unconvincing and somewhat disingenuous.

162.5. opined that the diagnosis of NF in this case could only have been made by the Claimant developing blisters on her arm.

163. Before summarising my final conclusions in respect of the evidence of all the experts, I set out my initial impression of these experts.

164. The opinions of Professor Nee on which the Claimant relied, namely an estimated period of 6 hours to make a diagnosis of NF, were not set out in the Joint Statements and were set out in subsequent correspondence. I have struggled to understand why they were not and can only believe that his concession, made in the Joint Statement on the Claimant`s agenda, in agreeing that it would have been reasonable to refer the Claimant to a plastic surgeon at 1230 to 1350 on the basis of her admission at 0629, had intended to adopt a similar estimated period to diagnose NF had the Claimant been admitted to SMH at about 2200, although he had inexplicably failed to set this out. However, his oral evidence to me corrected his views and he readily confessed that he had erred in expressing his views as he did in such Joint Statement.

165. In those circumstances I have asked myself whether this omission is fatal to his credibility. On the facts of this case I am satisfied that it is not. I have to say that, apart from this error, I found Professor Nee to be an impressive witness. His opinion that it would have taken about 6 hours from the Claimant`s admission to SMH to make a diagnosis of NF, which he frankly conceded was only an estimate, made much sense to me, bearing in mind that it took about that length of time from the Claimant first being seen by Dr Careless at 0730 to Dr Shahidi raising a suspicion of NF at 1350. Moreover, I note that even at 0730 Dr Careless also found bruising over the anteromedial upper arm and that at 0900 Dr Shaw recorded that there was `bruising++` over the elbow and upper arm. I will return to the significance of such bruising later. To this 6 hour period would have to be added the period it would take arrange for the Claimant to undergo surgery.

166. Neither Dr Campbell-Hewson nor Dr Murphy referred in their reports to the transcript of the 999 call immediately before the attendance of the ambulance at 2058 which hardly seemed a balanced approach to considering all the evidence. Moreover, Dr Campbell-Hewson:

166.1. seemed to have accepted unequivocally the timings of contained in the PRF, when viewed objectively, they were unlikely to have been correct;

166.2. did not appear to recognise that if the Claimant had been admitted at about 2200, she would have been dealt with *as a matter of urgency* because of the loss of bladder and bowel control and is unlikely to have waited up to 2 hours to see a doctor; and

166.3. had initially contended that even if the Claimant had been admitted to SMH about 2200 it is likely that she would have been discharged home with symptomatic treatment and advice. This contention was not pursued at trial and he accepted that it was improbable that the Claimant would have been sent home without investigations being commenced and when her reported severe pain was likely to have been treated with morphine and thereafter re-assessed.

167. I was thus not impressed with Dr Campbell-Hewson`s evidence.

168. I was also not impressed with Dr Murphy`s evidence. As I have already observed I found his explanation for not setting out a full and complete history of events as unconvincing and disingenuous. I felt that his evidence was frequently attempting to `pick out the plums` of the Defendant`s case without acknowledging appropriately the matters which could legitimately be advanced in support of the Claimant`s case. In short, I did not regard him as properly balancing all the available evidence in the case and I am reluctant to place any significant reliance on his evidence.

169. The fundamental distinction between these experts` evidence was whether NF could be diagnosed or suspected following a defined, albeit somewhat imprecise, period of time [as was suggested by Professor Nee] or whether NF could only be diagnosed on the occurrence of blistering [as was suggested by Dr Campbell-Hewson and Dr Murphy]. Of course, if the latter is correct, it is irrelevant at what time the Claimant was admitted to SMH.

170. Although Professor Nee conceded that he fell into error in expressing his views as he did in the Joint Statements, his evidence that NF could be diagnosed or suspected after an interval of time appeared in his original report [see in particular paras 9.16 and 9.17], albeit that he did not express an upper limit of 6 hours in that report. However, it is plain from such report that he was not suggesting that NF was dependent on the appearance of blisters on the Claimant`s right arm and his opinion that it was reasonable to consider a diagnosis of NF by approximately 0900 on 10 August [see paras 9.12] was expressly to the contrary.

171. As I will set out below, a similar approach to that adopted by Professor Nee was also adopted by Professor Cartwright who was able to assess differing time periods for the diagnosis of NF without reliance on the occurrence of blisters to the arm.

172. On the basis of the expert evidence which was adduced before me, I am satisfied on the balance of probabilities that on the facts of this case NF could reasonably be diagnosed before the onset of blistering. That was the evidence of Professor Nee and each of the microbiologists. I accept Professor Nee`s evidence that skin blistering is quite a late development in NF and that skin blistering is not required to make a diagnosis of NF. I also accept that the presence of blistering skin lesions would have prompted even a medical student to refer a patient with such lesions to a plastic surgeon. I am satisfied that skin changes, as opposed to blistering, should have been sufficient to allow a diagnosis of NF to have been made and I note that bruising was noted over the anteromedial upper arm at 0730 and that `bruising++` over the elbow and upper arm was noted at 0900. It necessarily follows that on this issue I do not accept the evidence of Dr Campbell-Hewson or Dr Murphy that in this case the presence of blistering was necessary before a diagnosis of NF could be made.

173. Additionally, I am unable to accept the evidence of Dr Campbell-Hewson and Dr Murphy on three other matters, namely:

173.1. the approach jointly adopted by both experts seems to have been that, faced with an initial diagnosis that the Claimant had gastroenteritis, that diagnosis would have continued until the Claimant developed blisters on her arm. In my judgment that ignored the fact that the Claimant`s condition was gradually deteriorating, that it was necessary to periodically review such diagnosis and ignored the evidence contained in the witness statement of Mrs Newman and, in particular that the Claimant had a raised temperature at various points. Dr Murphy contended that he would have expected the Claimant to have had a constant temperature, but both microbiologists disagreed with such contention.

173.2. the rejection by both experts of the proposition that severe disproportionate pain is a classic feature of NF. On the basis of the evidence put before me I accept that it is.

173.3. whether the Claimant was suffering from sepsis at the time of her admission to SMH. Although neither expert accepted that this was the case, all the other experts, save Mr Russell who expressed no view, each believed that at the time of the Claimant`s admission to SMH the Claimant was suffering from severe sepsis [Professor Nee and Dr Stone], septic shock [Mr Ward] or streptococcal toxic shock syndrome [Professor Cartwright]. Although I do not take this into account, it may be remembered that the Trust`s Investigation Report also suggested that sepsis should have been considered.

