Neutral Citation Number: [2022] EWHC 2735 (KB)

Case No: QB-2020-004078

IN THE HIGH COURT OF JUSTICE
KING'S BENCH DIVISION

Royal Courts of Justice
Strand, London, WC2A 2LL

Date: Monday 31st October 2022

Before:

HIS HONOUR JUDGE TINDAL
(Sitting as a Judge of the High Court)

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Between:

MRS MARION O'BRIEN (ADMINISTRATRIX OF THE ESTATE OF MR JOHN BERRY (DECEASED))	**Claimant**
- and –	
GUY'S & ST THOMAS' NHS TRUST	**Defendant**

- -

Mr Jim Duffy (instructed by Slater & Gordon) for the **Claimant**
Mr Liam Duffy (instructed by Bevan Brittan) for the **Defendant**

Hearing dates: 3rd-5th October and 31st October 2022

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Approved Judgment

I direct that pursuant to CPR PD 39A para 6.1 no official shorthand note shall be taken of this Judgment and that copies of this version as handed down may be treated as authentic.

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HIS HONOUR JUDGE TINDAL

HIS HONOUR JUDGE TINDAL:

Introduction

1. This case relates to the treatment by the Defendant hospital in March 2017 of the Claimant's brother, John Berry ('Mr Berry'), who sadly passed away on 23rd January 2019. It is not suggested the Defendant's treatment played any part in Mr Berry's death. However, it is the Claimant's case that the administration of 400mg of the antibiotic Gentamicin on 4th March 2017, when Mr Berry was in the Defendant's Intensive Care Unit ('ICU') under the care of Dr Meyer, was a negligently excessive dose given that he had no effective renal function and was dependent on dialysis. It is agreed the Gentamicin dose caused Mr Berry 'ototoxicity' side-effects leading to balance problems requiring care from the Claimant (but disputed whether it also caused him the hearing loss he experienced). Subject to liability, damages are agreed at £45,000.

2. The Claimant was represented by Mr Jim Duffy; the Defendant by Mr Liam Duffy. Both were excellent, although to avoid confusion, I shall refer to them as Claimant's Counsel and Defence Counsel. Claimant's Counsel accepted the claim stood or fell on whether Dr Meyer's prescription at lunchtime on 4th March 2017 of 400mg of Gentamicin and its administration that evening were negligent and that a non-negligent lower dose would not have caused the ototoxicity. Boiled down, he presented the claim in three ways. Firstly, he argued that Dr Meyer had ignored Mr Berry's renal impairment and simply applied the Defendant's in-house ICU Gentamicin dosage guideline which was inconsistent with national and other 'in-house' guidelines. Secondly, he argued that even if Dr Meyer had calibrated the 400mg dose to Mr Berry's circumstances, he and the Defence ICU Expert Dr Danbury failed to justify a departure from the national guidelines. Thirdly, he argued in any event, the opinion of the Claimant's ICU Expert Dr Bell showed Dr Meyer's choice of dose, even though supported by Dr Danbury, was illogical and unreasonable. Defence Counsel's response was firstly that Dr Meyer's decision was justified given Mr Berry's worsening infection and supported by the in-house ICU guidelines and Dr Danbury's opinion which were both reasonable. Secondly, he argued irrespective of the in-house guidelines, departure from other guidelines was justified. Thirdly, he argued Dr Meyer's dosage was supported by Dr Danbury and not negligent despite Dr Bell's opinion. He added in any event the Claimant had not proved a lower dose would not have had the same effect.

3. Liability for clinical negligence is judged according to the famous test of McNair J in *Bolam v Friern Hospital Management Committee [1957] 1 WLR 582* at pg. 587: that a clinician "*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*", and not "*merely because there is a body of opinion which would take a contrary view."* *Bolam* was clarified and it was also held the burden of proof on the balance of probabilities is on the Claimant in *Bolitho v Hackney Health Authority [1998] AC 232* at pg.239. I return to *Bolitho* and *Bolam*, but merely as shorthand I refer to a decision or practice complying with the *Bolam/Bolitho* standard as '*Bolam*-compliant' and a decision or practice not complying with that standard as '*Bolam*-negligent'.

4. I return to the familiar principles later, but they raise three issues for me to decide here:
   (a) What were the circumstances leading to and following from Dr Meyer's decision to prescribe Mr Berry 400mg on 4th March 2017 ?
   (b) Having regard to the answer to (a), was Dr Meyer's prescription of 400 mg of Gentamicin and/or its later administration *Bolam*-negligent ?
   (c) If so, did the 400mg dose cause ototoxicity which a lower dose would not have ?

