



Neutral Citation Number: [2023] EWHC 1080 (KB)

Case No: QB-2021-001279

IN THE HIGH COURT OF JUSTICE
KING'S BENCH DIVISION

Royal Courts of Justice
Strand, London, WC2A 2LL

Date: 11 May 2023

Before:

CLARE PADLEY
(Sitting as a Deputy High Court Judge)

Between:

J & J FRANKS LIMITED
- and -
(1) MURRAY SHOTTER (2) MICHAEL BYERS
(IN PARTNERSHIP T/A SHOTTER & BYERS
EQUINE VETERINARY SERVICES)

Claimant

Defendants

Michael Mylonas KC and Chloe Hill (instructed by **Mackrell Turner Garrett**) for the
Claimant

Patrick Lawrence KC and Romilly Cummerson (instructed by **Keoghs**) for the **Defendants**

Hearing dates: 6-10 March 2023

Approved Judgment

This judgment was handed down remotely at 10.30am on 11 May 2023 by circulation to the parties or their representatives by e-mail and by release to the National Archives.

.....

Clare Padley (sitting as a Deputy High Court Judge):

1. This case concerns a claim for damages resulting from alleged veterinary negligence in the diagnosis and treatment of a racehorse called Sand Diego (hereinafter referred to as “SD”) in the seven days leading up to the decision to euthanise him in hospital on 28 February 2020.
2. The Claimant company was the registered owner of SD and its managing director is Mr Peter Crate.
3. The Defendants are partners in a partnership trading as Shotter & Byers Equine Veterinary Services which was retained to provide veterinary services to the Claimant’s horses, including SD. The treating vet who was responsible for the period of treatment of SD giving rise to this claim was a junior vet employed by the Defendants called Dr Barbara Portal and the Defendants accept that they are vicariously liable for her actions.
4. I have been provided with a large volume of documents and academic literature in this case and I have considered all that evidence so far as it is relevant. I have summarised in this judgment the parts of the evidence which are necessary to understand the reasons for my conclusions.
5. I have also had the benefit of detailed written and oral submissions from Counsel for which I am grateful.

The racehorse (SD)

6. At the time of these events, SD was a three-year-old chestnut thoroughbred gelding racehorse. His sire was a stallion called Starspangledbanner, who was a commercially successful racehorse, and his dam was a sprint bred mare. The Claimant had purchased SD as an eight-month-old foal in December 2017 for £35,700. Prior to the events in February 2020, Mr Crate was training SD as a novice racehorse at his own yard at June Farm, Reigate, Surrey. SD made his debut as a two-year old racehorse in July 2019 and by February 2020 he had completed 4 races and had won his last race at Sandown in September 2019 before being rested for the winter. There is a dispute between the parties as to his value at the time of these events which I will address later in this judgment.
7. The claim relates to Dr Portal’s treatment of SD between 21 and 26 February 2020. SD developed acute lameness overnight on 21-22 February and Dr Portal was called out to see him by Mr Crate on Friday 21 February. It is now common ground that SD was suffering from a bacterial infection in his right hind leg known as focal peritarsal infection. Antibiotic treatment for this infection was not commenced until Sunday 23 February 2020 at 11 pm. SD did not recover from this infection and was sadly euthanised in Liphook Veterinary Hospital on 28 February 2020.

Nature of the Claimant’s claim

8. The claim was issued on 7 April 2021 and in the Particulars of Claim of the same date, the Claimant summarised the claim in the following terms before setting out a detailed chronology of events:

“Outline of the Claim

1. This claim arises out of treatment provided to Sand Diego ("the horse") between 21st February and 26th February 2020 by Dr Barbara Portal.
2. Dr Portal was called to see the horse on 21st February when it was very lame. She took blood tests that were available at 1730 hrs and identified a significant inflammatory process. Given the presenting history, she ought to have included infection as a differential diagnosis. On the morning of 22nd February, Dr Portal bandaged the horse's affected leg tightly. She delayed the administration of antibiotics until the evening of 23rd February.
3. In the letter of response it is averred that Dr Portal did include infection as a differential diagnosis. She made no note of this in any record. She made no mention of it in conversation and instead suggested that it was due to trauma. She provided no treatment for infection until the evening of 23rd February 2020. Alternatively, if she did consider infection before 23rd February, she failed take any or any appropriate action. Details are set out below.
4. The horse was suffering from focal peri-tarsal infection from which it never recovered and was subsequently euthanised.
5. Dr Portal's management was negligent. She should have commenced treatment with antibiotics at the latest, on the morning of 22nd February. She should not have bandaged the affected limb.
6. Had the horse been treated with antibiotics as indicated above, he would have survived. The bandaging of the affected limb contributed to the deterioration in the affected limb and the horse's death.
9. I note in passing that the nature of the claim has remained consistent throughout these proceedings, and indeed in the pre-action correspondence between the parties which commenced in early March 2020, very shortly after SD's death.
10. The Claimant then made a number of specific allegations of breach of duty against Dr Portal set out in the Particulars of Claim:

“Particulars of Breach

53. Dr Portal was negligent in that:

- a. She failed to apportion any or any sufficient weight to the blood results obtained on 21st February. They were strongly suggestive of an infective process and mandated the commencement of broad spectrum antibiotics by the morning of

22nd February at the latest. If she had commenced broad spectrum antibiotics on the morning of 22nd February and there had been little response by the following evening, it would have been mandatory to change antibiotics;

b. On Friday 21st, she fixed on a traumatic cause of the injury and negligently failed to review and re-visit that decision when the blood results which arrived that afternoon did not support such a diagnosis the high WBC, very high neutrophil count with left shift and high SAA indicated infection as the most likely cause. The absence of high muscle enzymes reduced the likelihood of trauma as a cause for the lameness.

c. If, which is denied, Dr Portal did include infection as a differential diagnosis on 21st February:

i. she negligently failed to take the horse's temperature on any occasion.

ii. she failed to record it on any occasion.

iii. she failed to prescribe antibiotics until the evening of 23rd

iv. she negligently bandaged the leg when that would impair drainage within the leg.

v. she negligently bandaged the leg when there was no proper or identified basis or advantage in doing so.

d. On Saturday 22nd she failed to consider or carry out any investigations to confirm or exclude a diagnosis of infection. In particular she failed to carry out any assessment of heart, lungs or temperature. At no point during any attendance did she assess heart or lung function or take the horse's temperature.

e. On Saturday 22nd she negligently bandaged the limb despite the onset of swelling. Her notes indicate that she believed the horse was suffering from lymphangitis. Bandaging in cases of lymphangitis is only to be undertaken with care because of the acknowledged risk of causing tissue damage by restriction in circulation within a limb already affected by circulatory compromise. It also prevented those caring for the horse from inspecting the limb on a daily basis to look for any changes occurring, such as local pain, discharge etc. Her decision to bandage and leave the bandage in situ without review for seventy two hours placed the horse at high risk of suffering tissue damage over the intervening period.

f. She failed at any point to identify that the horse was almost certainly suffering from an aggressive infection. She should have reached that diagnosis, or at least included infection as a

differential diagnosis, on the Friday afternoon when the blood results arrived.”

11. I note here that there was no specific allegation of breach of duty in relation to the failure of Dr Portal to also advise that SD should be subject to ‘forced walking’ which the veterinary literature indicates can form an important part of the appropriate treatment for focal peritarsal infection. I will return to this point in due course.
12. The Claimant sought to establish causation for the death of SD in the following terms:

“Causation

54. If, no later than the Saturday morning, Dr Portal had treated properly with antibiotics (whether broad spectrum or ceftiofur or enrofloxacin) and had not bandaged the limb, the horse would probably have survived. Treatment with Ceftiofur /enroflaxin on the Saturday morning would have resulted in a 99% probability of cure. Treatment with broad spectrum antibiotics would have resulted in a longer time to recovery but the horse would probably still have recovered. In either case the horse would probably have returned to racing at its previous level. All the evidence supports the view that successful recovery from this infection will probably not affect performance. If the Defendant suggests to the contrary it is kindly requested to identify in its letter of response, all literature relied upon.”

13. At trial, the Claimant did not pursue the suggestion that ceftiofur or enrofloxacin should have been administered at any stage by Dr Portal, but only that if SD had been treated with broad spectrum antibiotics on Saturday 22nd February (the type of which were eventually prescribed by Dr Portal on Sunday 23rd February at 11pm) and had not been bandaged, he would probably have survived and returned to racing at his previous level.
14. The particulars of claim also included an alternative basis for the claim based on material contribution, but Mr Mylonas confirmed in his opening submissions that the Claimant was not pursuing any claim on that basis.

Defendants’ disclosure and amended Defence

15. A Defence was served on 18 May 2021, which was supported by a statement of truth signed by the Second Defendant, Mr Byers, in which all the allegations of breach of duty, as well as causation, were denied.
16. The Defendants positively averred that infection was included by Dr Portal as part of a differential diagnosis for the horse on Friday 21 February and that she had taken SD’s temperature which was normal. It was also positively averred that Dr Portal measured SD’s temperature, heart rate and respiratory rate regularly and at least during the first examination on each day of attendance although it was accepted that the results of these measurements had not been recorded in the electronic clinical records. It was also positively averred in relation to her actions on Saturday 22 February, that at all material times, lymphangitis was part of Dr Portal’s differential diagnosis for SD.

17. The account put forward by the Defendants in their Defence, and in particular the inclusion of lymphangitis as part of Dr Portal's differential diagnosis, was based upon the content of the clinical records from their online system which had been provided by the Defendants to Mr Crate in early March 2020 following his first concerns being raised.
18. There were a significant number of pre-trial applications in this case and some serious issues have arisen between the parties relating to disclosure and, where necessary, I will address the relevant matters relating to evidence in this judgment. Suffice to say at this stage that it came to light in 2022 that the Defendants' clinical records had been altered by Mr Byers on 10 March 2020 before copies were provided to Mr Crate. The Defendants have provided details of the metadata from their computer record system which show which records have been altered but unfortunately do not reveal the original entry prior to its amendment. Since then, further evidence has come to light which should have been disclosed by the Defendants at the outset, including an earlier note prepared by Dr Portal dated 18 April 2020 which includes a different version of events to that set out in the online records and the Defence and recordings of temperature, heart rate and respiratory rate which do not appear in any other records, or in Dr Portal's witness statement for the case. Most recently, some further clinical records prepared by Dr Portal, apparently contemporaneously, have been disclosed by the Defendants having apparently been found during a 'clear out of the office' in December 2022. It is apparent from all these documents that, at the very least, there has been a degree of fabrication in the lay evidence produced by the Defendants at different stages of these proceedings.
19. On the first day of the trial, an application was made by the Defendants to amend their Defence to admit breach of duty in relation to the delayed administration of antibiotics. That application was not opposed. I granted permission to the Defendants to amend their Defence but indicated that any arguments as to costs would be determined at the conclusion of the trial. The Defendants, following the service of the amended defence, also indicated that they did not intend to rely on any of their lay witness evidence, so I have not heard from either the treating vet, Dr Portal or the owner of the Defendants' practice and veterinary surgeon, Mr Byers.
20. In their amended defence and at trial the Defendants denied that the application of the bandage by Dr Portal on Saturday 22 February 2020 amounted to a breach of duty. They also denied causation on the basis that SD would not have survived even if Dr Portal had administered broad spectrum antibiotics on Saturday 22 February (and, if found to be a breach, not applied a bandage) by reason of the multi-drug resistant nature of the Staphylococcus Aureus bacteria which had caused the initial infection.

Defendants' clinical records

21. In the absence of Dr Portal and Mr Byers, I have heard no evidence to explain the changes which it is now admitted by the Defendants were made to the Defendants' clinical records relating to SD's treatment on 10 March 2020. Given that they differ in many significant ways from the recollection of events of both Mr Crate and Ms Wilson and from Dr Portal's own recently disclosed earlier clinical records and her earlier account dated 18 April 2020, I do not regard them as a reliable source of contemporaneous evidence.

22. I consider it more likely that the typed and handwritten clinical notes made apparently contemporaneously by Dr Portal and only recently disclosed by the Defendants are more reliable, but for the reasons explained above in relation to her subsequent actions, I approach any records made by Dr Portal with some considerable caution.
23. I have not been invited to reach any specific conclusions in relation to the reasons, or responsibility, for the fabricated records and inaccurate and misleading witness evidence presented by the Defendants, and I am mindful that I have not heard from Dr Portal or Mr Byers, but I note that they are matters of serious regulatory concern.
24. For the purposes of these proceedings, Mr Lawrence accepted at the outset that he would not be in a position to contradict the account given by Mr Crate or the Claimant's other lay witnesses of the actions taken by, and their conversations with, Dr Portal.