The evidence of the microbiologists

174. Both experts provided very long and detailed reports. They both had worked in the same public health laboratory in Gloucestershire. Although Dr Stone was still in practice,

Professor Cartwright had ceased to accept breach of duty instructions in 2013 when his accreditation expired. He was no longer in clinical practice and had no continuing exposure to patients but had kept himself up to date by reading widely.

175. Dr Stone`s opinions as expressed in his report may conveniently be summarised thus:

175.1. On reviewing the medical records Dr Stone was clearly of the opinion, albeit with the benefit of hindsight, that the Claimant`s described symptoms were a strong indicator of systemic sepsis with the primary source being the arm and that sepsis is an acute medical emergency which should have elicited an immediate attendance by someone able to accurately assess her.

175.2. The Claimant suffered from GASNF probably as a result of a relatively minor non-penetrating trauma to her right arm during the exercise class and it is likely that she had a transient bacteraemic episode with this organism shortly after such trauma. Rapid and exponential bacterial replication is then likely to have taken place. Her condition would be characterised by disproportionate pain and severe systemic toxaemia which would typically cause vomiting, diarrhoea [which were reported by Mrs Newman] and, later, circulatory collapse and multi-organ dysfunction.

175.3. Although the infection develops in an accelerating manner and the timing of the Claimant`s injury and symptomatology are well documented to the point of amputation, it is possible to construct an approximate timeline of progression of the infection and make predictions as to the effects of interventions at various stages.

175.4. In setting out the approximate timeline of the progression of the infection he made the following observations:

175.4.1. at 2015 on 9 August 2012 when the Claimant was recorded as having `high temp, nausea, delirious, vomited`: At this stage the infection was progressing unabated with local tissue destruction continuing in the right arm. Intravenous antibiotic therapy and local tissue debridement would be required to prevent the infection spreading but at this stage the infection would have been controlled without a need for amputation.

175.4.2. at 0300 on 10 August 2012 after the visit by Dr Dias: At this stage there was no evidence of septic shock and locally, pain and tenderness remained confined primarily to the right arm. Whilst the bacterial load would have increased substantially without any intervention, the infection would still have responded to treatment without the need for limb amputation although it is probable that the extent of debridement would have been more extensive.

175.4.3. at 0630 when the Claimant arrived at A&E in SMH: There would have been a further deterioration by this time and required antibiotic therapy and assessment in emergency surgery. By this time or shortly afterwards the Claimant was in a state of severe sepsis with the primary focus of infection being the right upper arm. At this stage he thought it was more probable that the limb could be salvaged with debridement but thought this issue should be determined by experts in plastic surgery / orthopaedics.

175.4.4. at 1100 when seen by Dr Shaw: The description of the arm being `floppy` and being unable to be kept up suggests that the biceps muscle was becoming ischaemic at this point. In principle the limb would probably be salvageable but that was for the surgical experts to determine.

175.4.5. at 1350 when seen by Dr Shahidi: despite the diagnosis of NF and the presence of blistering which is a poor prognostic sign in NF, intravenous antibiotic therapy was not commenced immediately and was not commenced for a further hour. At about this time the viability of the arm had become marginal.

175.4.6. at 1500: The arm by now had become unsalvageable and removal of the sepsis which was threatening the Claimant`s life was paramount.

175.4.7. The histology findings reported on after the amputation showed that some bacteria had migrated into the muscle but there was no report of myositis of the surrounding muscle although there was evidence of muscle death. The former suggests that amputation could have been avoided by earlier surgery.

175.5. NF spreads with accelerating rapidity so that the majority of changes seen when her arm was amputated at 1700 would have occurred within the last few hours

176. Professor Cartwright`s opinions as expressed in his report may conveniently be summarised thus:

176.1. The report of the Claimant shivering on the evening of 8 August 2012 must have been rigors caused by the presence of GASNF in her bloodstream. The strong likelihood is that such bloodstream infection caused the early evening fever and that during such infection the fascia overlying the right biceps muscle was seeded with small numbers of virulent streptococci which multiplied to cause necrotising infection that worsened rapidly. Such infection caused the Claimant`s vomiting and diarrhoea during that day.

176.2. Although diarrhoea and vomiting are usually caused by gastroenteritis, they are also seen in septicaemia and toxaemia.

176.3. By the time the Claimant arrived at SMH she fulfilled the criteria for a diagnosis of streptococcal toxic shock syndrome but only in retrospect in that streptococcus pyogenes had not been isolated at that time and, other than hypotension, her clinical and laboratory abnormalities had not been recognised or their significance appreciated.

176.4. Although the Claimant`s had clarified their case to be that the viability of the Claimant`s arm was marginal at 1350 but unsalvageable thereafter, Professor Cartwright thought that was extremely optimistic.

176.5. Even if the Claimant had arrived in SMH at some earlier time, in the absence of any local skin changes, it is likely to have taken at least 3-4 hours to make a diagnosis of NF and probably longer. Additional time would have elapsed in order to carry out initial resuscitation, administer antibiotics and to arrange surgery. In his opinion this would not have been less than 2-3 hours.

176.6. Had the Claimant been seen by an A&E doctor at SMH at 2200 on 9 August 2012, the possibility of severe sepsis is unlikely to have been considered, she would not have appeared severely unwell and in view of her overall appearance and normal vital signs it is very unlikely that severe sepsis would have been considered for a least a further 6 hours and NF for a further 2-3 hours after that. On this basis the arm would not have been saved.

176.7. The window of opportunity to save the amputated arm probably ended at 0300 at the latest, by which time NF had probably been present for about 26 hours and there would have been considerable damage to the soft tissues of the upper arm. Even at that stage there would have been major debridement of tissue would have been necessary so as to make either a later amputation or gross functional loss more likely than not.