5. Issue (b) raises an interesting legal question, which arises from time to time and does so centrally in this case: what is the relevance of (non-)compliance with clinical guidelines (both national and 'in-house') to *Bolam*-negligence ? However, the question has only been addressed relatively briefly in a few authorities I discussed with Counsel, possibly more rarely than one might expect given the prevalence of clinical guidelines. Perhaps the reason is that ultimately Courts must decide whether claimants have proved *Bolam*-negligence in the circumstances of the particular case. Guidelines are not a substitute for expert medical evidence on liability in that particular case and so will rarely – if ever – be wholly determinative. Nevertheless, in this case the Defendant deploys its 'in-house' ICU guideline as a 'shield' and the Claimant deploys the Defendant's other and national guidelines as a 'sword', to use the expressions in the 2003 article by Samanta, Samanta and Gunn:[1] *"Legal considerations of clinical guidelines: will NICE make a difference ?"*. Therefore, this appears an appropriate case to consider the question in a little detail. I turn first to the relevant guidelines and their legal and regulatory context.

[1] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC539423/pdf/0960133.pdf in the *Journal of Royal Society of Medicine* Vol 96 March 2003 pgs.133-138

The Guideline Framework for Gentamicin

6. The regulatory context of clinical guidelines and their application in clinical negligence litigation is helpfully discussed in the Samanta article. As it explains, 'NICE' (The National Institute for Health and Care Excellence) is a non-departmental governmental body founded in April 1999 and *'One of its main functions is to develop guidelines on best practice and clinical management'*. NICE now operates under Part 8 of the Health and Social Care Act 2012, but that comment remains true. As NICE's website states:[2]

> "*NICE guidelines make evidence-based recommendations on a wide range of topics… Many guideline recommendations are for individual health and social care practitioners, who should use them in their work in conjunction with their own judgement and discussion with people using services.*"

As that illustrates (and as is often said in guidelines themselves), NICE itself does not regard its own guidelines as inflexible 'rules', but as 'recommendations' to clinicians to be used in conjunction with their own clinical judgement and discussion with patients. Now closely related to NICE (although it predates it by almost 50 years) is the British National Formulary ('BNF'), jointly authored by the British Medical Association and Royal Pharmaceutical Society. The BNF, updated regularly, contains basic information on a wide variety of common drugs with prescription guidance, including pharmacological details, indication, contra-indications, side effects and recommended dosages. It is one of the most familiar books for clinicians and the BNF is now also available to the public on the NICE website.[3]

7. Whilst I return to the relevance of clinical guidelines in clinical negligence cases later, for clinicians their relevance is clear. From a regulatory standpoint, the General Medical Council ('GMC') in *'Good Medical Practice' (2013)* instructs doctors that:

> "*You must recognise and work within the limits of your competence and you must keep your knowledge and skills up to date. You must maintain and develop your knowledge and skills that are relevant to your role and practice in: a pharmacology and therapeutics and prescribing and managing medicines*."

Therefore, as at 2017, consideration of NICE and BNF Guidelines was not an explicit regulatory requirement, but may well have been good practice in 'keeping up to date'.

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[2] https://www.nice.org.uk/process/pmg20/chapter/introduction#nice-guidelines
[3] https://bnf.nice.org.uk/