Lay witness evidence

25. I only heard oral evidence from one lay witness, the Claimant, Mr Crate. The Claimant also relied on the evidence of three other lay witnesses, Ms Wilson, Ms Johns and Mr Dobbs, whose evidence was read and was not challenged by the Defendants.
26. I found Mr Crate to be a very straightforward, honest and reliable witness who was prepared to concede matters against his own interests, for example in relation to his wish to keep rather than sell SD. His evidence in the witness box was consistent with his previous accounts and with the contemporaneous text and WhatsApp messages between himself and Dr Portal, and himself and other colleagues, which he produced. He did not accept the Defendants' suggestion that Dr Portal had indicated to him on Saturday 22 February that she was considering the possibility of infection as well as a trauma as the cause of SD's symptoms and I accept his evidence on this matter. I also record that I accept as truthful and accurate Mr Crate's full accounts of the events at his yard and the condition of SD between 21 and 26 February 2020 as set out in his witness statement and supported by the accounts of Ms Wilson and Ms Johns who were each present at the yard during some of that time.
27. I do not propose to rehearse all of Mr Crate's evidence, but I will return to key aspects of that evidence as I go through my key findings of fact about the chronology of events in this case. I will then address the expert evidence.

Factual findings

28. The parties were not in full agreement as to the background and chronology of the events leading up to the decision to euthanise SD on 28 February 2020, so I have set out below the matters which are agreed together with my findings of fact in relation to the matters in dispute.

Friday 21 February 2020

29. SD was noted to be acutely lame in the right hind leg by Mr Crate during his morning visit to the stables. SD had appeared fine and was walking normally the previous evening. Dr Portal was called by Mr Crate to attend SD as Mr Byers was abroad. Dr Portal attended at approximately 9.00 am. At that time, SD was lame but there was no visible swelling. Dr Portal was unable to reach any clear diagnosis about the cause of

the lameness, but following discussion with Mr Crate, she undertook some tests to exclude possible causes. A nerve block was performed to exclude infection in the foot and blood samples were taken to check for muscle enzymes associated with tie-up/set-fast (a severe cramp-like equine condition). Treatment with an anti-inflammatory/painkiller Phenylbutazone (Bute), was advised by Dr Portal.

30. Mr Crate has been clear throughout that Dr Portal did not take any temperature, heart rate or respiratory rate observations of SD on that first visit or on any other visit and, as invited to do so by both Counsel, I accept that evidence and find as a fact on the balance of probabilities that Dr Portal did not take any such observations of SD between 21 and 26 February 2020 and that the recordings of any such readings contained in her April 2020 note were fabricated after the event.
31. Later that day, the blood test results were received by Dr Portal. The report is timed at 17:30 and revealed a raised white blood cell count, and neutrophilia with a left shift. A separate test result revealed raised serum amyloid A (“SAA”) at 383mg/L. The blood test results did not reveal any muscle enzyme results consistent with tie-up.
32. It is agreed that Dr Portal telephoned Mr Crate that evening to report the blood test results, but the remainder of the conversation remained in issue. I accept Mr Crate’s evidence that Dr Portal advised him that the bloods did not indicate that the horse had tie-up but that they did show an inflammatory reaction that she considered was due to physical trauma or injury, such as SD having been cast and twisted himself. I reject entirely the account in the Defence that Dr Portal expressly qualified her opinion by saying that “this was most likely to be due to physical trauma”. I am satisfied that had any such qualification been clearly expressed, Mr Crane would have asked for more clarification and would have passed on this information in his WhatsApp message to Ms Wilson sent at 18.23 which stated:

“Bloods. He hasn't tied up but shows inflammation reaction so probably muscular She now says 2 butes tonight... as I suggested earlier! She thinks he's got cast and twisted as not reactive/sensitive this morning to any pressure points. I hope she's right”

33. On the balance of probabilities, I am satisfied and find as a fact that Dr Portal was only considering trauma as the cause of SD’s symptoms at that time despite the blood results. It is agreed that Dr Portal advised an increase dose of Bute (4 sachets of Bute per day).
34. I note that no breach of duty is now alleged by the Claimant in relation to Dr Portal’s actions on Friday 21 February.

Saturday 22 February 2022

35. At 8.03 am Mr Crate sent photographs of SD’s leg to Dr Portal by WhatsApp and the following message:

“Morning Barbara. Sand Diago had substantial swelling on inside of hock last night also very hot. This morning even bigger hot and hard only thing is he is happier in self but very lame. Are you on duty this morning or should I ring office? Peter”

The hock is another name for the tarsal joint mid-way down a horse's leg which bends backwards as the horse walks.

36. Dr Portal attended at approximately 9.00 a.m. There is a factual dispute about Dr Portal's reaction and response when she saw the size of the horse's hock and for the reasons I have set out above, I accept Mr Crate's evidence that Dr Portal was obviously shocked at the swelling and commented on it. I have seen photographs taken at that time and the specific location and degree of swelling is very distinct. I note that the swelling in the inside of the right hock was said to be very sore when touched, despite the high dose of painkillers he had received. Dr Portal undertook X-rays of the leg which revealed no abnormalities.
37. Again, I accept Mr Crate's account of Dr Portal's visit and treatment decisions on this day. In particular, I accept that Dr Portal did not make any mention of infection, focal peritarsal infection, lymphangitis or cellulitis to Mr Crate. I note that his evidence in this regard is supported by the contemporaneous WhatsApp messages, Dr Portal's own handwritten clinical notes and her April 2020 statement, none of which make any mention of a possible diagnosis of any type of infection. The only evidence that she may have been considering lymphangitis on that date is in the Defendants' amended clinical records upon which I do not consider it appropriate to place any reliance in this case for the reasons I have outlined.
38. Dr Portal prescribed further pain relief and SD was administered 4 sachets of Bute on Saturday. It is agreed that no antibiotics were prescribed to SD at that time. As I have stated above, the Defendants now admit that Dr Portal's failure to prescribe SD with penicillin and gentamicin on Saturday 22 February 2020 fell below the standard of a reasonably competent equine vet providing care to a thoroughbred racehorse like SD and was in breach of her duty to SD.
39. I have already made a finding that Dr Portal did not take any observations including rectal temperature during this visit. It follows that her recorded reading of a normal temperature in her April 2020 note and her assertion that she took a temperature on that date in her witness statement must be false. I note that no such reading appears in her handwritten note. I also note that it is now common ground between the parties, that had she taken a rectal temperature at that time, on the balance of probabilities it would have been raised and therefore been regarded as abnormal.
40. Dr Portal then applied a large bandage to SD's affected right hind leg and advised that he should remain confined to his stable on "box rest". On the face of the pleadings there were factual disputes as to the circumstances in which the bandage came to be applied, Dr Portal's rationale for applying it, and how tightly it was applied. In the absence of any evidence from Dr Portal I accept the evidence of Mr Crate in relation to the nature, position and tightness of the bandage, which is supported by the photographic evidence.
41. In relation to Dr Portal's rationale for applying the bandage at that time, I am satisfied for the reasons set out above that she had not made a primary or differential diagnosis of focal peritarsal infection or cellulitis or lymphangitis at that time but remained solely focussed on the possibility of some form of physical trauma as the cause of SD's symptoms.

Sunday 23 February 2020

42. SD remained in his box all day, in line with Dr Portal's advice and was administered 4 sachets of Bute. Shortly after 10.00 pm, Mr Crate telephoned Dr Portal to request a further visit that evening due to his concern about SD's condition. Dr Portal attended at approximately 11.00 pm. She removed the bandage and I accept Mr Crate's evidence that SD's leg was very swollen above and below the bandage but that it was less swollen where the bandage had been wrapped tightly round it. Dr Portal looked at the swollen leg and advised Mr Crate that SD had cellulitis which she thought might be due to a stifle injury (the stifle is a knee-like joint higher up the horse's leg than the hock). She advised Mr Crate that if the swelling was not reducing, she would x-ray the stifle the next day. She then commenced broad-spectrum antibiotic treatment, namely a combination of Penicillin and Gentamicin. Phenylbutazone and Dexamethasone (anti-inflammatories) were also administered. She did not re-apply any bandage.
43. Following her visit, Mr Crate sent a message to Nicole Dyson (one of his yard employees) stating:
- “Not sure what's going on but she now thinks cellulitis as he has swollen more. Has given him penicillin. Engimycin and fynadine. May X-ray stifle in morning if swelling not reducing”*
44. This contemporaneous reference to “now thinks” provides additional support for Mr Crate's evidence that there had previously been no mention of cellulitis by Dr Portal on Saturday 22 February when she applied the bandage.
45. The Defendants' amended clinical record contained an entry for this visit but no clinical notes at all.

Monday 24 February 2020

46. Dr Portal attended at 8.00 a.m. Again, there were factual disputes on the face of the pleadings as to the condition of the leg that morning and the conversations that took place between Mr Crate and Dr Portal. I accept the evidence of Mr Crate as to what happened and find that the note in the Defendants' amended clinical records stating *“Today there is much improvement since last night”* was incorrect and misleading. Mr Crate's evidence was that SD's leg had continued to swell overnight and that he asked Dr Portal if SD should be referred to an equine hospital but she dismissed the idea and advised that he should be walked 2-3 times a day and continued on penicillin and gentamicin. Finadyne paste was dispensed as an alternative anti-inflammatory/painkiller to the oral Bute. Dr Portal said she would return that evening. Mr Crate remained concerned as although SD had been able to move more easily after being walked, his leg had started to seep some type of liquid and he sent a message to Dr Portal at about 3.30pm that afternoon. Dr Portal attended again later that afternoon at approximately 5.45 pm. She advised Mr Crate that the seepage was lymph fluid and administered penicillin, gentamicin and dexamethasone (a steroid) and advised more walking.

Tuesday 25 February 2020

47. It is agreed by both parties that SD had deteriorated overnight. He was still non-weight bearing on his affected leg and it had swollen even further. Dr Portal attended at approximately 8.00 a.m. and Penicillin and Flunixin (an anti-inflammatory) were administered. She advised that the ‘forced’ walking should be continued every 3 hours, including during the night, and the leg should be hosed with cold water (a treatment known as cold-hosing). More photographs were taken of the leg by Mr Crate which I have seen and they show a severely swollen leg.
48. At 4.03 pm that day Mr Crate sent Dr Portal a message advising that the horse was “*getting worse in real pain and leg even bigger*”.
49. Dr Portal reattended at 4.30 pm. She changed the antibiotic treatment to oxytetracycline (Engemycin). Dexamethasone and Flunixin were also administered, together with an analgesic injection and analgesic patches (Fentanyl). The limb was wrapped with DMSO Furacin liquid solution in cling film.
50. I accept Mr Crate’s evidence that, once again, Dr Portal maintained her position that admission to equine hospital was not required, although he made clear that the cost was not a concern for him. Mr Crate’s statement also included a graphic and emotional account of his repeated attempts to force SD to walk that evening, in line with the instructions he had been given, despite the signs that SD was in significant distress. He says that he had been advised by Dr Portal of the need “to be cruel to be kind” and I recognise the severe upset that this must have caused him.

Wednesday 26 February 2020

51. Dr Portal attended at approximately 8.00 a.m. SD had further deteriorated overnight and a decision was taken by Mr Crate that SD should be transferred to Liphook Equine Hospital (“LEH”) to which Dr Portal finally agreed. Oxytetracycline was administered before transfer. At approximately 10.46 a.m. SD was admitted to LEH. Treatment continued there with oxytetracycline, dexamethasone and flunixin.
52. I note that the discharge report from LEH dated 6 March 2020 addressed to Dr Portal includes a summary of the referral information in the first paragraph. I do not propose to set it out in full, but I note that it includes the following sentences:

“The horse arrived at the hospital having had a short history of intermittent lameness followed by a suspect lymphangitis. On the Friday prior to referral Sandiago was noted to be lame in the right hind and with some swelling over the hock. This was treated symptomatically and seemed to have resolved over the weekend with the horse walking sound and with no swelling. On the Monday the swelling in the limb was noted to increase and Sandiago was treated with penicillin, gentamicin and NSAIDS as well as ongoing nursing including walking.”

53. It is important for me to record that it is plain from all the other contemporaneous evidence that this account of the period of treatment prior to admission is grossly misleading and on the balance of probabilities I find that this misleading information

about the treatment Dr Portal had given to SD during the preceding days must have been provided to LEH by her.

Thursday 27 February 2020

54. SD remained at LEH and his condition continued to deteriorate. The antibiotic treatment with oxytetracycline was stopped and replaced with penicillin, gentamicin and metronidazole. Dexamethasone and analgesia were continued. A sample of fluid was collected from the subcutaneous tissue for culture and sensitivity tests. An epidural catheter was put in place to administer morphine and detomidine to try and improve SD's comfort levels and SD continued to be walked out.

Friday 28 February 2020

55. SD was found to be weight-shifting in his hind limbs and X-rays were taken of his left hind leg to exclude contralateral limb laminitis. During the process of lifting the right limb for x-ray, skin denuded off the lateral cannon. On inspection there was no associated blood loss and the surrounding skin appeared loose and non-viable, whilst the soft tissues underneath were pale pink, soft and malodorous.
56. A decision was taken to euthanise SD due to the lack of blood supply to the infected right hind leg and because the prognosis was hopeless. SD was euthanised that day.