177. The experts were asked on the Defendant`s agenda, by what time would the Claimant have had to be treated with antibiotics and surgical debridement for the need to amputate her right arm to be avoided, on the balance of probabilities and answered thus:

177.1. Dr Stone: Late morning on 10 August 2012. The nearer to this time, the greater the degree of tissue damage and the need for more extensive debridement. Myonecrosis (necrosis of the muscle) would not have occurred until the limb had become ischaemic. Earlier antimicrobial therapy (given immediately following hospital admission - which will vary depending upon the particular scenario being considered) would potentially extend this time period by a few hours.

177.2. Professor Cartwright: In my opinion radical debridement of the Claimant`s upper right arm would have been needed by around 0300 on 10 August 2012 at the latest. Intravenous antibiotics would also have been needed because there was both local and systemic group A streptococcal sepsis but the paramount, urgent requirement to save the arm was for radical surgery.

178. The experts were asked a large number of questions on the Claimant`s agenda and stated:

178.1. they agreed that all the features reported by the Claimant before the attendance of the paramedics at about 2058 were consistent with the history of NF and Dr Stone opined that they were strongly suggestive of systemic sepsis. However, Professor Cartwright opined that they were not in themselves diagnostic of NF and were consistent with other diagnoses, particularly other infections.

178.2. when asked whether amputation would have been avoided if treatment for NF had been put in place following an earlier admission to SMH, Professor Cartwright opined that `if optimal management had been put in place by around 0300 on 10 August 2012 on the balance of probabilities amputation of the Claimant`s right arm would have been avoided` although he `would have expected a major debridement to have been necessary to extirpate the infection`.

179. It may thus be observed that in his report and both Joint Statement, Professor Cartwright nailed his colours to the opinion that, for the amputation to have been avoided, antibiotics and radical surgical debridement would have to have occurred by 0300 on 10 August 2012

180. The evidence of both experts was significantly modified in cross-examination.

181. Dr Stone said that he disagreed with Dr Murphy that this was an atypical presentation of NF. He believed that it was a typical presentation with symptoms and signs which would be expected from GASNF.

182. At the outset of his cross-examination Dr Stone conceded that at various points in his detailed report he had made observations which were outside his specialism as a microbiologist such as:

182.1 the absence of any evidence adduced by the Defendant to support Paramedic Brooke's recorded pain score of 0/10. However, he had made this observation because he knew that a pain score of 0/10 would be incompatible with a diagnosis of NF.

182.2. his criticism of Paramedic Brooke for not observing that the symptoms and signs displayed by the Claimant were features of NF.

182.3. whether the admitting team at SMH could have been expected to have diagnosed systemic bacterial sepsis.

183. Such concession was properly made and I agree that such matters did not fall within the legitimate remit of a report by a microbiologist. However, although I need to emphasise that I will not take such matters into account in reaching my judgment, I can understand why, although he should not have done so, Dr Stone made such observations in the context of a comprehensive report.

184. Additionally, Dr Stone conceded that in writing his reports he had made mistakes such as:

184.1. his assumption that the Claimant was young when she was in fact aged 71 years.

184.2. his description of venous blood gases as atrial blood gases to justify his conclusion that the Claimant was systemically unwell when admitted to hospital although Mr Martin himself conceded that there was other evidence which might have justified such conclusion.

185. However, Dr Stone repeated that:

185.1. in NF the infection progresses in an exponential and not a linear fashion so that most of the toxin production etc occurs later in the infection rather than earlier.

185.2. in his opinion amputation was avoidable with early antimicrobial therapy although there may have been a need for repeated surgical debridement and that clindamycin was more beneficial than other antibiotics.

186. However, the major concession made by Dr Stone in cross examination related to the time by which the provision of antibiotics and surgical debridement would have avoided an amputation of the Claimant`s right arm. Although in his report, referred to above, he had said that at 1100 on 10 August 2012 `in principle the limb would probably be salvageable` but such was for the surgical experts to determine and that at 1350 `the viability of the arm had become marginal`, he explained that not only was the arm not salvageable on the balance of probabilities at 1350 but it was also not salvageable at 1100 and that he would have to agree with Mr Martin that he `would need to move it probably back a couple of hours`. It was in that context that I asked Dr Stone directly at what time was he contending that, with the provision of antibiotics and surgical debridement, an amputation could have been avoided. His answer was that by 0900 the risk of amputation could have been avoided albeit that he conceded that this was `quite a difficult situation to address precisely because there is a range of rate of development in individuals. He has maintained that position.

187. In re-examination Dr Stone confirmed that no antibiotics would have avoided the need for surgical debridement.

188. In cross-examination Professor Cartwright reaffirmed his views that by the time the Claimant had pain she was likely to have necrotic tissue and antibiotics alone would have little effect so that surgical debridement, the removal of the source of infection, was the key component and treatment. Whilst he agreed that Dr Stone`s opinion that broad-spectrum antibiotics, and particularly clindamycin, extended the window before an amputation became inevitable, was reasonable, he did not agree with it.

189. More importantly, in cross-examination Professor Cartwright repeated various estimates of the time it would have taken to diagnose NF and to undertake any necessary surgical debridement but avoid an amputation of the Claimant`s right arm. However, it should be noted that:

189.1. all of these estimates were on the basis the diagnosis of NF was *not* made on the basis of the discovery of blisters and he expressly confirmed that he would have expected NF to have been diagnosed *before* the development of any blisters and that the diagnosis of NF could be made *before* the appearance of skin changes. This is in marked contrast with the expert evidence by Dr Murphy and Dr Campbell-Hewson who had stated that the diagnosis of NF was made upon the discovery of blisters on the Claimant`s right arm.

189.2. these different timings were difficult to reconcile with any degree of consistency. For example:

189.2.1. at page 9 of his report summarising his opinions, Professor Cartwright had opined that it would have taken a minimum of 5 to 6 hours to diagnose NF and a minimum further 2 hours to resuscitate the Claimant and prepare her for surgery so that `even with a medical review as early as 2200 on 9 August 2012 in my view [the Claimant`s] arm would not have been saved.` This meant that surgery within 7 to 8 hours + would have avoided the need for amputation.

189.2.2. at page 36 of his report expressing his opinion on causation, Professor Cartwright had given a time of at least 3 to 4 hours `and probably longer` to diagnose NF and a time of `not less than 2 to 3 hours to give a reasonable standard of treatment`. That meant that surgery within 5 to 7 hours + would have avoided the need for amputation.