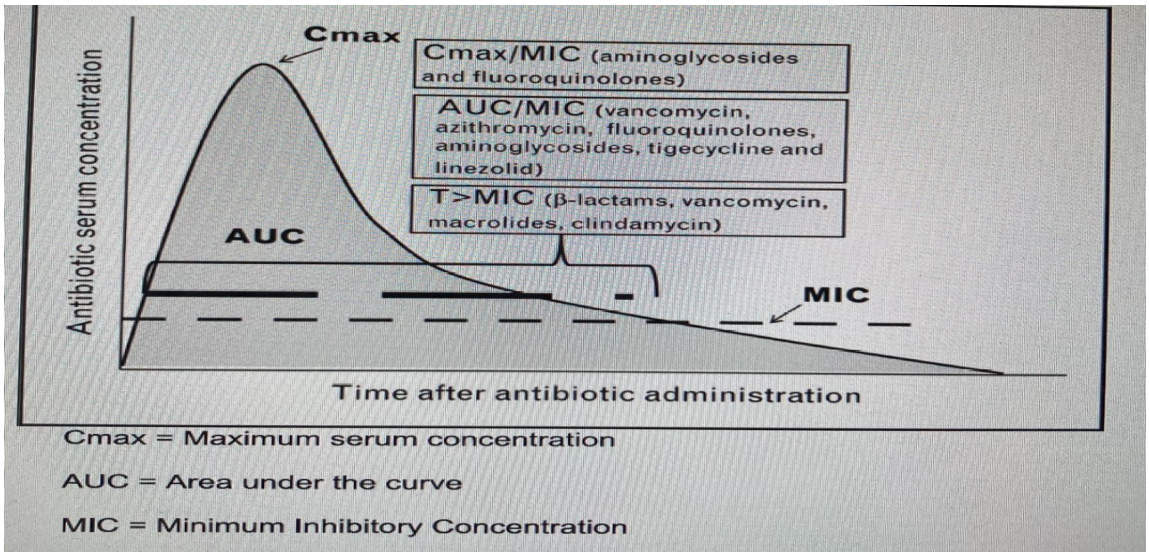
However, in 2021, the GMC issued more specific guidance on *'Keeping up to date and prescribing safely'*[4] elaborating on this 2013 general guidance and stating at ps.14-15:

> "*You should follow the advice in the BNF on prescription writing….You should take account of the clinical guidelines published by NICE [and]…Royal Colleges and other authoritative sources of specialty specific clinical guidelines*."

8. The Defendant appears to be typical for large NHS Trusts in producing its own 'in-house' clinical guidelines to share and encourage best practice. Dr Danbury's hospital in Southampton has also done so (to which I return). Indeed, Dr Meyer is Chair of the Defendant Trust's Clinical Guidelines Committee. Whilst he was not involved in the production of the relevant guidelines in this case by the Drug Sub-Committee, he said 'in-house guidelines' for the Defendant were often authored by specialists in the field, there would be collective effort and editorial input from several different specialisms.

9. Before turning to the relevant clinical guidelines in this case, it may be helpful to discuss what Gentamicin is. It is a strong aminoglycoside antibiotic used widely in intensive care medicine for a range of infections and typically comes in ampoules of 80mg/2ml. There is a detailed description in Dr Danbury's report and its appendices. For present purposes it is sufficient to note that Gentamicin works by disrupting the ability of two different types of bacteria (Gram-positive and Gram-negative) to make proteins. Dr Danbury explains that in low plasma concentrations it exhibits bacteriostatic effects (i.e. it holds bacteria in check), but in high plasma concentrations it exhibits bacteriocidal effects (i.e. it kills them) even after the concentration falls. General Gentamicin prescription has changed from frequent administration of low-doses every few hours (as with common drugs like paracetamol), to a large initial dose but then an interval based not on time but on the serum concentration in the blood before re-dose ('High Dose Extended Interval' or 'HDEI' - see Bell/Danbury Joint Statement pg.518) This is because there is an initial 'peak level' ('CMax') of Gentamicin in the blood-stream typically within 30-60 minutes, which then falls away as the Gentamicin is absorbed by the kidneys and gradually excreted. Gentamicin in the blood gradually falls to a 'trough level' ('MIC'), often taken as 1 mg/L when it is then safe to re-dose. How long this takes depends on how fast the Gentamicin is extracted by the kidneys. Dr Danbury illustrated this process with HDEI dosing with a graph:

[4] https://www.gmc-uk.org/ethical-guidance/ethical-guidance-for-doctors/good-practice-in-prescribing-and-managing-medicines-and-devices/keeping-up-to-date-and-prescribing-safely



10. However, as with many drugs, there are side-effects with Gentamicin. In particular, its excretion through the kidneys can damage them ('nephrotoxicity') and Dr Danbury accepts there is a relationship between nephrotoxicity and the size of the 'Area Under the Curve' ('AUC'). Dr Danbury also accepts there is a linkage between Gentamicin and 'ototoxicity', which is when a medicine causes damage to a patient's balance and hearing by damaging the inner ear. This is also the agreed evidence of Dr Tranter and Dr Clark, Consultant ENT Surgeons with more expertise on that specific issue, stating:

> "*Gentamicin can cause vestibular toxicity and subsequent balance issues. [It] can [also] cause hearing loss, but this occurs much less commonly… In this case, the Gentamicin administration probably led to balance problems*."