Sunday 2 March 2020

57. Results of the culture and sensitivity test taken from SD's affected limb confirmed a heavy growth of Staph A, which was resistant to the three antibiotics (Penicillin, Gentamicin and Oxytetracycline) with which SD had been treated.

Issues between the parties

58. The following issues remain to be determined in relation to breach of duty:
- i) Whether there was a negligent failure by Dr Portal to take any observations (temperature, heart and respiratory rate) on any of her visits between 21 and 26 February when SD was transferred to LEH.
 - ii) Whether Dr Portal fixed on a traumatic cause of lameness and failed to review that decision upon receipt of the blood results on Friday 21 February
 - iii) Whether Dr Portal failed to reach a primary or differential diagnosis of a localised bacterial infection of the hock on Saturday 22 February 2020
 - iv) Whether Dr Portal was negligent in applying the bandage to SD on Saturday 22 February
59. The following issues remain to be determined in relation to causation:
- i) If SD had been treated with penicillin and gentamicin on Saturday morning (and, if breach of duty is found in relation to bandaging, the leg had not been bandaged) on the balance of probabilities, would he have survived ?

- ii) If he had survived, on the balance of probabilities, would he have returned to his pre-infection performance?
60. The following issues remain to be determined in relation to quantum:
- i) What was the replacement value of SD as at February 2020 ?
 - ii) Whether SD would have required equine hospital treatment in any event?

Legal principles

61. There was agreement between the parties as to the applicable legal principles in this case. Both Counsel referred to *Bolam v. Friern Hospital Management Committee* [1957] 1WLR 52, where in his directions to the jury McNair J said this:

“I, myself, would prefer to put it this way, that he is not guilty of negligence if he has acted in accordance with a practice accepted as proper by a responsible body of medical men, skilled in that particular art. ... Putting it the other way round, a man is not negligent, if he is acting in accordance with such a practice merely because there is a body of opinion which would take a contrary view.”

62. That legal direction was specifically approved in the House of Lords case of *Bolitho v. City of Hackney Health Authority* [1998] AC 232. Lord Brown-Wilkinson said in that case, having been referred to the relevant authorities:

“”These decisions demonstrate that in cases of diagnosis and treatment there are cases where, despite a body of professional opinion sanctioning a defendant's conduct, a defendant can properly be held liable for negligence. (I am not here considering questions of disclosure of risk). In my judgment that is because in some cases, it cannot be demonstrated to the judge's satisfaction that the body of opinion relied upon is reasonable or responsible. In the vast majority of cases the fact that distinguished experts in the field are of a particular opinion will demonstrate the reasonableness of that opinion. In particular where there are questions of assessment of the relative risks and benefits of adopting a particular medical practice, a reasonable view necessarily presupposes that the relative risks and benefits have been weighed by the experts in forming their opinions. But if, in a rare case, it can be demonstrated that the professional opinion is not capable of withstanding logical analysis, the judge is entitled to hold that the body of opinion is not reasonable or responsible.

I emphasise that in my view it will very seldom be right for a judge to reach a conclusion that views genuinely held by competent medical experts are unreasonable. The assessment of

medical risks and benefits is a matter of clinical judgment which a judge would not normally be able to make without expert evidence.”

63. It was also agreed by both parties that the applicable standard to be applied in considering any alleged breach of duty on the part of Dr Portal, was that of a reasonably competent equine vet holding herself out as being able to provide veterinary care to a thoroughbred racehorse like SD.
64. It was also agreed that causation is a question of past fact which has to be decided on a balance of probabilities. In *Hotson v East Berkshire* [1987] AC 750, the House of Lords held that a claimant cannot recover damages for the loss of a chance of a complete or better recovery when there has been a finding on the balance of probabilities that the injury would have occurred in any event.

Expert evidence

65. The purpose of expert evidence is to assist the court in its decision-making. CPR Part 35 and PD 35 set out procedural requirements for such evidence.
66. I heard oral evidence from four veterinary experts: a veterinary surgeon and a microbiologist for each party. It was an unfortunate feature of this case that each of those experts faced challenges and allegations from the other party as to their competence and/or integrity and as to their compliance with the strict requirements of CPR Part 35. Each of them in turn has had to apologise to the court for errors they have made in their written reports and/or breaches of their Part 35 duties and each has sought to provide explanations to the court for their failings. I recognise that unlike medical experts for whom the preparation of such reports and appearance in such cases is usually a fairly regular occurrence, veterinary negligence cases of this type are less common and these experts’ familiarity with the court process appeared to be limited. That is not to excuse all their failings which have rightly been the subject of vigorous cross-examination, but to recognise the context in which some of their mistakes were made. Notwithstanding that context, I have had to make an assessment in relation to each expert as to the reliability of their evidence, their explanations for their errors or omissions and their significance, and their ability to provide expert assistance to the court.
67. I will address their specific evidence in relation to the points in dispute in due course, but I will first set out my overall assessment of each expert and the extent to which I consider that their evidence can assist me in my decision-making.

Mr Pieter Ramzan (Claimant’s veterinary surgeon)

68. Mr Ramzan is a practising veterinary surgeon specialising in racehorse sports medicine. He qualified at the University of Sydney in 1994 and has been a partner in the Rossdale and Partners practice in Newmarket since 2005 and Clinical Director there since 2021. Rosdables is the largest equine-only veterinary practise in Europe and has a longstanding internal programme of veterinary training. He still has a significant “first opinion” caseload and has also published and lectured on veterinary medicine. He is the author of “The Racehorse: A Veterinary Manual” published in 2014. He is a fellow

of the Royal College of Veterinary Surgeons and sits on the British Equine Veterinary Association's Racing Sub-Committee.

69. Despite his clinical and academic experience and expertise, which was not challenged, Mr Ramzan has only rarely been asked to act as an expert in similar court proceedings. It is right to note that his expert report was set out in a somewhat unconventional manner, no doubt as a consequence of his limited experience as a court expert. He reviewed, and gave his expert opinion on, various documents in the bundle he was sent, including the pleadings and the witness evidence, as well as providing his opinion on the specific matters of breach of duty and causation on which he was instructed.
70. He was cross-examined in relation to his failure to include a full summary of his instructions in the body of his report, as required by CPR 35.10. Instead, he had referred to an email from the Claimant's solicitors but not included a summary of its contents. He accepted and apologised for his omission in this regard, which resulted in a short witness statement being provided during the hearing from the Claimant's solicitors confirming his instructions and was not pursued further by Mr Lawrence in terms of any application.
71. My assessment of Mr Ramzan was that he was a methodical, honest and credible expert witness with a significant amount of relevant clinical experience who was doing his best to assist the court but was not an experienced expert witness. Whilst he would undoubtedly have benefitted from more guidance from those instructing him as to the format and structure of his report, I found his evidence in relation to treatment matters to be consistent and compelling and to be supported by the literature on which he relied. I found his expert evidence in relation to causation to be more limited, as it was based almost entirely on his own clinical experience rather than any specific academic expertise in relation to the key issue of anti-microbial resistance.

Mr Rendle (Defendants' veterinary surgeon)

72. Mr Rendle is a veterinary surgeon with 18 years specialist equine experience. He worked in private equine hospitals, including many years at Liphook Equine Hospital, for most of his career until 2019 and is now an independent consultant in equine medicine. He is a Fellow of the Royal College of Veterinary Surgeons and has published papers and lectured on a range of equine veterinary topics including the management of lymphangitis and cellulitis. He only has limited experience as a first opinion vet.
73. I recognise that Mr Rendle found himself in a somewhat difficult position as an expert witness, given that the Defendants had chosen to admit a breach of duty by Dr Portal in relation to the delayed administration of antibiotics shortly before the trial, which Mr Rendle had strongly defended in his written report. However, even taking that into account, my assessment of Mr Rendle was that he was a defensive witness who did not accept any deficiencies in his report writing and did not provide an adequate explanation for many of his errors or omissions. For example, it had been accepted by the Defendants during an earlier directions hearing that Dr Portal's earlier undisclosed statement, dated 18 April 2020, which included a number of temperature readings which did not appear in the clinical records, had been provided to Mr Rendle, but it was not included by him in the list of documents in his report. He was unable to provide any adequate explanation for this omission, save to repeat that he had no reason to

deliberately exclude it and had not intended to deceive the court. Similarly, he was unable to adequately explain why he had chosen not to include various temperature and heart rate measurements recorded by Dr Portal in that statement when it must have been apparent to him that they were potentially relevant to the matters in issue. When pressed, he would continually suggest alternative explanations for his failure to include matters which were critical of Dr Portal, which did not stand up to scrutiny.

74. It also became apparent that Mr Rendle had included repeated references to academic papers and studies which either he had not accurately summarised or were not of any direct relevance to this case. For example, he included numerous alternative explanations (and supporting references) in his report and in the joint statement for the raised SAA blood test result which Mr Ramzan considered was indicative of infection rather than physical trauma, which were of no direct relevance to SD's condition at all and I accept Mr Mylonas's submission that they appeared to have been deployed as a smokescreen.
75. It was also striking that despite being advised that the Defendants were now admitting Dr Portal's failure to administer antibiotics on Saturday 22 February, and accepting that there was no evidence that she had in fact taken any of the observations that she claimed to have done, he appeared unwilling to accept these concessions. During his cross-examination he continued to seek to defend Dr Portal's actions by reference to the disputed measurements that were no longer relied on by the Defendants and he stated at one point:

"I would be very surprised if she would invent records. I do believe she took them. It would be incredible if a member of the profession did not."

76. For all these reasons, I was not able to regard Mr Rendle as a reliable, independent, and objective expert witness and I accept the Claimant's submission that his evidence should be treated with caution. In my view, where his evidence is contradicted by Mr Ramzan, I prefer the expert evidence of Mr Ramzan.

Professor Holmes (Claimant's veterinary microbiologist)

77. Professor Holmes is a veterinary microbiologist with a particular interest in antibiotic resistance. He is a lecturer at the University of Cambridge and holds a chair in Microbial Genomics and Veterinary Science. By an order of Master Sullivan, he and the Defendants' expert Dr Gibbons were to be instructed to provide expert microbiology evidence in relation to causation.
78. My assessment of Professor Holmes is that he is a very eminent professor with a detailed knowledge of his subject but is a very inexperienced expert witness. By his own admission, he found it very challenging to give precise percentage and probabilities of the kind which are of most use to the court. At the time of the joint meeting, he accepted that he had made a fundamental error in his analysis in that he did not accept in his written report that the MDR sample cultured in the Liphook lab was the same bacteria which had infected SD. In arriving at that conclusion, he had overlooked a record of the sampling from Liphook Hospital in the bundle. When asked about this error in the cross-examination, he frankly said it was *"through carelessness and rushing I missed that fact and I made that mistake."*

79. During his live evidence, he then admitted to a further error which was not picked up during the joint meeting. He spent a good deal of time in the witness box apologising for his shortcomings as an expert and accepted that he had “*not served the court with the diligence and duty that I think I should have.*” He was also vociferous in insisting that nevertheless his evidence could be relied upon. It would be very tempting to disregard the evidence of Professor Holmes altogether, as Mr Lawrence invited me to do, on the basis of his performance in the witness box. However, having read his expert report carefully and heard his live evidence, I am satisfied that there are parts of his evidence about the nature and progress of SD’s condition which are based on his extensive knowledge and experience as an expert microbiologist and remained uncontradicted by Mr Gibbons and which are of some assistance to me in reaching my conclusions.
80. I should add that at times, in both his written report and his oral evidence, Professor Holmes strayed into giving evidence in relation to breach of duty. The relevant sections of his report had been redacted following an application by the Defendants and I accept the Defendants’ submission that I should not place any reliance on his evidence in relation to breach of duty.

Dr Gibbons (Defendants’ veterinary microbiologist)

81. Mr Gibbons is a veterinary microbiologist who has been based at the Irish Equine Centre in County Kildare since 2018. He completed a PhD in veterinary microbiology in 2011 and has a specialist interest in antimicrobial resistance. He has previously taught at the University of Edinburgh and University College, Dublin and has lectured, published and researched on antimicrobial resistance.
82. Mr Gibbons spent less time in the witness box than the other experts and was subject to less vociferous cross-examination. He accepted that he had made a mistake in setting out the definition of ‘resistance’ in the CLSI standards (see para 128 below) but did not accept that his transcribing error had led to any error in his conclusions. He was robust and consistent in the opinions he had provided and did not accept that he had based them on an incorrect interpretation of the underlying papers.
83. Overall, I found Mr Gibbons to be straightforward expert witness whose evidence was of assistance to the court in relation to the matters that he had addressed. I do note however that he had not fully engaged in all the key points in issue, some of which he stated were not within his area of expertise. For example, he did not engage with, or indeed challenge, either on paper or in his evidence, the views of Professor Holmes and Mr Ramzan about the specific nature of FPI as a disease and the potential impact of bandaging on the lymphatic system.