189.2.3. at page 38 of his report considering a hypothetical review by an A&E doctor at SMH at 2200 on 9 August 2012, Professor Cartwright, when addressing a possible diagnosis of sepsis, had said that `it is very unlikely that severe sepsis would have been considered for at least a further 6 hours, and [NF] for a further 2 to 3 hours after that`. That would have meant that surgery within substantially in excess of 9 hours, because this analysis omits the time necessary to prepare the Claimant for surgery.

189.3. Professor Cartwright frankly agreed that such different timings represented an inconsistency and that he should have clearer and more consistent in his opinions. He agreed that all such timings could not all represent his opinion and concluded that the view set out in para 189.2.3 was probably the most accurate. However, that view stands in marked contrast with his opinion set out in para 177.2 in the Joint Statement [Defendant`s agenda] that radical debridement of the Claimant`s upper right arm would have been needed by around 0300 on 10 August 2012 at the latest to avoid an amputation. He agreed that such conclusion might in part have been influenced by his mistaken belief that, when admitted to SMH at 0630 the Claimant was not using her right arm, whereas he accepted after reviewing the medical records that they recorded her as holding the arm in flexion because of pain.

189.4. At the end of his cross-examination it was put to Professor Cartwright by Mr Baker that it was impossible for him to express with any degree of certainty the time at which the die was cast for avoiding an amputation to which he replied that `I accept that I can`t say 3 o`clock rather than 2 o`clock or 4 o`clock but I would place in my opinion the latest time for saving the arm at around 3 o`clock`. When I asked why he had chosen 0300 he responded only that `the infection was predestined to continue to develop in a very aggressive manner from the time that it first began`, `the speed of the infection was dramatic even for [GASNF]` and that `at surgery … there was naked eye evidence of muscle necrosis in all the muscle groups`.

190. My initial conclusions in respect of the evidence of these experts may be summarised thus.

191. I accept the evidence of both experts that the Claimant`s described symptoms on admission to SMH were a strong indicator of systemic sepsis [Dr Stone] or toxic shock syndrome [Professor Cartwright], both of which ought to have been treated as a medical emergency and that whether the arm was salvageable is a matter for the surgical experts.

192. I also accept the evidence of both experts that as a matter of principle it is possible to give a time for the likely diagnosis of NF and treatment which does not depend on the development of blisters on the Claimant`s arm, as had been suggested by Dr Campbell-Hewson and Dr Murphy.

193. Both experts conceded that they have made errors in their reports. I have to decide whose evidence I should prefer on the balance of probabilities.

194. Dr Stone undoubtedly made observations which were outwith his specialism as a microbiologist and had made mistakes as to the age of the Claimant [describing her as young] and had mistakenly attributed venous blood gases as arterial blood gases to justify his conclusion that the Claimant was systemically unwell when admitted to SMH. I regard these as minor matters which do not significantly impact on these fundamental disputes

195. However, the fundamental disputes between these experts relates to:

195.1. whether the Claimant could have avoided amputation if she undergone debridement sooner.

195.2. the effect of the administration of intravenous antibiotics on the progression of NF.

196. I will address these two disputes separately.

197. As to the time by which the amputation of the Claimant`s right arm could have been avoided, I accept that in cross-examination Dr Stone made a significant concession. However, it always seemed to me that the timings he originally gave in his report were somewhat elastic, he was always cautious about giving a precise timing and in the Joint Statement he had said only that the die was cast by `late morning`. So it was that in his evidence he revised the time by which the amputation could have been avoided. In his report he had stated that at 1100 `in principle the limb would probably be salvageable` but that such was for the surgical experts to determine. In his evidence he gave a slightly earlier time of 0900 on 10 August 2012. Such derived from a misunderstanding on his part as to the time between the Claimant`s arm becoming floppy and the time when the histology sample was taken which was in fact 6 hours and not 12 hours as he had initially believed. That is why I asked Dr Stone to explain his position on this issue. His answer was that by 0900 the risk of amputation could have been avoided albeit that he conceded that this was `quite a difficult situation to address precisely because there is a range of rate of development [of NF] in individuals`.

198. I found this change in his evidence to be both reasonable and realistic and I accept that it is enormously difficult to say by what precise time the arm could have been saved in a situation in circumstances in which it is common ground that the progression of NF was neither linear nor truly predictable. I am satisfied that I should accept his evidence on this fundamental issue and I do so.

199. I note that in cross-examining both Dr Stone and Mr Russell, Mr Martin referred to the histological report after the amputation surgery and suggested to both experts that necrosis had spread to the hand. While Dr Stone seemed to agree with this suggestion Mr Russell did not. He believed that this was a transcription error and should have referred to the right arm, given that firstly that the report was filled in by different doctors, namely someone in theatre [who referred to the right arm], the labeller of the specimens and the reporting histopathologist and secondly that the pictogram from the operation note showed that the right hand was relatively spared, apart from the base of the thumb. Although I deal with this issue below, when considering Mr Russell`s evidence, I agree with Mr Russell that there may well have been a transcription error and on the basis of this report alone I am unable to conclude, even on the balance of probabilities, that by the time of the surgery to amputate the Claimant`s right arm, the necrosis had spread to the Claimant`s right hand.

200. By contrast I do not accept the evidence of Professor Cartwright as to time when the arm would have been salvageable, namely by around 0300 on 10 August 2012. I so conclude for the following reasons:

200.1. In his report Professor Cartwright gave three different scenarios of for how long he would have expected NF to have been diagnosed and treated: these varied between 5-7 hours and probably longer and a minimum of 8-9 hours. Whilst recognising that this is a difficult issue on which to express a definitive opinion, I cannot ignore the fact that in the same report Professor Cartwright expressed his views in three different ways and gave seemingly inconsistent timings. I believe that this, together with the other matters set out below, render his evidence inherently unreliable.

200.2. It also seemed to me that, when asked by me to state which of the three scenarios I should regard as his settled evidence, Professor Cartwright was anxious to adopt that which favoured the Defendant`s case on causation. I did not find this persuasive.

200.3. Moreover, in such report Professor Cartwright adopted two different methods of calculating the period of time he would have expected to enable a diagnosis of NF to be made.

200.3.1. In the shorter [at page 36 of his report] he stated that it would take `at least 3-4 hours to make a diagnosis of NF and probably longer` and additional time of no less than 2-3 hours to carry out initial resuscitation, administer antibiotics and arrange surgery, making a total of 5-7 hours.