They disagree whether the Gentamicin caused Mr Berry hearing problems, but since they agree it 'probably' (i.e. on the balance of probabilities) caused his balance problems and damages are agreed, this establishes causation subject only to issue (c): whether that injury to Mr Berry would have been the same with a lower dose. On that, they defer to Dr Bell and Dr Danbury and I will consider their dispute later. However, I will say now that Dr Danbury's references to studies questioning the link between Gentamicin dosage and ototoxicity were general studies not focussing on renally-impaired patients. As Gentamicin is excreted through the kidneys until it reaches a 'trough level', it follows that in patients with little or no kidney function, it is excreted much more slowly, so stays in the system longer, so can cause more damage. Indeed, this basic distinction between patients with and without renal (i.e. kidney) impairment is a thread running through all but one of the guidelines in this case. The odd guideline out is the Defendant's ICU guideline Dr Meyer used in this case.

11. The NICE/BNF guideline for Gentamicin provided by Dr Bell (dated 2018, but I accept reflecting by then established practice) states that for serious infections such as pneumonia in hospital and septicaemia, intravenous Gentamicin for adults should be:

> "*Initially 5–7 mg/kg, subsequent doses adjusted according to serum-gentamicin concentration, to be given in a once daily dose regimen."*

'mg/kg' means milligrams of Gentamicin per kg of a patient's 'dry weight', which in Mr Berry's case at the time was agreed to be 84.5kg. Therefore, 5 mg/kg would equate to 422.50mg and 7 would equate to 591.5 kg (although that may be reduced for ideal body weight). However, the NICE/BNF guideline takes a different approach for patients with renal impairment, to be measured by their 'creatinine clearance rate ('CCR')': i.e. the rate at which the kidneys clear the chemical creatinine from the body. 'Normal' rate for men appears to be around 100 ml/min, but with impaired kidney function, their CCR falls. This is reflected in the NICE/BNF guideline:

> "*If there is impairment of renal function, the interval between doses must be increased; if the renal impairment is severe, the dose itself should be reduced as well. Excretion of aminoglycosides is principally via the kidney and accumulation occurs in renal impairment. Ototoxicity and nephrotoxicity occur commonly in patients with renal failure. In adults, a once-daily, high-dose regimen of an aminoglycoside should be avoided in patients with a creatinine clearance less than 20 ml/ minute*." (my underline).

In context, a 'high dose regimen' would seem to mean the usual 5-7 mg/kg dose.

12. A similar approach is taken in the 2014 Renal Handbook. It uses a slightly different measure of kidney function: the Glomerular Filtration Rate ('GFR') measuring how much fluid generally goes into the kidneys: again ml/min, often calculated from CCR. It provides that a dose of Gentamicin with normal renal function is 3-7 mg/kg in a once daily dose, but it then differentiates between (and within) renal impairment and types of dialysis. For un-dialysed renal impairment, subject to local policies, the dose for 30-70 ml/min GFR is 3-5 mg/kg; for 10-30 ml/min GFR it is 2-3 mg/kg; and for 5-10 ml/min GFR it is 2mg/kg every 48-72 hours. For Continuous Venol-Venous Haemodialysis ('CVVHD' see below) the dose is 3-5 kg/mg (i.e. as 30-70 GFR impairment) depending on severity of infection, but for ordinary haemodialysis ('HD' see below), the dose is 2 mg/kg after dialysis every 48-72 hours (i.e. as for 5-10 GFR impairment). Mr Berry's CCR or GFR has not been calculated, but it is agreed they were in the worst categories.

13. Again, a similar approach is taken in the Defendant's 'in-house' guidelines on Gentamicin applicable outside of ICU, which were only disclosed at the start of trial. The standard Gentamicin dosage guideline effectively maps the NICE/BNF guideline in distinguishing between patients with different renal functions. If there is no impairment, the standard dose is 5 mg/kg up to a maximum of 480mg and a maximum of one dose per 24 hours, with a second dose not to be prescribed until the 'trough level' of Gentamicin is less than 1mg/L. However, as in the NICE/BNF guideline, if CCR is less than 20 mg/min, clinicians are referred to the more detailed guideline *'Antibiotic Use in Adult Patients with Renal Impairment'*. This is authored by the Defendant's drug sub-committee of its Clinical Guidelines Committee which Dr Meyer chairs, although he was not involved either in this guideline (or the next I consider). I will return to it later, but in summary at pg.21 it indicates dosing no more than once per 24 hours and not again until the Gentamicin level falls below 1 mg/L and following advice of an infection or renal doctor or pharmacist. However, on dose level, it yet again distinguishes between the extent of renal impairment and replacement. If CCR is greater than 20 ml/min, the dose is (like the normal guideline) 5 mg/kg up to a maximum of 450 mg (adjusted for obese patients). If CCR is less than 20 ml/min but the patient is not on dialysis, the dose is 3mg/kg up to 280 mg. However, if on 'intermittent dialysis', the dose is 2 mg/kg up to a max of 180mg (or 3 mg/kg up to 280mg for first dose in 'severe Sepsis' cases when risk of death outweighs side effects). It is debateable whether this is a 'high-dose regimen' under the NICE/BNF guideline.