Academic papers and material

84. In addition to the experts reports, the court had a literature bundle comprising 1,122 pages of academic papers, surveys, textbook extracts and international standards. It was unfortunate that more effort had not been made by the parties to rationalise and reduce the size of this bundle in advance of the hearing as it contained a significant amount of duplication. During the course of the trial I was taken to 19 of these papers which were relied on by one or more of the experts. I am grateful to Counsel for providing a summary of these 19 papers at the end of the trial. I attach a numbered and slightly

shortened version of this summary as an annexe at the end of this judgment and any references to an academic paper in this judgment is to one of those numbered papers with the number of the paper added in square brackets eg [11].

Cellulitis, lymphangitis and focal peritarsal infection (FPI),

85. Before reviewing the relevant evidence in relation to each aspect of breach of duty, I will record some agreed information about SD's condition.
86. The term cellulitis refers to the diffuse infection and inflammation of sub-cutaneous tissues. In horses, cellulitis involving the limbs is typically acute in onset and characterised by substantial inflammation. The affected limb typically becomes swollen, indurated, warm and painful with the horse often becoming lame or unable to bear weight on the affected limb. It can develop independently (primary) or as a result of a penetrating wound to the skin (secondary). Staph A is generally regarded as one of the most common infecting organisms in cellulitis in horses.
87. The term lymphangitis refers to inflammation of the lymphatic vessels. In practice, cellulitis and lymphangitis frequently occur concurrently and, histologically, cellulitis is invariably associated with evidence of lymphangitis and vasculitis. True lymphangitis appears to be rare in the UK. It is common ground amongst the experts in this case, that the terms cellulitis and lymphangitis are often used by UK vets interchangeably.
88. Focal peritarsal infection (FPI) is a distinct form or sub-set of localised cellulitis/lymphangitis originating around the tarsal (hock) region of a horse's leg and is an extremely painful condition. Common clinical features of this condition include acute-onset severe hindlimb lameness and swelling of the dorsal aspect of the tarsus. The dorsal tarsus is hot to palpate and light digital pressure elicits an extremely marked pain response. The swelling is initially very localised in the hock region, but it can develop into more generalised cellulitis/lymphangitis. It was first documented as a specific type of cellulitis in the *Pilsworth and Head* paper in 2001 [15] and was the subject of a more recent study in the *Kalka* paper in 2021 [11]. It was also the subject of an entry entitled "*Peritarsal/inguinal infection (lymphangitis)*" in a textbook "*The Racehorse: A Veterinary Manual*" written by Mr Ramzan in 2014 [14].

Breach of duty

89. The Defendants have either admitted or do not resist a finding of breach of duty in the following respects:
 - i) A negligent delay of approximately 38 hours in the administration of antibiotics by Dr Portal from the morning of Saturday 22 February 2020 (when they should have been administered) to the late evening of Sunday 23 February 2020 (when they were first administered)
 - ii) A negligent failure by Dr Portal to take any observations (temperature, heart and respiratory rate) on any of her visits between 21 and 26 February 2020 (when SD was transferred to LEH).

90. In addition, upon the basis of my factual findings set out above, I make the following additional findings. I find, on the balance of probabilities, that any reasonably competent equine vet holding themselves out as providing care to thoroughbred racehorses, as Dr Portal was, even if they were not specifically aware of FPI as a distinct condition, should have reached a primary diagnosis of a suspected localised infection of the hock by Saturday morning. I reach this finding on the basis of the following matters which were, or should have been known to her:
- i) acute onset of lameness overnight,
 - ii) the level of pain and discomfort shown by SD,
 - iii) the absence of any bony injury following completion of the X-ray,
 - iv) the absence of any other foot injuries or localised foot infections such a foot abscess or tie-up, all of which had been excluded by the other tests performed by Dr Portal,
 - v) the distinct localised swelling over the tarsal area,
 - vi) the high SAA and other blood results which, when combined with the other symptoms, were highly suggestive of infection.
91. Prior to the hearing, the Defendants accepted that antibiotics should have been commenced by that time but did not appear on the face of the amended Defence to accept that this must mean that a sole or primary diagnosis of some form of localised bacterial infection in the hock region should have been made by then.
92. Mr Lawrence sensibly conceded in his closing submissions that the explicit admission by the Defendants that Dr Portal should have administered antibiotics on Saturday morning carried with it an implicit admission that there was sufficient evidence available to Dr Portal to support a differential diagnosis of such a bacterial infection, but continued to submit there was evidence to indicate that Dr Portal did have such a differential diagnosis in mind alongside her primary diagnosis of structural defect. In so doing he relied on Dr Portal's decision to take bloods, on her written record of lymphangitis and on the evidence that she was looking for cuts or punctures.
93. For the reasons I have set out above, I accept Mr Crate's evidence that the blood test was only taken to rule out 'tie-up' (which it did), that no reliance can be placed on the reference to lymphangitis in the Defendants' altered clinical records, and that Dr Portal did not give any indication to Mr Crate that she was doing anything other than examining SD for the site of a blunt trauma. Most significantly, it is agreed by all the experts that once a diagnosis of suspected infection is made, it is imperative for antibiotic treatment to be started immediately. Indeed, this is what Dr Portal herself did on Sunday night.
94. Taking into account my factual findings above, I have found no credible evidence that Dr Portal had in mind even a differential diagnosis of infection of the hock on Saturday morning.

95. It follows that, on the balance of probabilities, my further findings in relation to breach of duty are:
- i) That Dr Portal negligently fixed on a traumatic cause of lameness and failed to review that decision upon receipt of the blood results on Friday 21 February 2020.
 - ii) That Dr Portal negligently failed to reach a primary or differential diagnosis of a bacterial infection of the hock on Saturday 22 February 2020

Bandaging

96. The remaining allegation of breach of duty relates to bandaging and was set out in paragraph 53 (c)(iv), (v) and (e) of the Particulars of Claim, set out at paragraph 10 above.
97. I have read and heard a significant amount of factual and expert evidence in relation to this issue. In reaching my conclusions, as I indicated to Counsel during the hearing, I have only taken into account the expert evidence of the two veterinary experts, Mr Ramzan and Mr Rendle and not any evidence relating to this issue from Professor Holmes.
98. In relation to the relevant factual evidence, for the reasons I have set out above, I accept Mr Crate's evidence in relation to the bandage which was applied to SD's leg by Dr Portal on Saturday 22 February, which was consistent with the photographic evidence and was not challenged. I find that Dr Portal bandaged SD's leg quite heavily using Vetrap bandage with a lot of Tensoplast tape at the top and bottom and that the bandage almost covered SD's whole leg from below the stifle area down to the foot. I accept Mr Crate's evidence that Vetrap is a long and stretchy bandage and that Dr Portal applied it tightly and that the Tensoplast tape was also applied tightly. I also accept Mr Crate's evidence that Dr Portal advised him that the bandage should be left in place until she returned on Tuesday 25 February 2020 and that SD should be kept in his box.
99. It also follows from my findings in relation to breach of duty set out at para 95 above, that on the balance of probabilities, Dr Portal had not reached either a primary or differential diagnosis of infection, cellulitis or lymphangitis before deciding to apply a bandage to SD's right hind limb.
100. The evidence of the claimant's veterinary expert Mr Ramzan on this issue can be summarised as follows:
- i) The application of a bandage of the type used by Dr Portal on Saturday 22 February 2020 was contraindicated because "*there were only potential risks (and no benefits) associated with this course of action*"
 - ii) That the risks were associated with the rapidly developing soft-tissue swelling.
 - iii) That the type of bandage used, namely Vetrap, was widely known and understood by veterinary clinicians and lay support staff in the industry to have the potential to constrict and damage limb structures as it is applied under some tension and does not expand or stretch.

- iv) That the presence of such a bandage meant it was not possible to observe the health of the underlying structures and there was a risk of tissue constriction and devitalisation if the swelling continues to grow under the bandage (as it did in this case) as the lymphatic/venous drainage system and blood flow to the affected area could be impeded.
 - v) Although bandaging is quite commonly used to treat generalised cellulitis as reported in the literature, this is always as an ancillary treatment to antibiotics and was only appropriate after the initial period of acute, rapid and severe swelling had passed.
101. In his written report, the Defendant's veterinary expert Mr Rendle sought to justify the actions of Dr Portal on the basis that she had arrived at a differential diagnosis of cellulitis/lymphangitis on Saturday 22 February and that use of bandages for the treatment of cellulitis was an acceptable form of treatment. His evidence was that vets routinely bandage cellulitic limbs to reduce swelling and/or to prevent further swelling. In doing so, he relied on the following academic papers and reports, helpfully set out by Mr Lawrence in his closing written submission, on which I have based this list of references (the numbers in bold are page numbers in the literature bundle).
- i) *Adam and Southwood* (2006) at [450] and [457] [1]
 - ii) *Adam and Southwood* (2007) at [470] [2]
 - iii) *Braid and Ireland* at [481] and [485] [4]
 - iv) *Cooper, Davidson, Slack and Ortved* at [515] [7]
 - v) *Fjordbakk, (2008)* at [558] [559] and [560] [10]
 - vi) *Rendle* (2017b) at [641] [17]
 - vii) *Rendle* (2017a) at [637] [16]
 - viii) *Markel (1986)* at [594] [12]
102. Mr Ramzan accepted in cross-examination that different types of bandaging could be appropriately used by vets in many situations, and that the papers relied on by Mr Rendle provided evidence that bandaging could be used to treat generalised cellulitis as an ancillary treatment to antibiotics and that this may be appropriate to reduce swelling after the initial period of acute, rapid and severe swelling had passed. He gave a number of examples of when it would be appropriate to bandage a horse's leg, including when it has a small amount of swelling in a distal limb, or when there is an open wound and a bandage is needed to support a dressing or to prevent infection.
103. Mr Ramzan did not accept that the literature relied on by Mr Rendle was relevant to Dr Portal's decision-making in relation to SD's condition on Saturday 22 February. He highlighted that each of the academic papers related to a cohort of horses being treated for generalised cellulitis (in other words a diffusely filled limb) in a hospital setting and that few details were provided of the nature or timing of the bandaging used. He said that the limbs in these cases were more similar to SD's appearance on Sunday night, once the swelling had become widespread. He also did not accept that reliance could

be placed on the *Braid* paper [4], which was a survey of UK vets, without more information about the survey questions which were asked and the types of cases being treated which had not been provided by Mr Rendle.

104. I have reviewed all the references in the papers (listed above) relied on by Mr Lawrence in his closing submissions for the Defendants. In my view, Mr Ramzan's evidence, and the examples he gave as to when bandaging may be appropriate, appear to be consistent with these academic papers. For instance the first reference to bandages in *Adams* (2006) [1] relates to wounds and the second reference relates to cellulitis affecting 'the entire limb'. *Adams* (2007) [2], *Cooper* [7], *Markel* [12] *Fjordbakk* [10] all relate to case reviews of the hospital treatment of generalised/diffuse full or distal limb cellulitis for which support bandaging is used as an ancillary treatment alongside aggressive antibiotic and anti-inflammatory treatment. In *Rendle* (2017b) [17] and *Rendle* (2017a) [16] I note that Mr Rendle summarises the key findings of the academic papers relating to generalised cellulitis referred to above, confirms the importance of antibiotic and anti-inflammatory treatment and then states in relation to bandaging " *For cellulitis of the limbs, pressure bandages should be applied to reduce swelling and should be changed daily*" No mention is made in any of these papers of the use of bandaging as a primary rather than an ancillary treatment or for the prevention of further rapid swelling in a localised infection.
105. Under questioning, Mr Ramzan remained firm in his opinion that the type of tight bandaging applied to SD by Dr Portal at the early acute stage of swelling was dangerous because bandaging a rapidly developing oedema (swelling) does not stop it swelling, it can have a tourniquet effect and it also covers up what is happening. He stated that when vets did use bandages they were normally trying to diminish swelling that is already there, not to restrict further swelling. Later in his evidence when he was being cross-examined further in relation to bandaging and was again asked whether, in the circumstances when it was permissible to use a bandage, the principle purpose is to compress the limb to limit swelling, he responded:

"No – it is to try to diminish swelling which has plateaued, not to restrict swelling which is progressing."