200.3.2. In the longer [at page 38 of his report] he stated that it was very unlikely that a diagnosis of severe sepsis would have been made for 6 hours and it would have taken

a further 2-3 hours after that to diagnose NF and did not identify any additional time for resuscitation, antibiotics or arranging surgery but presumably a further 2-3 hours should be added to make a total period 10-12 hours.

200.4. Although Professor Cartwright sought to justify the inevitability of amputation at 0300 on two different grounds, namely the passage of 26 hours and that by 0300 there would have been considerable damage to the soft tissues of the arm and to the function of the arm:

200.4.1. he was unable to produce any published study to support his contention that amputation was inevitable a period of 26 hours; and

200.4.2. at 0300 the Claimant continued to have reasonable function and power in the arm.

200.5. When asked by me for reasons to justify why an amputation by 0300 would have led to the arm being salvageable, Professor Cartwright said that NF had spread widely throughout the arm, notwithstanding antibiotics having been started at 0700, when such had in fact only been started at 1500. This inaccurate justification of a rapid progression of the infection gave me concern as to how much of Professor Cartwright`s evidence was based on speculation as opposed to evidence.

200.6. In cross-examination Professor Cartwright sought to introduce caveats relating to the experience of doctors treating the Claimant in recognising NF when his report contained no such caveats. It seemed to me that these caveats were merely a means of justifying a longer period when none was in fact justified.

200.7. In so far as Professor Cartwright relied upon evidence of muscle invasion on microscopy histology of the Claimant`s biceps muscle and relied on *Bakleh et al* in *Correlation of Histopathologic Findings with Clinical Outcome on Necrotizing Fasciitis* [Clinical Infectious Diseases 2005 : 40 410] to suggest that this was a similar situation of deep-seated infection, I do not accept his evidence. I remind myself that the histopathology report recorded that `There is necrotic skeletal muscle. No inflammatory infiltrate is seen but there are *scattered colonies* of coccoid bacteria` and I accept Dr Stone`s evidence, when cross-examined by Mr Martin about such paper, that this case was to be contrasted with the patients in that paper because the presence of scattered bacteria was more consistent with early invasion of the muscle tissues.

201. Per contra, I am satisfied on the balance of probabilities that by the time of Dr Dias` visit at 0250 the infection was likely to have responded to treatment without the need for amputation of the arm albeit that there would have been extensive surgical debridement.

202. As to the effect of antibiotics on the progression of NF, I note that Dr Stone opined that antibiotics `would buy some time` by extending the period during which amputation might have been avoided by a few hours. Although Professor Cartwright accepted that such opinion was a reasonable one, he did not agree with it and opined that there would be `little effect`, albeit that he accepted that there was no published study on the effect of antibiotics in reducing the risk of amputation. I have concluded that on this point Professor Cartwright is being unduly

pessimistic and that I should prefer the evidence of Dr Stone that the antibiotics would have had a modest, but not minimal, impact on the need for an amputation.

The evidence of the plastic / hand surgeons

203. Mr Russell had seen numerous cases of NF and in the last year alone had been invited to report on 3 cases of NF. His opinions as expressed in his report may conveniently be summarised thus:

203.1. A biceps tendon injury would not continue to deteriorate in the manner of the Claimant`s presentation, does not generally require opiate level of analgesia and does not produce sensory symptoms distally such as altered sensation or loss of power in the hand.

203.2. Given the evidence of excruciating pain and an evolving discolouration of the skin with blistering, as well as signs of systemic illness, a diagnosis of bicep tendon injury is wrong. He observed that at 0900 there was `numbness from bruise peripherally` and `bruising ++ over elbow and upper arm` and that Mr Heywood, the surgeon who carried out the amputation, had stated that the bicep strain was `a misleading and speculative diagnosis which was part of the reason why her diagnosis and treatment were delayed`.

203.3. It is likely that necrosis of the skin was already underway when the Claimant was first seen at SMH and that by about 1100, when she had developed skin blistering and loss of use of her arm when it was noted that `arm is floppy below right elbow`, that necrosis of these muscles was likely established. He thus opined that it was likely that the Claimant would have had an amputation of her arm even if she had been taken to theatre after 1100.

203.4. Whilst recognising that there would be a range of opinion amongst experts as to when the arm would have become unsalvageable, he opined that if the Claimant had been taken to theatre before 1100 there would have been an opportunity to avoid the amputation of her arm.

204. I read the above analysis as stating that Mr Russell believed that an amputation was likely if taken to theatre at 1100 because, by then, the arm was floppy below the right elbow but that an amputation could have been avoided if she been taken to theatre before 1100. Given that the Claimant had last been seen by a doctor at 0900, it necessarily follows that sometime between 0900 and 1100 there was a window of opportunity to avoid an amputation. Hence in the Joint Statement referred to below, Mr Russell unsurprisingly stated that had debridement surgery taken place by 0900 on 10 August 2012 an amputation could have been avoided because at 0900 the medical records indicated that at that time the arm was still functioning in terms of movement and muscle power. That remained Mr Russell`s evidence. However, I agree with Mr Baker that Mr Russell could have avoided any confusion by expressing himself more carefully.

205. Mr Ward had a special interest in NF and had presented lectures thereon, both nationally and internationally, although he had retired from practice in 2014 and last saw a patient with NF in 2014 before he retired. His opinions as expressed in his report may conveniently be summarised thus:

205.1. After such initial debridement surgery, a second-look operation about 24 hours later is necessary and often further surgical debridement may be needed. It is only after all necrotic tissue has been removed that repair of the affected area can be considered.

205.2. He opined that by the time the Claimant arrived at SMH, NF was very well established because her blood pressure was very low, indicating septic shock, she had pain in her arm which was not responding to painkillers, by mid-morning she was unable to feel her arm and by 1230 she had uncontrollable pain, increased bruising and swelling and blistering of the arm.

205.3. NF is likely to have started in the evening of 8 August 2012 when the Claimant was shaking and shivering and, by the evening of the next day, some 24 hours later, NF would have been so extensive that, even if she had been admitted to hospital and undergone surgery by 2400 on 9 August 2012, it was inevitable that her right arm would have been amputated.