14. However, as noted, the 'odd guideline out' is the Defendant's ICU Gentamicin guideline. This takes a binary approach to 'renal impairment' and even then, does not distinguish between those with and without it for the first dose, only for later ones. It was authored by a single Critical Care Pharmacist, albeit under supervision of the Drug Sub-Committee. Given its importance, I quote it nearly in full (my underline):

> "*<u>This guideline is for use within adult critical care areas only</u>. Treatments, medicines and monitoring methods contained within this document may not be clinically appropriate outside these settings. DO NOT USE outside adult Critical Care areas without consulting with the Critical Care consultant on call and/or Critical Care pharmacist. Critical care pharmacy team / Critical care consultants. <u>This Guideline is for reference only and for interpretation by clinical healthcare professionals working in the critical care setting</u>.*

Patients with normal renal function

Prescribe between 5 mg/kg to 7 mg/kg (ideal body weight) to a maximum of 480mg. Ideal Body Weight (kg) for men = 50kg + [(height (cm) – 154] x 0.9) Ideal Body Weight (kg) for women = 45.5kg + [(height (cm) – 154] x 0.9) Obese patient dosing should be based on dose determining weight (obesity is defined as actual body weight (ABW) >20% higher than ideal body weight IBW) again to a maximum of 480mg per dose: DDW (kg) = IBW + [0.4 x (ABW – IBW)] Please check if previous aminoglycoside therapy has been administered to the patient. If a dose of amikacin or gentamicin has been given within last 24 hours, the timing of the gentamicin dose should be confirmed with the ICU medical team Patients with impaired renal function

A large first dose is still desirable. In the majority of patients 5 to 7 mg/kg (to a maximum of 480 mg) should be used. The continuation of gentamicin in renal failure must be reviewed after the initial dose in accordance with the critical care empirical antibiotic guidelines and microbiology. If gentamicin it is still the preferred agent, consider reducing subsequent doses, discuss dosing regimen with critical care pharmacy. Re-dose according to levels (see therapeutic drug monitoring section below). For further advice on dosing in renal impairment and CRRT, discuss with the critical care pharmacy team.

Administration - Administer in 100 mL glucose 5% or sodium chloride 0.9% over 30 minutes. Therapeutic drug monitoring - Samples should be taken 20 hours post-dose If gentamicin level is less than 1 mg/L, patients may be re-dosed. If gentamicin level is greater than 1 mg/L, re-check levels in another 12 hours. Do not re-dose gentamicin until the trough level is less than 1 mg/L Length of Treatment - Initial dose should always be prescribed on "Stat" section of medication record…. If a course is required, subsequent doses should be prescribed on the "PRN" section for a total maximum duration of five days.

Summary - All patients should initially receive 5-7 mg/kg administered in 100 mL of glucose 5% or sodium chloride 0.9% over 30 minutes. Dosing is based on Ideal/Dose Determining weight. Maximum dose is 480 mg Levels should be requested from the ICU laboratory 20 hours post-dose If levels are below 1 mg/L, patients may be re-dosed If levels are greater than 1 mg/L, re-check in 12 hours.

This Guideline is for reference only and for interpretation by clinical healthcare professionals working in the clinical care setting…"

Evidence and Witnesses

15. I had a trial bundle ('TB') of over 850 pages in three lever arch files and a medical records bundle ('MR') of over 5600 pages in twelve lever arch files. I am very grateful that I did not have to navigate such an unwieldy volume of material by paper, as I was helpfully also given access to both bundles in PDF form. This enabled me before arriving at Court to read all the documents referred to in Counsels' skeleton arguments and to work more effectively both in and out of Court. This pre-reading included the Claimant's witness statement and expert evidence from Consultant ENT Surgeons (Mr Tranter for the Claimant and Mr Clark for the Defendant) on the effects of Mr Berry's ototoxicity on his balance and hearing loss. However, as Defence Counsel rightly anticipated, damages were agreed and they did not need to give oral evidence. This enabled us all at trial to focus on the three issues noted above.