106. Mr Lawrence invited me to regard this evidence as a new 'plateau' theory developed by Mr Ramzan in the witness box. I do not accept that submission as it was clear to me that, on being asked the same question in different ways, Mr Ramzan was simply trying to explain the same point using slightly different language as he thought his previous replies had not been understood. He was also challenged as to whether his opinion that bandaging was contra-indicated at that stage was based on his view that Dr Portal should have recognised SD's condition as focal peritarsal infection. Mr Ramzan was clear in his response that bandaging was contra-indicated on first principles on the basis that the evidence available to Dr Portal was suggestive of infection, which suggested that further swelling would happen if not treated appropriately, which would lead to generalised swelling. He was then asked:

Q. Was it not reasonable for a vet to apply a bandage to inhibit that swelling ?

A. Horses are like human infants, they can't express tightness of a bandage. It is incumbent on a vet to consider when it is

appropriate to apply one. A rapidly swelling leg is a dangerous thing to restrict by putting a bandage on”

107. Later in his cross-examination, Mr Ramzan accepted that there are some instances where vets using bandages do so to both reduce existing swelling and limit further swelling, but I do not accept, as Mr Lawrence has invited me to do in his submissions, that this amounted to an acceptance that the use of a bandage for SD’s condition on Saturday was an acceptable form of treatment. Mr Ramzan remained clear in his evidence that such bandaging was only appropriate at a later stage in the disease process of cellulitis, in line with the literature to which I have referred.
108. In his oral evidence, Mr Rendle accepted that most of the papers he relied on related to hospital admissions for horses with generalised cellulitis and that the references only provided evidence that some form of bandaging had been used rather than the specific nature and purpose of the bandaging.
109. Despite having reached agreement with Mr Ramzan on page 11 of the joint statement on the correct diagnosis in this case in the following terms “*the horse is best described as having focal peritarsal infection that led to generalised cellulitis of the limb*”, Mr Rendle was insistent in his oral evidence that focal peritarsal infection should not be regarded as a distinct condition but only as a type of cellulitis, so that the papers he relied on relating to generalised cellulitis provided a proper basis for his opinion in relation to the use of bandaging. I note that in his own written report, Mr Rendle had in fact made reference to FPI as “a distinct form of cellulitis” and “a specific form of peritarsal cellulitis” and referred to its specific clinical features. However, he had formed the opinion at that time that it was unlikely that SD was suffering from that condition, in part in reliance on the apparently normal rectal temperature taken by Dr Portal on Saturday morning, on which the Defendants no longer seek to rely. His report was therefore not focussed on localised peritarsal cellulitis, and I regarded his evidence about the nature of FPI as an attempt to distance himself from the conclusions in his written report in this respect.
110. As I have outlined above, it was also put to Mr Rendle that he had made a number of errors in his summaries of some of these papers and each time his reply was to accept the error or oversight and state that he could not have put in every caveat or he would never have finished the report. I note that he did however find space to include long passages relating to possible alternative explanations for the raised SAA blood test result overlooked by Dr Portal.
111. In arriving at a decision in relation to an alleged breach of duty, I must consider the reasonableness of the decision taken by Dr Portal. Mr Lawrence submits that it does not matter whether Dr Portal should have suspected an infection on Saturday morning provided the application of a bandage to SD’s leg at that time was a treatment which was one that a similarly qualified equine vet, acting with reasonable care and skill, could have selected.
112. In his written and oral closing submissions, Mr Lawrence did not seek to place any direct reliance on the expert evidence of Mr Rendle. Instead, he sought to rely on the literature that Mr Rendle had made reference to in his report and the concessions he contended had been made by Mr Ramzan, in order to meet the *Bolam* test in relation to

the appropriateness of the use of a bandage to treat SD's swollen leg on Saturday 22 February. For all the reasons I have already outlined, I did not regard Mr Rendle's evidence as independent or reliable, but, as invited to do by Mr Lawrence, I did consider all the academic literature on which he relied, to which I have referred above.

113. As I have stated above, there was disagreement between the experts about the level of awareness that an equine vet in Dr Portal's position should have had about the specific condition or sub-set of cellulitis known as FPI. I note that the Claimant has not in fact pleaded, nor sought to assert during the hearing, that Dr Portal should have been aware of this specific condition. For the reasons set out above, I have found that there was sufficient evidence for her to have arrived at a primary diagnosis of an infection of the hock by Saturday morning which would have necessitated the same aggressive antibiotic treatment.
114. Dr Portal, having failed to arrive at that appropriate diagnosis of infection and failed to commence the aggressive antibiotic treatment which was required, went on to apply a full length and tight bandage. It follows from my factual findings, that contrary to the assertion in the Defence, she did not reach this decision having taken into account all the potential risks and benefits of bandaging as a treatment for such a localised infection.
115. The evidence of Mr Crate to which I have already referred, and which was not challenged by the Defendants, was that this bandage prevented him and his staff from being able to observe the increasing swelling in SD's affected limb over the following 38 hours until it had developed beyond the edge of the bandage. I also accept Mr Crate's evidence that when the bandage was removed by Dr Portal at 11pm on Sunday 23 February, the leg was more swollen above and below the area which had been covered by the bandage.
116. The only possible justification for Dr Portal's course of action put forward by the Defendants was based on the literature referred to in Mr Rendle's report that the application of a bandage was a common ancillary treatment used for cellulitis and was supported by a reasonable body of veterinary opinion. The Defendants submit that in deciding whether Dr Portal was negligent I should take into account the information that was or ought to have been available to Dr Portal, including what they now belatedly accept are cogent grounds for a differential diagnosis of infection. In other words, if a professional does the right thing for the wrong reason, or for a combination of reasons, some of which are wrong there can be no actionable breach of duty.
117. I do not accept that the evidence supports the Defendants' submissions on this issue. In my view, the most that can be concluded from literature relied on by the Defendants which I have listed above, is that bandaging may be acceptable as an ancillary treatment for generalised cellulitis alongside the two primary treatments, namely antibiotics and analgesia, but this was not the factual situation in this case. There is no evidence in Mr Rendle's written or oral evidence or in any of the papers he has relied on that tight bandaging alone is supported by a responsible body of equine veterinary opinion as an appropriate initial treatment for a suspected localised bacterial infection with rapidly increasing swelling in the hock area. I prefer the evidence of Mr Ramzan that the application of such a long, tight and restrictive bandage was completely inappropriate and contra-indicated for the initial treatment of an infection causing rapidly developing

localised swelling and that this should have been plain to any equine vet acting with reasonable care and skill on the basis of first principles.

118. It follows that I do not consider that the actions of Dr Portal to apply such a bandage to SD's leg on Saturday 22 February without any proper assessment of the risks and benefits of doing so, including the potential risk of impeding lymphatic circulation in the leg, was a treatment which an equine vet treating a racehorse such as SD with reasonable care and skill could have selected.
119. I should add for the sake of completeness that Mr Lawrence sensibly accepted that Dr Portal's advice to leave the bandage on without any review for 72 hours until her next planned visit on Tuesday 24 February was not justified. This concession reflected Mr Ramzan's evidence and the academic papers, and Mr Rendle accepted under cross-examination when taken to his own academic papers (although he had not addressed this point in his written report) that such a delay was not good practice and would only be permissible in practice for reasons of cost which were not a relevant consideration in this case.
120. For the reasons set out above, I find that on the balance of probabilities, Dr Portal was negligent and in breach of her duty of care to SD in applying the long tight bandage to SD on the morning of Saturday 22 February 2020.

Causation

121. The parties are agreed that in relation to the issues to be determined in relation to causation, as set out in paragraph 59 above, the questions must be answered on the balance of probabilities, on a hypothetical basis.
122. Both parties are also in agreement that this is a case in which the appropriate approach is to apply the standard "but for" test, in other words, would the injury or loss have been suffered but for Dr Portal's breach of duty? Another way of expressing this test is to ask whether the Claimant has established that SD's subsequent deterioration and euthanising would not have occurred in any event. If, on the balance of probabilities, it would, then causation is not established.
123. In relation to this issue, I have carefully considered all the available factual and expert evidence and the supporting literature. Before turning to the different opinions held by the experts in this case, I will summarise the agreed matters in relation to antimicrobial resistance.

Antimicrobial Resistance

124. Infections such as cellulitis and focal peritarsal infection are caused by the presence of bacterial organisms in the body. The most common treatment for such infections is the administration of antibiotic treatment, which is also described in the literature and by the experts as antimicrobial treatment. For all purposes relevant to this judgment, the two terms are interchangeable. Some bacteria can be resistant to such treatment which means that the antimicrobial agent is not effective to either inhibit replication of the bacteria or to kill it. It is recognised that such antimicrobial resistance is a growing issue on a global scale.

125. As I have noted above, one of the most common infecting organisms for peritarsal cellulitis is Staph A and it is noted in various papers that antimicrobial resistance amongst this type of organism is quite common. Resistance can be a result of a number of different genetic changes and it is also recognised that the use of antimicrobial treatment can itself result in the development of more resistant bacteria.
126. Resistance is measured using specific culturing techniques and there are international standards governing the definitions of susceptibility and resistance, including the European EUCAST [9] and American CLSI [6] standards to which I have been referred and which are referred to by both the microbiology experts.
127. The European Committee on Antimicrobial Susceptibility Testing (EUCAST) [9] standards in place since 2019 are now as follows:

“S – “susceptible, standard dosing regime”: a microorganism is categorised as this when “there is a high likelihood of therapeutic success using a standard dosing regimen of the agent.””

I – “susceptible to increased exposure*” - a microorganism is categorised as this when there is a high likelihood of therapeutic success because exposure to the agent is increased by adjusting the dosing regimen or by its concentration at the site of infection

R –“resistant” - a microorganism is categorised as this when there is a high likelihood of therapeutic failure even when there is increased exposure.

*Exposure for these purposes is a function of how the mode of administration, dose, dosing interval, infusion time, as well as distribution and excretion of the antimicrobial agent will influence the infecting organism at the site of infection.

128. Although the CLSI standard [6] is expressed in slightly different terms, I understand from the experts that the intention is for the categories to be broadly equivalent across the EU and US. The correct definition of resistant in the CLSI standard (which was misstated by Mr Gibbons in his report) is as follows:

“Resistant” strains are not inhibited by the usually achievable concentrations of the agent with normal dosage schedules and/or fall in the range where specific microbial resistant mechanisms are likely (eg beta-lactamases), and clinical outcome has not been predictable in effectiveness studies.”

129. The term “Minimal inhibitory concentration” (MIC) refers to the lowest concentration of an antimicrobial agent that prevents visible growth of a microorganism in an agar or broth dilution susceptibility test. The MIC value is then compared to the interpretive criteria published by the internationally recognized bodies described above.
130. A bacterium which is resistant to more than one antimicrobial is described as multi-drug resistant or MDR. It is common ground that vets are bound to have regard to relevant guidance in relation to antimicrobial stewardship in reaching decisions about

the use and choice of antibiotics for veterinary treatment. In light of the Defendants' recent admission in relation to the delay in commencing antibiotic treatment and the experts' agreement about the reasonableness of the initial choices of antibiotics by Dr Portal, no specific reliance is now placed on this guidance by the Defendants.

131. It was also common ground that bacterial susceptibility and resistance do not guarantee treatment success or failure respectively. This principle was summarised by Mr Gibbons in his report in the following terms, and confirmed in similar terms by the other experts in their evidence:

“It should be noted that any antimicrobial designated as sensitive on susceptibility testing does not guarantee a successful outcome to treatment as other patient and drug factors may lead to treatment failure...

Similarly infection with a resistant bacterium does not guarantee treatment failure but such failure is considered far more likely to occur, hence, clinicians are advised not to select for treatment antimicrobials against which the bacterium is designated as resistant. “

132. The interplay between antimicrobial resistance and outcomes is at the heart of the dispute over causation in this case.

Analysis of sample

133. Samples for antimicrobial testing can be taken in a number of different ways and can be tested using different types of machines, resulting in different levels of accuracy and reliability. Prior to the hearing there was an issue between the parties as to the accuracy of the testing undertaken in this case, arising out of Professor Holmes' initial report. That issue was resolved at the joint meeting with Mr Gibbons, during which Professor Holmes accepted that he had overlooked key evidence from Liphook Hospital about how the sample was taken.
134. It is now accepted by both parties that:
- i) A sample of bacteria was taken from SD by Liphook Hospital on 27 February 2020 using a sterile needle.
 - ii) The sample was cultured and the results analysed using a Vitek machine. The Vitek machine could provide S, I or R results and the results provided were determined by the machine in accordance with the internationally recognised standards set out above.
 - iii) A heavy growth of Staph A was isolated which was 'resistant' to penicillin, gentamicin and tetracycline (which includes oxytetracycline) but was susceptible to some other antimicrobials including ceftiofur and enrofloxacin.
 - iv) On the balance of probabilities, the Staph A bacteria isolated in the sample was the same type of bacteria which was responsible for the initial infection in SD's

hock and the resistance pattern of that organism was unlikely to have changed over the duration of the infection.

- v) The use of ceftiofur or enrofloxacin in the early stages of the infection would be likely to have led to a successful resolution of the infection but could not be guaranteed.

135. The question for the court is the meaning and significant of those results in terms of causation having regard to all the other factual and expert evidence.

Question 1 – would SD have survived ?

136. In light of my finding in relation to bandaging, both parties agree that the hypothetical question I have to answer is whether SD would have survived if antibiotic treatment, with penicillin and gentamicin initially, had been commenced on Saturday morning, and his leg had not been bandaged?

Forced walking

137. In this case, a decision has been taken by the Claimant not to include an allegation of negligence and breach of duty relating to forced walking. It follows, as submitted by the Defendants, that I cannot take the potential benefits of earlier forced walking into account when considering the ‘but for’ scenario required to reach a decision in relation to the likely outcome. It is therefore necessary to scrutinise the evidence of the Claimant’s experts very carefully and ensure that I am careful to disregard the possible benefits which would have arisen if SD had been forced to walk regularly from Saturday morning onwards.