205.4. Moreover, if the Claimant had been admitted to hospital earlier and had undergone surgery by 2400 on 9 August 2012 and surgeon had decided at such surgery *not* to undertake a primary amputation, that debridement would have been very extensive and, at second-look surgery on 10 August 2012, amputation would have been essential to remove all the necrotic tissue, to stop the NF from spreading further and to save the Claimant`s life, and because the necrosis would have been so far advanced that the arm would have been left useless.

206. In their Joint Statement on the Claimant`s agenda Mr Russell and Mr Ward agreed that:

206.1. the damage to the tissues of the right arm was likely to have been caused by the infection process including the likely release of toxins and the systemic effects from the infection.

206.2. the diagnosis of NF is made following an assessment by the acute medical or accident and emergency team and the results of blood tests.

207. In response to a further question on the Claimant`s agenda as to whether, with the provision of intravenous antibiotics and surgical debridement sooner, the Claimant was likely to have avoided an amputation of her right arm, the experts stated:

207.1. Both experts agree that there was likely to have been a `window of opportunity` in which the amputation of the Claimant`s arm may have been avoided.

207.2. Mr Ward opined that amputation would likely to have been unavoidable after approximately midnight on 9 August 2012.

207.3. Mr Russell, noting that NF does not progress at a uniform rate in all individuals so that it is difficult to have a scientifically proven time line and thus inevitable a range of opinion amongst experts, opined that amputation was likely to have been avoided if the Claimant had undergone debridement by 0900 on 10 August 2012, given that the medical records indicate that the arm was still functioning in terms of movement and muscle power about this time.

208. In cross-examination by Mr Martin, Mr Russell:

208.1. whilst agreeing that going to theatre for such debridement within 1½ hours was reasonable, observed that sometimes in the early hours of the morning [as might be the case on the basis of my finding that the Claimant should have been admitted to SMH by 2130 and would have been seen by an A&E doctor as a matter of urgency by 2200] a patient can be taken to theatre quicker because at that time theatres did not tend to be used much. He cited an example where it took only an hour to get a patient to theatre.

208.2. believed that both surgical debridement and intravenous antibiotic therapy were equally very important but agreed that absent surgery a patient would probably die.

208.3. agreed that the onset of arm pain was the start of the infection and that from that point it was inevitable that the Claimant would require a degree of debridement.

208.4. contended that although the histological report after the amputation surgery suggested that necrosis had spread to the hand, he believed that this was a transcription error and should have referred to the right arm, given that firstly that the report was filled in by someone in theatre, the doctor who labelled up the specimens and the histopathologist and secondly that the diagram from the operation note showed that the right hand was relatively spared, apart from the base of the thumb. However, he agreed that no one had ever suggested this before and it was suggested to him that this was pure speculation.

208.5. opined that at 0900 there was bruising++ without blistering [whereas at 0730 there had simply been bruising] and still very good power in the arm [although he did not imagine that the function of her arm would have been normal]. So far as he was concerned the presence of bruising alone was not an indication for amputation and did not necessarily indicate muscle involvement.

208.6. stated that most of the patients he has seen with NF had skin changes but they did not all end up with an amputation.

209. In cross-examination by Mr Baker, Mr Ward:

209.1. opined that whilst the use of antibiotics was important, that alone, absent surgical debridement, would not cure a patient from NF.

209.2. opined that amputation would have been appropriate at 2400 on 9 August 2012 because 24 hours had elapsed since the commencement of NF and this was a GASNF infection which was fulminant. However, he added that, had a surgeon decided that only debridement and not amputation was required at 2400, amputation would have been needed at the second-look operation.

209.3. conceded that he had seen no literature which suggested that, in the case of GASNF, the expiry of 24 hours suggested that amputation was more likely than not. He agreed that there was no published literature on that particular aspect of NF.

209.4. disagreed with Mr Russell that there was no muscle involvement and observed that at 0730 Dr Careless had noted that the right arm was being held with the elbow in flexion which to him indicated that the muscle infection had already started. He did not regard that as inconsistent with the finding that at 0900 the Claimant had normal reflexes in the biceps, triceps and supinator because he believed that some of the muscle was still functioning at that stage. However, he could not explain the absence of bruising at 2400 if, as he believed, there was muscle involvement at that time.

210. My initial conclusions in respect of the evidence of these experts may be summarised thus.

211. The essential difference between the plastic / hand surgeons is thus that Mr Russell sets the time at which amputation of the Claimant`s right arm would have been avoidable at 0900 on 10 August 2012 whereas Mr Ward sets the time at midnight on 9 August 2012. I believe that this reflects a difference between these experts as to how well-established NF was at the time of the Claimant`s admission to SMH. Mr Russell states that when admitted to SMH NF was established whereas Mr Ward that at such time it was `very well established`.

212. Mr Russell justifies his opinion on the basis that at 0900 there was bruising++ without blistering [whereas at 0730 there had simply been bruising] and the Claimant still had very good power in the arm [although not normal function] and that as far as he was concerned the presence of bruising alone was not an indication for amputation and did not necessarily indicate muscle involvement. He added most of the patients he has seen with NF had skin changes but they did not all end up with an amputation. However, he concedes that when the arm had become floppy at 1100 the opportunity to avoid amputation had been lost. I found this evidence very persuasive because it relied on the clinical findings and observations in the medical records.

213. Moreover, I accept Mr Russell`s evidence that the histopathology report after the amputation surgery may have contained a transcription error and I am surprised that this issue was not raised with other experts. Notwithstanding that the point was raised late, I am unable to conclude, even on the balance of probabilities, on the basis of that report that by the time of the surgery to amputate the Claimant`s right arm, the necrosis had spread to the Claimant`s right hand. In my judgment this supports Mr Russell`s view as to how well-established NF was at 0900.

214. By contrast, Mr Ward relies on the fact that 24 hours had elapsed since the commencement of NF, which is correct, and this was a GASNF infection which was fulminant.

214.1. As to the former he could produce no published literature to show that a NF infection was more likely to result in amputation after 24 hours and although referred to a published paper by Swain [*A five-year review of necrotising fasciitis in a tertiary referral unit*] he agreed such did not support the proposition that the lapse of 24 hours makes an amputation more likely. I add that I was also referred to published papers by Smith [*Necrotising myositis: a surgical emergency that may have minimal changes in the skin*] and Bakleh [*Correlation of Histopathologic Findings with Clinical Outcome on Necrotizing Fasciitis*] which similarly do not support such proposition.