Alternative antibiotics and later treatment

138. It was common ground between the experts that had SD been treated with Ceftiofur or Enrofloxacin (to which the Staph A bacteria were susceptible), he probably would have survived. But again no breach of duty was alleged in relation to this point as the Claimant accepted that the initial two choices of antibiotic treatment used by Dr Portal were reasonable in the absence of the results of the bacteria culture. It was also agreed that as no criticism has been made about the treatment at Liphook Hospital, I should approach the issue of causation on the basis that the same approach to the treatment there, including their choice of antibiotics, would have occurred in any event.
139. In relation to the issue of causation, I heard written and oral evidence from Mr Ramzan and Professor Holmes for the Claimant and Mr Rendle and Mr Gibbons for the Defendants and I was presented with the relevant academic literature relied on by each expert.

Claimant’s evidence on causation

140. The Claimant sought to establish that if SD had been given penicillin and gentamicin on the morning of Saturday 22 February 2020 and his leg had not been bandaged, then he would have survived, despite the bacteria responsible for that infection being resistant to those antibiotics.

141. In relation to this issue, the Claimant placed a significant degree of reliance on the literature relating to FPI cases, namely the *Pilsworth* [11] and *Kalka* [15] papers which showed a very high recovery rate in such FPI cases. In the *Pilsworth* study in 2001, all 10 horses who were treated for FPI made a full recovery to their previous athletic function and in the *Kalka* study in 2021 which involved 7 horses with FPI and long digital extensor tendon sheath (LoDETS), 5 horses survived and 4 horses returned to racing. Reliance was also placed on the *Cooper* study from 2020 [7] which involved 8 horses with limb cellulitis and other conditions who were treated in hospital. All the horses survived to discharge and four returned to their previous athletic function.
142. The Claimant submitted that the significant difference between all those horses which survived and SD, was the presence of the compression bandage and the likely impact that it had on the course of the disease. I note however, and it was accepted by the Claimant's experts, that in the *Pilsworth* and *Kalka* papers there is no information about the resistance of the bacteria, and the antibiotics used in the treatment of many these horses included Ceftiofur and Enrofloxacin. I also note that in the *Pilsworth* paper it states "*All of the horses were encouraged to walk repeatedly during the day, preferably on a horse walker, and spend as little time as possible standing still*" and a similar walking regime was reported for all the horses in the *Kalka* paper. In the *Cooper* paper, which did not concern a cohort of horses with FPI, all the horses were infected with Staph A and there is information in the paper about resistance, including multi-drug resistance, but it is noticeable that none of the horses had been solely treated with antibiotics to which the bacteria were found to be resistant on sampling and they had all been bandaged. It follows that the treatment regimes in these papers were not comparable to the 'but for' scenario in this case.
143. In addition to the literature, Mr Ramzan also relied on the empirical evidence arising out of his own clinical practice and experience as a front-line equine vet treating thoroughbred racehorses like SD. His evidence was that he had treated about 4-6 cases of FPI a year over the last 25 years and he estimated that a proportion of those infections, in the region of 30-40 cases, would be due to resistant Staph A and in each case the horses had survived. However, he again accepted that there had been no bacterial testing in those cases and so he was unable to confirm what percentage of those cases involved MDR infections. Furthermore, his own treatment regime for FPI always involved early forced walking.
144. In his written report, Mr Ramzan stated that the fatality rate of FPI with appropriate management was likely to be low and that it was reasonable to estimate it as being below 0.5% based on his clinical experience and that of his colleagues and the relevant reported case studies in the literature.
145. In his report he made clear that "*this is a condition in which it is important to act fast*" and that it is common for antibiotic treatment to be commenced without any determination of the sensitivity or resistance patterns of the bacterial pathogens. He rejected the suggestion made by the Defendants that the MDR nature of the bacteria in this case, and its apparent virulence, effectively pre-determined the outcome in this case. It was put to him in cross-examination that the case had progressed with unusual rapidity and my note of his reply is as follows:

"It did move with amazing rapidity but that was in my view because everything that could have been done to assist

colonisation of the limb was done. In other words, no antibiotics, no movement and bandaging. And all the preventative measures which could have been done to limit colonisation were not taken. This created a hothouse for bacterial infection. This is why the initial 24 to 48 hours are very important,”

146. I note that in his written report, in a section addressing the issue of breach of duty relating to bandaging, Mr Ramzan, stated: “ *I make no judgement as to whether the application of the bandage made a material difference to the outcome of this case, however I consider it a serious breach of duty of care for such a bandage to have been applied to a limb that was demonstrating a rapidly developing soft tissue swelling and particularly without a plan to remove the bandage to check the health of the underlying structures within 24 hours*”
147. This wording was contrasted by Mr Lawrence with the language used by Mr Ramzan in the joint statement in which he stated “ *..the effect of bandaging, combined with the restricted exercise that was both advised by Dr Portal and necessitated by the application of the bandage, is likely to have led to the severe generalised cellulitis/lymphangitis and ultimately poor outcome in this case.*”
148. When questioned about this discrepancy in cross-examination, Mr Ramzan said in relation to the comment in his report:

“Reading that line I can only assume that the phrasing was in relation to the relative contribution of all the factors...the relative contribution of the bandaging. I have always considered it to be a serious breach of duty.”

This response accords with the concluding paragraph of his report, in which he stated that “*the individual contribution of each of the various actions/inactions (ie the delayed commencement of appropriate medical therapy and exercise; the application of the bandage) in the current case cannot be determined..*”

149. The main difficulty I face in considering Mr Ramzan’s evidence in relation to causation, is that I can only consider how SD would have progressed had the specific breaches of duty I have found proved not occurred, and not include any benefit that may have arisen if forced walking had been commenced on Saturday morning. In his written report, in a section in which he commented on a statement in the Defence to the effect that the outcome for SD would have been the same, even if antibiotic treatment had been commenced on 22 February and regardless of whether or not the leg was bandaged, Mr Ramzan stated “ *I strongly disagree and reiterate that with appropriate and timely veterinary intervention (antibiotic medication and ample forced exercise) in similar cases it would be reasonable to expect full resolution of the infection and return to full athletic use;*” Similarly, he said elsewhere in the report in relation to the delay in relation to forced walking: “*The longer a horse with this condition remains immobilised the greater the likelihood of serious morbidity, prolonged course of the disease and poorer final outcome*” and “*it is my view that confinement of the horse and failure to commence forced exercise at an early stage was just as crucial an omission in Dr Portal’s management of the case*” and “*Administration of antibiotics alone (regardless of antibiotic choice) without exercise can be expected to result in unsatisfactory clinical progress in most cases*”.

150. Mr Ramzan’s reasoning for this opinion was also set out clearly in his report when he stated “ *If commencement of medical treatment and forced exercise is delayed (or insufficient) cases of peritarsal infection can deteriorate rapidly both in terms of clinical severity and outcome. Ample empirical evidence supports early, forced exercise as being fundamental to successfully preventing a profound lymphangitis affecting the entire limb, presumably due to assisted lymphatic drainage and circulation. Administration of antibiotic and anti-inflammatory therapy alone without forced and regular exercise typically results in greater and poor outcomes. Once generalised lymphangitis/cellulitis of the limb (distal & proximal) is manifested, it may still be possible to eliminate the infectious component of the disease however returning the leg to normal dimensions may not be possible due to permanent impairment of lymphatic drainage (which can also make such cases more susceptible to future recurrent infections).* “
151. Under cross-examination, Mr Ramzan was asked whether an unsatisfactory outcome might still have occurred, even if Dr Portal had administered broad spectrum antibiotics to SD on Saturday morning without forced exercise. My note of his reply is as follows:
- “Exercise assists the limb to not swell up and not develop into generalised cellulitis – otherwise you are creating a high protein soup which bacteria love to multiply in. You are increasing the chance of a poor outcome, even if you apply antibiotics early in the disease process. You would see more swelling than if the horse is exercised. It will take longer for the limb to return to normal size,”*
152. Although to be fair to Mr Ramzan, he consistently made clear his own view that the application of a bandage would necessarily have restricted any walking, I do not consider it is appropriate for me to equate the presence of the bandage with the absence of any forced walking. No breach of duty has been pleaded in relation to forced walking and the Defendants’ experts have not been asked about it.
153. It follows, that whilst I accept Mr Ramzan as a reliable and objective expert witness on whose evidence I am prepared to rely, it does not provide me with a sufficient basis for reaching the conclusion on causation that the Claimant seeks to establish. At its highest, Mr Ramzan’s empirical evidence as a very experienced first-opinion vet, is that had SD been treated by Saturday 22 February with the full trio of appropriate treatment for FPI espoused by Mr Ramzan and supported by the literature, of antibiotics, anti-inflammatories and forced walking, then irrespective of the antimicrobial resistance of the bacteria, SD would probably have survived and made a full recovery. It does not assist me with what the probable outcome for SD would have been, if the antibiotics had been commenced earlier but had not been accompanied by the forced walking to assist lymphatic drainage and circulation, so strongly advocated by Mr Ramzan.
154. I should also mention the additional evidence produced by Mr Ramzan in his second witness statement. This was an internal review compiled by one of his research colleagues of bacterial samples submitted to his laboratory for culturing. In 15 cases, Staph A was isolated which was resistant to the same three drugs as in SD’s case (penicillin, gentamicin and oxytetracycline). The report indicated that all 15 horses had survived beyond that initial infection but provided no other information about the nature of the infection or treatment. Further details provided later indicated that only one of

the cases involved cellulitis and that in most cases the horses had been treated with antibiotics to which they were not resistant. Mr Ramzan sought to rely on it in support of his contention that the presence of MDR Staph A as a primary pathogen in a clinical case does not pre-determine a poor outcome in that case. He fairly conceded in cross-examination that the cases did not concern FPI and were not directly comparable to the present case.

155. Given that it was common ground that bacterial susceptibility and resistance do not guarantee treatment success or failure respectively (see paragraph 131 above) I consider that the additional evidence provided by Mr Ramzan did no more than illustrate this general point by way of empirical evidence. It did not provide any further assistance as to the likely course of SD's condition.
156. The other expert evidence relied on by the Claimant was that of Professor Holmes. As I have already stated, Professor Holmes accepted that he had made some very significant errors in preparing his evidence. For the reasons I have already outlined, I have treated the evidence of Professor Holmes with some caution, but there were some parts of his evidence which were not challenged and were supported by other evidence. In particular, he provided a clear description of the nature and progress of an FPI infection in his written report:

“ FPI is an infection of the tissue under the skin adjacent to the hock, but not involving the actual joint itself....The severity of the pain in this condition is not due to severe tissue damage, it is caused by localised pressure on a nerve (in just the way the pain of tooth ache can be disproportionate to the amount of infection in the tooth). It is important to understand that the infection causes the horse extreme, almost overwhelming, pain and as a consequence the horse is very reluctant to move and will want to rest the affected leg. Once drainage is achieved, by getting the horse moving, and the underlying cause of the swelling addressed with antibiotics, the pain dissipates quickly and no permanent damage results.”

157. In his oral evidence, he expanded on this description. He described how FPI is an infection in a particular anatomical location where the lymphatics or small vessels/capillaries are trapped between a nerve and a tendon. At the onset of the infection a tiny number of bacteria lodge there and cause inflammation and swelling which pinches the nerve. The clinical signs are exaggerated, so even a tiny number of bacteria can lead to pain. In his opinion the number of bacteria in the early stages of FPI are only in their thousands, not the millions normally needed to generate a response in the laboratory, so this is why he would expect the immune system to be able to deal with it. He would expect the bacteria to drain into the lymphatic system.
158. This description of microbiological process occurring in the disease course of FPI was not challenged by Mr Gibbons and I accept it. It does not however lead me to the conclusion contended for by the Claimant, namely that the determining factor in SD's survival was not the MDR resistant bacteria, nor the absence of forced walking, but the presence of the bandage. Rather, his evidence indicates, in the same way as that of Mr Ramzan, that the key determinant of early resolution of FPI is active movement to ensure lymphatic drainage.

159. I note that Professor Holmes' evidence has evolved in relation to this issue. In his written report, Professor Holmes stated his opinion : “ *In this disease, early antibiotic treatment combined with forced exercise (and analgesia) is required to achieve a successful outcome*”. In response to the likely outcome of antibiotics being commenced on Saturday morning, he said “ *I still consider that if antibiotics had been administered at anytime on day 2 with forced exercise, I estimate the probability is 60 - 80% that he would have had the same outcome as if the correct treatment had been started the previous evening*”
160. He only included one line in his report about the impact of bandaging, without any explanation for his conclusion, which was as follows:
- “The use of firm bandaging was inappropriate and not justified clinically. The application of the bandage accelerated the deterioration of the patient’s condition.”*
161. In relation to the key issue of antimicrobial resistance, I note Professor Holmes' opinion, based on the empirical evidence from his own and colleagues' clinical experience that in up to 10% of cases 'resistant' bacteria had responded in practice to the 'wrong' antibiotic. He went on to state that he thought that if SD had been treated with penicillin and gentamicin on Saturday morning, the treatment “ *is likely to have been successful (ie > 50% chance of cure) and highly likely if it had been combined with forced exercise*” but he did not provide any reasoning for this conclusion.
162. In the joint statement, by when Professor Holmes had accepted his error in relation to the Liphook bacterial sample, he sought to explain why the antibiotics would still have been effective if given on Saturday morning. He relied on a number of new points relating to the nature of bacterial resistance, including the impact of combined use or combination therapy, which he later accepted was not of direct relevance during his oral evidence. He concluded by expressing the opinion that there was a high chance (probably greater than 80%) that SD would have responded to antibiotic therapy on Saturday morning. When challenged about this change in his evidence about the percentage chance of SD's recovery, Professor Holmes was unable to provide a satisfactory explanation. I also note that during his cross-examination, when providing a possible explanation for SD's rapid deterioration he said “*Lack of movement stops blood and capillaries moving.*”
163. In the joint statement and in his oral evidence, Professor Holmes, sought to place much greater significance on the potential impact of the bandaging rather than forced walking than in his original written report and provided additional evidence about its potential impact on SD's lymphatic and immune system. Given the errors in his evidence, I treat this change of emphasis with some caution. He also sought to place a significant degree of reliance on a case described in the *Pilsworth* paper [15] which was not included in the main study, although this case was not mentioned in his written report. He stated that the horse had been left untreated for 48 hours and when it was brought to the vet's attention it was given antibiotics and was forcibly walked. Although this horse was eventually euthanised, it was because it had been standing on the other leg leading to a lack of circulation in the other limb and had developed laminitis. Professor Holmes expressed his opinion that the “*the one difference is the bandage, so if that horse had been bandaged then the outcome would have been the same as SD*”. This evidence appeared to be based on a non-sequitur, not least because there is no information in the

Pilsworth paper about the resistance of the bacteria, so it is simply not possible to conclude that the ‘one difference’ was the bandage. Rather, it left me with the distinct impression that Professor Holmes was trying to work backwards from SD’s fatal outcome to a possible explanation for it based on his criticism of Dr Portal’s treatment choices, rather than approaching this issue of causation objectively by the application of accepted microbiological principles.

Defendants’ evidence on causation

164. In response Mr Rendle and Mr Gibbons both relied entirely on one point, namely that as the bacteria causing SD’s infection were resistant to the three antibiotics which should have been administered earlier, the overall outcome would have been the same, whether or not a bandage was applied. They discounted the significance of the literature about survival rates in the FPI case studies, namely the *Pilsworth* [15] and *Kalka* [11] papers on the basis that neither of those papers involved cohorts with known MDR bacteria. For the reasons I have already outlined, I do not place much reliance on the evidence of Mr Rendle in this respect.
165. The evidence of Mr Gibbons in relation to antimicrobial resistance was clear and balanced. He accepted in both his report and the joint statement that infections caused by resistant bacteria may well improve following treatment with an antimicrobial to which they are resistant, but that it is likely that this successful outcome results from the activity of the host immune system, not from the antimicrobial treatment.
166. In this case, his opinion was that it was highly unlikely that the commencement of antimicrobial therapy on Saturday 22nd February would have been effective in controlling this infection because of the clear evidence that the bacteria present were resistant to penicillin and gentamicin. He set out his opinion in the joint statement, which was based on the definitions of resistance in CLSI and EUCAST as meaning that “*there is a high likelihood of therapeutic failure*”.
167. It is right to note, as was explored with him in cross-examination that he used the phrase “very unlikely” at some points in his report but in his final conclusion he says “unlikely”. He was challenged during cross-examination as to why he had not expressed the opinion in his report ‘on the balance of probabilities’. He apologised and clarified that in each case, he understood that ‘likely’ meant greater than 50% and ‘highly unlikely’ meant more than 70%.
168. As I have already noted, Mr Gibbons accepted during cross-examination that he had mis-stated the CLSI definition. Mr Mylonas questioned him at length about the possible impact of this mistake on his evidence and the Claimant’s closing submissions relied heavily on the contention that this mistake fundamentally undermined his evidence. During the trial, Mr Mylonas produced what he contended was a correct version of the CLSI test which he put to Mr Gibbons. Unfortunately, as I pointed out during the trial, that version was also incorrect. The correct version of the test, taken from the CLSI standard in the bundle, is set out at paragraph 128 above. If I have understood his questions to Mr Gibbons and his submissions correctly, Mr Mylonas sought to suggest that Mr Gibbons had incorrectly conflated ‘higher likelihood’ of success or failure with such success or failure being ‘highly likely’ and that the language in the corrected version of the CLSI test suggested that the results R and S were only

defined in relative terms to each other and could not form the basis for a conclusion on the balance of probabilities.

169. In support of his contention, Mr Mylonas placed reliance on a 2013 paper by Mark Papich (who was then Chair of the Veterinary Antimicrobial Susceptibility Testing Committee (VAST)) in which he referred to the phrase “greater likelihood”. I note that none of these criticisms of Mr Gibbons’ report were addressed by Professor Holmes in his expert evidence and that the Papich paper predates the latest CLSI and EUCAST standards on which Mr Gibbons relied. I do not accept the Claimant’s submission. Throughout his report, Mr Gibbons refers to both the EUCAST and the CLSI definitions and it was the EUCAST definition which he expressly quoted in the joint statement as noted above. I have already commented on the inexperience shown by all the expert witnesses in this case, and I accept that it would have been better if Mr Gibbons had used more familiar expert terminology in expressing his conclusions. However, it seems plain to me that if bacteria is categorised via a properly calibrated machine against an internationally recognised criteria as being resistant to a particular antibiotic, which is defined in EUCAST [9] as “when there is a high likelihood of therapeutic failure” then it was reasonable for Mr Gibbons to express the opinion that it is highly unlikely that the same bacteria will be successfully treated by that antibiotic whenever treatment was commenced. That is of course not the same question as whether the patient (or horse) will nevertheless recover from a particular condition, as that may depend on other factors, as discussed above.
170. Professor Holmes and Mr Gibbons were also asked questions about the “90-60 rule”, which was mentioned in the *Papich* paper [13] and referenced in a US paper called *Doern and Brecher* (2011) [8] first produced by Mr Mylonas on the fourth day of the trial. I have looked at that paper and I note, as Mr Gibbons explained during his cross-examination, that it was not a scientific paper but the output of a one-day scientific meeting of the American Society for Microbiology in 2011. The broad effect of the paper was that it is not an academic ‘rule’ clearly established by academic research but more of a short-hand term used in the clinical microbiology world to summarise the limitations of testing for anti-microbial resistance. At its simplest, the rule states that in 90% of cases there will be a favourable therapeutic response when a patient is treated with antibiotics to which the relevant bacteria proved to be susceptible and in 60% of cases in which a patient is treated with antibiotics to which the relevant bacteria proved to be resistant, there will be a favourable therapeutic response.
171. I note that in the *Papich* paper [13] the author states that in veterinary medicine there is no data to confirm or challenge the 90-60 rule. I also note that neither of the microbiology experts in this case considered this so called ‘rule’ to be of sufficient relevance or weight to include any direct reference to it in their written reports. Given the very broad spectrum of human cases from which the underlying statistics were derived and the age of the report which pre-dates the most recent EUCAST and CLSI standards, I do not regard this rule as providing me with any more assistance in this case than the general principles already set out in the reports of Professor Holmes and Mr Gibbons. I also note that both microbiology experts agreed that in the cases where the patient recovers, it is most commonly as a result of the patient’s own immune system managing to deal with the bacteria, rather than the antibiotic eliminating the ‘resistant’ bacteria.

172. In relation to the evidence of the microbiologists, I accept the evidence of Mr Gibbons that the proper conclusion to be drawn from the results of bacterial testing was that, on the balance of probabilities, the antibiotics chosen by Dr Portal would not be effective to eliminate the bacterial infection suffered by SD even if they had been administered earlier. This conclusion is further supported by the factual evidence that SD did not show any sign of improvement after treatment with the chosen antibiotics had commenced. Any possible recovery would therefore have to rely solely on SD's own defences and I accept the evidence of Mr Gibbons that it is apparent from the fatal outcome in this case that SD's lymphatic and immune system were not able to eliminate the bacteria.
173. The final strand of the Defendants' argument on causation was that SD was infected with a particularly virulent strain of bacteria which spread more quickly than would normally be seen in a case of FPI and resulted in severe septic cellulitis. I do not accept that any reliance can be placed on the discharge report from Liphook Hospital in which comment is made about the unusual and extreme nature of SD's condition. As I have found above, it is now apparent that the referral information provided by Dr Portal was incorrect and misleading, so the hospital's assessment of the nature and speed of SD's deterioration is unlikely to be reliable. I do accept however, as did all the experts in this case, that SD's deterioration was rapid and very different from the course of the disease seen in the reported FPI cases.
174. I also accept the written evidence of the Claimant's experts, that the bacteria in SD's leg were left to spread and develop into more generalised cellulitis due to the absence of either effective antibiotics or any forced walking during the first two days whilst SD remained in his stable. I also accept the original written evidence of Mr Ramzan and Professor Holmes, which was not challenged by Mr Gibbons as he considered that it fell outside his area of expertise, that this spread of the bacteria was accelerated by, and remained undetected for longer due to, the presence of the bandage applied by Dr Portal. As Mr Ramzan stated in his evidence, this combination of factors, together with its multi-drug resistance, led to the apparent 'virulence' of this bacteria.

Conclusions on causation

175. Having considered all the factual and expert evidence and my findings set out above, I have reached the following conclusions on the issue of causation, on the balance of probabilities:
- i) SD was a horse with no pre-existing health or immunity issues which had been performing at a competitive level prior to being rested for the winter. The nature of SD's infection was a specific type of bacterial cellulitis, now agreed by both experts to be focal peritarsal infection. The cause is unknown but may have been linked to the sarcoid removal from the same leg a few weeks earlier.
 - ii) At the time of Dr Portal's breaches of duty on Saturday 22 February 2020, SD was suffering from FPI, not generalised cellulitis.
 - iii) The antibiotics penicillin and gentamycin would not have been effective in eliminating the bacteria causing the infection in SD's leg if administered on Saturday 22 February 2020, on the basis of both the expert evidence of Mr Gibbons about the antimicrobial resistance of the bacteria, and the factual

evidence that they were not in fact effective in reducing the infection in SD's leg when they were administered on Sunday night and the bandage had been removed.

- iv) There were only three ways in which the FPI could have been effectively treated on Saturday 22 February leading, on the balance of probabilities, to SD's recovery from this infection:
 - (a) the administration of antibiotics to which the bacteria were susceptible, such as ceftiofur or enrofloxacin (as agreed by both parties' microbiological experts)
 - (b) an immediate and rigorous forced walking regime to activate SD's own lymphatic drainage system through movement and allow it to clear itself of the small number of bacteria present at the outset of this type of FPI infection, irrespective of the effectiveness of the antibiotics (as advocated by Mr Ramzan and Professor Holmes and recorded in the *Pilsworth* [15] and *Kalka* [11] papers.)
 - (c) a combination of (a) and (b)
- v) If FPI is not identified and treated immediately using the effective treatment regime outlined above, then both parties' expert evidence indicates that the bacteria will start to spread and develop into more generalised cellulitis, irrespective of the presence of a bandage, and that the only effective treatment is then with antibiotics to which the bacteria are susceptible.
- vi) The presence of a bandage during the initial 38 hour period did contribute to the 'colonisation' effect described by Mr Ramzan and it was likely to have accelerated the speed of that spread of the infection and the development of the more generalised cellulitis. I also accept that the bandaging did delay the discovery of the increased swelling.
- vii) However, even taking the Claimant's expert evidence at its highest, I am not satisfied on the balance of probabilities that the absence of a bandage would have prevented the spread of the bacteria and the development of generalised cellulitis during that initial 38 hour period, in the absence of any early forced walking or effective antibiotic treatment.
- viii) All the experts agreed that it would be reasonable for a vet to allow 48 hours after the commencement of antibiotic treatment to determine if the treatment had been effective.

176. It follows that the probable course in the 'but for' scenario that I must consider is that in the absence of any forced walking, or effective antibiotics and without a bandage present, there would have been a gradual increase in swelling throughout SD's leg over the weekend, leading to the realisation by Dr Portal that the bacteria were not responding to the chosen antibiotics within 48 hours, by the morning of Monday 24 February. Then there would have been a change of antibiotics to Dr Portal's second choice of oxytetracycline (which is not criticised) to which the bacteria were also resistant, for another period of 48 hours. Thereafter, it must be assumed that Dr Portal would have sought external advice and SD would then have been admitted to hospital

by Wednesday 26 February and sample testing undertaken which would have taken 3 days to culture. By then, as I am asked to assume that neither ceftiofur nor enrofloxacin would have been used at any stage at Liphook hospital, the disease would have followed the same course, and it would have been too late to successfully treat SD.

177. Overall, for all the reasons set out above, I am not satisfied on the balance of probabilities that if SD had been treated with the same antibiotics on the morning of Saturday 22 February and his leg had not been bandaged, he would have survived.