214.2. As to the latter I am unconvinced that the use of `fulminant` takes the matter further in the context of an infection which develops in a wholly unpredictable way.

215. It seemed to me that the real alleged basis for Mr Ward`s opinion that there *was* early damage to the muscles in the Claimant`s right arm caused by NF. He opined that there was muscle involvement at 0730 when the Claimant was examined by Dr Careless because he had noted that the right arm was being held with the elbow in flexion. He did not regard that as inconsistent with the finding at 0900 that the Claimant had normal reflexes in the biceps, triceps and supinator because he believed that *some* of the muscle was still functioning at that stage. Mr Russell did not agree, although he agreed that later there was muscle involvement as was demonstrated in the histopathology report from tissue taken at surgery.

216. When asked by Mr Baker to explain what matters he relied upon to justify his opinion that by 2400 on 9 August 2012 an amputation was unavoidable, Mr Ward responded that the pain was highly significant and showed signs of muscle involvement. He relied upon Dr Dias`s note at 0250 that the Claimant had `no tenderness in shoulder joint but on biceps muscle`. He had not referred to such muscle involvement either in his report or in the witness statements or in the Joint Statements and when asked to identify the time when this point had first occurred to him he said that this was `the weekend before last` when he had been going through all the paperwork in preparation for the trial. It seemed to me that at this point Mr Ward was becoming an advocate rather than an expert.

217. In any event, reliance on Dr Dias`s note was misconceived because Mr Ward accepted that Dr Dias, when palpating the Claimant`s arm, would not know whether he was eliciting tenderness in the fascia or in the biceps muscle, notwithstanding what he had recorded and that tenderness on palpation was a classic feature of NF, whether there was muscle involvement or not. When pressed further, Mr Ward said that he had to take Dr Dias`s note as an accurate statement of what he had found and he was thereafter reluctant to engage with further cross-examination on this issue.

218. I note that, when examined by the paramedics who attended the Claimant`s home at 0511, it was noted that there was `no swelling or visible bruising in arm, able to mobilise` and there was no reference to any reduction in the muscle strength of the arm.

219. I did not find Mr Ward`s evidence on this issue, or indeed generally, to be persuasive, particularly when he could not in my judgment satisfactorily explain the absence of bruising at 2400 if, as he believed, there was muscle involvement at that time. His failure to acknowledge the deficiencies in his evidence in my view damaged his credibility.

220. Whilst I accept, per Mr Ward, that NF is likely to have started in the evening of 8 August 2012, which caused the Claimant`s subsequent shaking and shivering, I am not persuaded on a balance of probabilities on this evidence that such NF was so extensive by 2400 on 9 August 2012 that amputation of the Claimant`s right arm was inevitable.

221. I am satisfied on a balance of probabilities that I should accept Mr Russell`s evidence that amputation of the Claimant`s right arm would have been avoidable at 0900 on 10 August 2012 and that I should reject that of Mr Ward which contends for a much earlier time. In my judgment his views offer greater consistency with the medical records and he has a greater current experience of NF than Mr Ward who retired from practice 5 years ago.

222. I also accept Mr Russell`s evidence that, although a period of 1½ hours to take the Claimant to theatre for debridement surgery was reasonable, on the facts of this case, where I have found that the Claimant would have been admitted to SMH and seen by a doctor by 2200 on 9 August 2012, it is highly likely that she would have been able to undergo such surgery quicker during the night.

223. I thus repeat my earlier finding that I am satisfied on the balance of probabilities that by the time of Dr Dias` visit at 0250 the infection was likely to have responded to treatment without the need for amputation of the arm albeit that there would have been extensive surgical debridement.

Overall conclusions on the expert evidence

224. Taking into account *all* the expert evidence, my overall conclusions on all the expert evidence may be summarised succinctly thus. My reasons are amply set out earlier in this judgment.

225. I have already found that the Claimant should have been admitted to hospital after the paramedics attended at 2050 on 9 August 2012 and because of her loss of control of bladder and bowels would have been admitted as an emergency and would have been seen by a doctor by 2200 that evening.

226. I accept Mr Russell`s evidence that amputation of the Claimant`s right arm would have been avoidable at 0900 on 10 August 2012. This was founded on the fact, set out in the medical records, that at that time the right arm was still functioning in terms of movement and muscle power. By 1100 it had deteriorated so that by that time amputation of the arm had become unavoidable. I agree that in his report Mr Russell could have expressed himself more clearly.

227. I reject Mr Ward`s evidence because I can find no principled basis for amputation of the Claimant`s right arm being unavoidable at 2400 on 9 August 2012. He could rely on no published study to show that amputation was almost inevitable after say 26 hours and that subsequently the Claimant had reasonable function and power in her arm. His reliance on Dr Dias`s note was in my judgment both opportunistic and misconceived. I am satisfied that in cross-examination he found himself completely unable to offer any principled basis for such evidence, beyond repeating that he had to regard Dr Dias`s note as accurate, even though he had in effect accepted that it could not be. For the same reasons, I reject Professor Cartwright`s evidence that amputation would have been unavoidable by 0300 on 10 August 2012

228. Although this was a matter primarily for the plastic surgeon experts, I also accept the evidence of Dr Stone that by 0900 the risk of amputation could have been avoided, although I accept that this evidence was given with a degree of hesitation because the rate of development of NF was neither linear nor predictable and it was not really within his expertise.

229. It necessarily follows that there were 11 hours [from 2200 on 9 August 2012 to 0900 on 10 August 2012] in which the Claimant could have been diagnosed with NF and received appropriate surgical treatment short of amputation.

230. I accept Professor Nee`s evidence that in this case a diagnosis of NF was not dependent on the presence of the development of blisters and note that his evidence is supported by that of Professor Cartwright.

231. I reject the evidence of Dr Campbell-Hewson and Dr Murphy that a diagnosis of NF can only be made with the presence of blisters and not after a defined, albeit imprecise period of time. Such evidence was contradicted by Professor Cartwright, the Defendant`s own microbiologist. I have already recorded that I am unable to accept the evidence of Dr Campbell-Hewson and Dr Murphy, particularly because of the three matters set out in paragraph 173 and note that Dr Murphy`s opinion that the Claimant would have had a constant temperature were rejected by both microbiologists. Moreover, the rejection by both Dr Campbell-Hewson and Dr Murphy of the suggestion that the Claimant was suffering from sepsis at the time of her admission to SMH was rejected by every other medical expert, save Mr Russell who expressed no view either way.

232. I accept Professor Nee's evidence that NF could have been diagnosed with appropriate treatment in 6 hours. Even allowing for time to get the Claimant to surgery, say 2 hours [ie a like time to that which in fact elapsed between 1500 [diagnosis] and 1700 [surgery]] this would have led to surgery by about 0600.

233. Although I have rejected the main plank of Professor Cartwright's evidence as to when an amputation would have been unavoidable, I note that of the three scenarios he gave as to how long it would have taken the Claimant to be diagnosed with NF and undergo surgery, the shortest period was 5-7 hours and the longest, even adding to it time for resuscitation, antibiotics and surgery, was 10-12 hours. Two of these scenarios would have meant that amputation was avoidable and the longest was on the cusp of the period at which amputation would have been available. Given that I have regarded Professor Cartwright's evidence as unreliable and that he appeared anxious to adopt a timescale which favoured the Defendant's case on causation, I am satisfied that on each of his three stated scenarios, amputation of the Claimant's arm would have been avoidable.

234. It being common ground that the paramedics who attended the Claimant's home at 2050 owed her a duty of care, the findings set out above are sufficient to justify a conclusion that the Defendants were in breach of such duty and that such breach of duty resulted in the amputation of the Claimant's right arm.

235. In all the circumstances I am able to decide this case on the balance of probabilities and it is not necessary for me to consider the question of material contribution.

The third issue: what residual disability would the Claimant have had in any event?

236. The remaining issue relates to what disability the Claimant would have had had she been able to avoid amputation of her right arm. This issue is solely a matter of expert evidence from the hand and plastic surgeons.

237. Mr Russell opined that even if the Claimant had been able to avoid an amputation:

237.1. the arm would have required significant debridement and subsequent reconstruction.

237.2. it would not have returned to full function but would likely be capable of some function such as being able to wash and dress herself, hold a light bag or use it to open doors whilst carrying something in her other hand.

237.3. if the skin around the elbow was the only tissue that needed to be removed, then shoulder movement and hand function would have been reasonable although elbow movement would likely have been very restricted.

238. Mr Ward opined that even if the Claimant had been able to avoid an amputation of her right arm there would have been extensive surgical debridement which would have caused extensive, permanent, unsightly scarring and a very major functional disability in the arm in that it would have been immobile, numb and useless and not even able to function as a prop in day-to-day living.

239. In their Joint Statement, the experts were asked to consider what the effect on upper limb function would have been if the Claimant had avoided amputation. In response they stated:

239.1. Both experts agree that there would have been a possible range of outcomes, depending on the degree of tissue that needed to be removed. Both experts agree that the Claimant would likely have had to undergo multiple operations to surgically clean (debride) the wounds on her arm. The Claimant would likely have required changes of dressing to be performed under general anaesthetic due to the extensive nature of the wound. The Claimant would then likely to have needed extensive skin grafting to heal the wounds on her arm.

239.2. Mr Ward opined that if surgery had been performed by 12 midnight on 9 August 2012 the Claimant would still have experienced significant functional limitation in the use of her arm.

239.3. Mr Russell opined that if surgery had been performed around 0900 on 10 August 2012 the Claimant was likely to have required extensive surgery around the elbow which would have left her with a very stiff elbow with limited range of movement, that she may have experienced some loss of movement and strength in her hand but was likely to have had some function of the hand.

240. In cross-examination by Mr Martin, Mr Russell agreed in the absence of amputation there would have been quite radical debridement both above and below the elbow. However, he:

240.1. did not believe it would be necessary to remove muscle, so the debrided area could be covered with a skin graft but would have consequential stiffness; but

240.2. did accept that the arm would be weak and stiff which would have a very significant impact on normal day-to-day activities in carrying but she would have been able to wash and dress herself.

241. In cross-examination by Mr Baker, Mr Ward repeated that debridement surgery short of amputation would have involved the removal of an extensive amount of muscle which would have added to the Claimant`s disability in any event.

242. Although I concede that it is difficult to predict the disability which the Claimant would have had in any event, I prefer the evidence of Mr Russell to that of Mr Ward for the reasons already set out above.

243. I am satisfied on the balance of probabilities that:

243.1. the Claimant would have undergone an initial radical debridement both above and below the elbow and multiple further debridement procedures, including reconstruction and skin grafting, thereafter. I think it is unlikely that muscle would have been removed, as suggested by Mr Ward because at 0900 I do not accept that there was muscle involvement and that Mr Ward`s opinion is unduly pessimistic.

243.2. the Claimant would have been left with a cosmetically unattractive arm which would have been weak and very restricted at the elbow but it would have had some useful, but restricted, function. Shoulder movement would have been reasonable and hand movement and strength would have been reduced. However, I think the hand would have been much more use than simply as a prop, as was suggested by Mr Ward.

243.3. there would have been a significant effect on most activities of daily living, such as carrying heavy shopping bags although the Claimant would have been independent in terms of being able to wash and dress herself.

Conclusions

244. My conclusions may thus be summarised as follows:

244.1. The paramedics attending at 2050 on 9 August 2012 were in breach of their duty owed to the Claimant.

244.2. That breach of duty resulted in the amputation of the Claimant`s right arm.

244.3. But for the amputation the Claimant would have the disability described above.

245. It necessarily follows that there should be judgment in favour of the Claimant against the Defendant with damages to be assessed at a further hearing in default of agreement.

246. I should add my sincere thanks to both counsel, together with their respective instructing solicitors. This case involved the consideration of much complex evidence and involved the making of very detailed opening and closing submissions. In particular, I was very much assisted by both counsel and express my sincere thanks and appreciation to both of them for the assistance that they gave to me.

247. I invite the parties to formulate a draft order which reflects my above judgment and deals with any ancillary issues, including costs. If these cannot be agreed a short hearing will be listed to deal with such issues.