Question 2 - if SD had survived, would he have returned to his pre-infection performance?

178. In light of my conclusions on question 1, question 2 does not remain a live issue, but I will deal with it briefly for completeness as it would have an impact on the quantum of this claim.

179. Even if I had been satisfied on the balance of probabilities that SD would have survived, then I would still have concluded on the balance of probabilities that SD would not have returned to his pre-infection performance. I would have reached this conclusion based on the evidence of Mr Ramzan and Professor Holmes that in any case (irrespective of antimicrobial resistance) where forced exercise is delayed or insufficient, then the infection can deteriorate in terms of severity and outcome. In this case, I consider that SD's period of treatment was likely to have been prolonged due to the development of diffuse swelling and the presence of the MDR bacteria in any event. Even if SD had survived and eventually made a full recovery from the infection in his right leg, after such a prolonged period of generalised cellulitis, the academic literature indicates that it is probable that the contour of his limb would have been unlikely to return to normal and he would have remained at risk of recurrence of cellulitis. On the balance of probabilities, I would have found that SD would have been able to pass a veterinary examination and return to racing but would not have returned to his pre-infection performance due to these longer-term vulnerabilities.

180. This alternative finding is relevant to the assessment of quantum in this case to which I will now turn.

Quantum

181. In light of my conclusions on causation, quantum does not remain a live issue, but I will deal with it briefly for completeness on the basis of my conclusion on question 2.

182. The claimant had three heads of claim:

- i) The value of SD as at the date of loss, namely 28 February 2020
- ii) The LEH costs of treatment between 26 and 28 February 2020
- iii) Disposal costs
- iv) Interest

183. It was agreed by the parties that the assessment of the Claimant's loss should be based on a replacement value for SD in February 2020. It was also agreed that as SD was a

gelding and had no alternative stud value, his value was entirely dependent on his previous and future racing form.

184. The Claimant initially set the value of SD in the Schedule of Loss at £325,000 based on a potential sale price for SD in the Hong Kong market. This was reduced to a suggested value of £200,000 during the hearing, based on the evidence of the Claimant's lay witness Mr Gibson and valuation expert Mr McKeever.
185. The defendant proposed a value for SD of £45,000 based on the evidence of their valuation expert Mr Stratton about the sale prices of similar horses at horse auctions in the UK in 2020.
186. I heard oral evidence from Mr Gibson via video link from Hong Kong, Mr McKeever via video link from Australia and from Mr Stratton in person. I found all of them to be straightforward witnesses who each provided reliable evidence based on their different areas of expertise and factual assumptions.
187. In short, the key point in issue between the parties was whether SD should be valued based on a possible sale to Hong Kong or on the basis of a sale in the UK. If a Hong Kong sale price was appropriate, then it was accepted by both parties it was likely to be a six-figure sum.
188. If such a sale was no longer a viable option as at February 2020, then the Claimant accepted that the figures provided by Defendant's expert, Mr Stratton could provide some assistance to the court.
189. It was accepted by Mr Crate in his oral evidence that he had no intention of selling SD to Hong Kong and intended to keep him to race in the UK. Mr Gibson's evidence was that he had approached Mr Crate immediately after SD's win in his final race in September 2019 about a possible sale, but that Mr Crate had made clear he did not want to sell SD and that Mr Gibson had not indicated a possible purchase price. Mr Gibson's evidence was that at that time he would have been prepared to offer up to £350,000 for SD which was "over the market price" in order to persuade Mr Crate to sell but that by February 2020 any offer would have been reduced to around £175,000 to £200,000 due to SD's long absence from racing. Mr McKeever, who has many years' experience of selling racehorses to Hong Kong, estimated a sale price of £200,000-£220,000 if SD was to be sold on that market. It was also agreed by both witnesses that before being sold to Hong Kong, SD would have to pass a veterinary test and have shown a full recovery from his infection and a return to full form within a short time following the winter break.
190. On the basis of Mr Crate's evidence and my alternative findings above about SD's longer recovery time and likely vulnerability to future recurrence, I do not consider that it would be appropriate for SD's replacement value in February 2020 to be assessed on the basis of a sale to Hong Kong.
191. I do however accept that SD would have retained his official handicap rating of 79 in February 2020, which exceeded the minimum level needed for a Hong Kong sale, so that this should be taken into account in looking at the comparable auction sales figures provided by Mr Stratton, which were not challenged. I consider that the appropriate figure for a fully fit SD would have been nearer the top of the range of sale prices for

that handicap rating, in the region of £70,000. Applying some reduction in that value to reflect the possible impact on SD's racing performance of a recurrence of cellulitis, in all the circumstances, I would have assessed the replacement value of SD in February 2020 in the sum of £ 50,000.

192. I would have rejected the claim of £3,361.00 in relation to the Liphook treatment as I consider that on the balance of probabilities, in the light of the MDR nature of the bacteria, a period of hospital treatment would have been needed in any event to ensure a full recovery.
193. The claim for the disposal costs was not challenged and would have been awarded in the sum claimed of £300.00, and interest would have been awarded.

Conclusion

194. The Claimant has established breach of duty but not causation of the losses suffered, so the claim must fail.

Note to Counsel

A hearing has been listed on 11 May 2023 (the earliest available date convenient to both parties) to hear submissions in relation to costs, including the Claimant's claim for indemnity costs arising out of the Defendant's late amendment application allowed on the first day of the trial, unless all matters of costs are agreed by the parties in a consent order submitted to the court prior to that date.

Annexe -Literature Summary

(1) Adam and Southwood (2006) [LB2/439-465]¹

Emma N Adam and Louise L Southwood – Surgical and Traumatic Wound Infections, Cellulitis and Myositis in Horses

US paper published in the Journal of the American Veterinary Medical Association. Academic paper on the diagnosis and management of surgical and traumatic wound infections, cellulitis and myositis in horses, produced in the University of Pennsylvania. The authors reference 82 published papers.

(2) Adam and Southwood (2007) [LB2/466-473]²

Emma N Adam and Louise Southwood – Primary and secondary limb cellulitis in horses: 44 cases (2000-2006)

US paper. Retrospective case series of 44 horses with limb cellulitis (24 primary cellulitis and 20 secondary cellulitis). Cases were selected by reviewing medical records of horses admitted to the University of Pennsylvania Teaching Hospital with acute limb swelling between January 2000 and October 2006. Cases were selected for inclusion if the horse was more than 6 months old and had clinical signs of limb cellulitis. Long-term follow-up information was obtained by way of a telephone survey.

(3) Blackman (2020) [LB2 378-387]

A L Blackman et al – Updates on Combination Therapy for Methicillin-Resistant Staphylococcus aureus Bacteremia ”

US academic paper referencing/reviewing 64 published papers on combination therapies.

(4) Braid and Ireland (2021) [LB2 480-490]

HR Braid and JL Ireland – A cross-sectional survey of the diagnosis and treatment of distal limb cellulitis in horses by veterinary surgeons in the United Kingdom

UK paper. The Claimant and the Court have not seen the questionnaire upon which the survey was based. Cross sectional survey, with data collected by way of an online questionnaires distributed via email and social media veterinary groups over a 12-week period (December 2019-March 2020). Data was obtained from 268 respondents (all veterinary surgeons treating horses and working in the UK), 224 of whom had treated more than 5 cases of distal limb cellulitis in the preceding 12 months.

(5) Clegg P (2003) [LB2 495-508]

Differential diagnosis of a swollen hock in the horse

UK paper reviewing differential diagnoses for swollen hock published in the journal “In Practice”.

(6) CLSI (2013) [21-114]

Document VET01-A4: Performance Standards for Antimicrobial Disk and Dilution Susceptibility Tests for Bacteria Isolated from Animals ”

Statement of the Clinical and Laboratory Standards Institute (global consensus standards organisation). The definition of resistance to be found at [35]

(7) Cooper (2021) [LB2 514-524]

Cooper HE, Davidson EJ Slack J and Ortved KF – Treatment and outcome of eight horses with limb cellulitis and septic tendonitis or desmitis

US paper. Retrospective case study of 8 horses. Cases selected from a review of medical records from 2000 to 2019, identifying horses with cellulitis and concurrent septic tendonitis and/or desmitis based on sonographic examination and positive bacterial culture. Long-term follow-up was available for 7 of the 8 horses and was obtained from follow-up examinations and/or telephone interviews.

(8) Doern and Brecher (2011) [LB2/9A-D]

Gary Doern and Stephen Brecher: The Clinical Predictive Value (or Lack Thereof) of the Results of In Vitro Antimicrobial Susceptibility Tests

US paper produced on Day 4 of trial. Opinion and discussion piece addressing the question “how well do the results of antimicrobial susceptibility tests predict therapeutic outcome in patients with infections?” Includes evidence about response rates and review Rex and Pfaller (2002) - not in the bundle - in which they coined the phrase “90-60 rule”.

(9) EUCAST (2019) [188-190]

EUCAST 2019: New definitions of S, I and R from 2019.

Definitions of S (susceptible), I (susceptible to increased exposure) and R (resistant) published by the European Committee on Antimicrobial Susceptibility Testing. The definition of resistance can be found at [189]

(10) Fjordbakk (2008) [LB2 558-561]

CT Fjordbakk, LG Arroyo, J Hewson – Retrospective study of the clinical features of limb cellulitis in 63 horses

Canadian paper. Retrospective study of 63 horses diagnosed with limb cellulitis between 1994 and 2005. All horses had an acute onset of painful generalised limb swelling, and a clinical diagnosis of limb cellulitis. Cases were selected from the medical records of horses admitted to the Veterinary Teaching Hospital at Ontario Veterinary College 01 January 1994 - 31 March 2005. Criteria for inclusion = history of acute and painful generalised limb swelling, hospitalisation and a clinical diagnosis of limb cellulitis made by the attending clinician. 31 of the horses (49%) were thoroughbreds.

(11) Kalka (2021) [LB2576-581]

Kalka A, Harding PG, Cullimore, AM Focal peritarsal cellulitis with long digital extensor tenosynovitis

Australian paper. Case study of 7 horses with focal peritarsal infection with long digital extensor tendon sheath (LoDETS) tenosynovitis, presenting to the author’s metropolitan equine practice over a period of 3 years

(12) Markel (1986) [LB2592 – 595]

M D Markel, JD Wheat, Spencer S Jang – Cellulitis associated with coagulase-positive staphylococci in racehorses: nine cases (1975-1984)

US paper. Retrospective case study of 9 thoroughbreds with cellulitis. Cases were selected from the records of horses admitted to the Veterinary Medical Teaching hospital, University of California over a 10-year period between 1 January 1975 and 31 December 1984. All had presented acute onset of limb swelling, followed by isolation of moderate to large numbers of coagulase-positive staphylococci. Horses with a history of trauma or injection into the affected limb were excluded.

(13) Papich (2013) [LB1 237-247]

MG Papich – Antimicrobials, Susceptibility Testing and Minimum Inhibitory Concentrations (MIC) in Veterinary Infection Treatment

Article published in the US academic journal “Veterinary Clinics of North America Small Animal Practice”, authored by the then Chairholder of the CLSI Veterinary Antimicrobial Susceptibility Testing Committee. The article references/reviews 30 published papers. Witnesses were taken to a reference to the “90 60 rule” at [238]

(14) Ramzan (2014) [LB2/362]

PHL Ramzan Peritarsal/inguinal infection (lymphangitis) in Regional Musculoskeletal Conditions (chapter 2)

Chapter taken from a textbook - The Racehorse: A Veterinary Manual

(15) Pilsworth and Head (2001) [LB4 911-915]³

Pilsworth RC, Head MJ - A study of ten cases of focal peritarsal infection as a cause of severe lameness in the thoroughbred racehorse: clinical signs, differential diagnosis, treatment and outcome

UK paper. Case study of 10 horses under the care of the authors in Newmarket, affected with acute onset lameness, associated with peritarsal infection, collected over a 2-year period. The population

under study comprised 600 Thoroughbred racehorses in training directly under the clinical care of the authors.

(16) Rendle (2017a) [LB3 637-638]

David Rendle Lymphangitis/Cellulitis

UK conference paper discussing diagnosis and management of C&L

(17) Rendle (2017b) [LB3 639-642]

David Rendle – Cellulitis and Lymphangitis

UK academic paper. Longer version of Rendle 2017a, referencing 6 further published papers.

(18) Richter (2020) [LB1 248-286]

Richter et al – Reasons for antimicrobial treatment failures and predictive value of in vitro susceptibility testing in veterinary practice: an overview”

Paper published in the UK academic journal “Veterinary Microbiology”, providing an overview of over 90 published papers concerning the possible reasons for antimicrobial treatment failures.

(19) Vyetrogon (2019) [LB3 687-691]

T Vyetrogon and MS Dubois – Perisuspensory abscessation in eight horses with hindlimb cellulitis

Canadian paper. Retrospective review of the presentation, diagnosis and treatment of 8 horses presented to the Milton Equine Hospital in Toronto between 2006 and 2017 for treatment of limb cellulitis and were diagnosed with perisuspensory abscesses.