16. Dr Meyer gave evidence first at trial. It is never an easy experience for a doctor accused of negligence to give evidence, although as I have said, in this case the Claimant's target is also the Defendant's ICU guideline. Dr Meyer frequently gave long, detailed answers to questions in cross-examination, even on occasion to apparently short, simple questions. However, in my judgment, this was not indicative of evasiveness, but of his care for precision and accuracy in his answers which was entirely understandable and indeed commendable. I found he gave calm, measured and balanced evidence which I found entirely reliable, under searching cross-examination spanning the whole case.

17. Turning to the expert evidence, in *Bolitho*, having reviewed references in cases such as *Bolam* to a 'reasonable body of opinion', Lord Browne-Wilkinson stated at pgs.242-3:

> "*…The use of these adjectives – responsible, reasonable and respectable – all show that the Court has to be satisfied that the exponents of the body of opinion relied upon can demonstrate that such opinion has a logical basis.…* *…..*
> *[I]t would be wrong to allow…assessment to deteriorate into seeking to persuade the judge to prefer one of two views both of which are capable of being logically supported. It is only where a judge can be satisfied the body of expert opinion cannot be logically supported at all that such opinion will not provide the benchmark by reference to which the defendant's conduct falls to be assessed*."

Lord Browne-Wilkinson was there discussing whether a body of opinion was what I call '*Bolam*-compliant'. But his comment is also relevant to *weighing* expert evidence.

Similarly, while the discussion of *Bolitho* in C v North Cumbria NHS *[2014] EWHC 61* by Green J (as he was) focussed on '*Bolam*-negligence', p.25(vii) is also relevant here:

> "*...[T]he task of the Court is to see beyond stylistic blemishes and to concentrate upon the pith and substance of the expert opinion and to then evaluate its content against the evidence as a whole and thereby to assess its logic. If on analysis of the report as a whole the opinion conveyed is from a person of real experience, exhibiting competence and respectability, and it is consistent with the surrounding evidence, and of course internally logical, this is an opinion to which a judge should attach considerable weight*."

In Kennedy v Cordia *[2016] 1 WLR 597 (SC)* in addition to stressing the importance of expert evidence assisting the Court, being based on a sound body of expertise and being impartial, Lords Reed and Hodge at p.59 endorsed this earlier judicial self-direction:

> "*It is necessary to consider with care, in respect of each of the expert witnesses, to what extent he was aware of and observed his function. I must decide what did or did not lie within his field of expertise, and not have regard to any expression of opinion on a matter which lay outside it. Where published literature was put to a witness, I can only have regard to such of it as lay within his field of expertise, and only to such passages as were expressly referred to. Above all, the purpose of leading the evidence of any of the expert witnesses should have been to impart to me special knowledge of subject matter, including published material, lying within the witness' field of expertise, so as to enable me to form my own judgment about that subject matter and the conclusions to be drawn from it*."

18. Bearing in mind that last point about 'imparting to the judge special knowledge of subject matter enabling the judge to form their own judgment about it', often some of the most helpful documents are the expert joint statements. They usually clarify the areas of agreement and narrow the field of disagreement, both as to the number of different issues and the extent of and focus of the disagreement on individual issues. The joint statement of the ENT Surgeons in this case (TB 466-475) is a good example and indeed led to the parties not requiring them to give oral evidence. That was always going to be less likely with experts on breach of duty such as the ICU Experts in this case, Dr Bell for the Claimant and Dr Danbury for the Defendant. Nevertheless, their joint statement (TB 516-532) was of less than usual assistance for several reasons:

18.1 Firstly, the unusual way in which the joint statement was prepared (TB 532) meant that rather than a 'summary of the reasons for non-agreement' (TB 517), at times the joint statement reads like a written debate, if not an argument. Out of 27 questions, I counted 8 where there was agreement and even in respect of some of these, that was not entirely clear. More commonly, there was disagreement and rather than the usual crisp statement of the reasons for it, typically one expert replied to the other who then counter-replied, sometimes prompting a counter-counter-reply. Frequently, the so-called 'end point' came in the middle. This is not an approach which assists understanding, nor should it be encouraged.

18.2 Secondly, a substantial portion of the joint statement was taken up with this kind of cut and thrust as to whether Mr Berry actually had Sepsis. One of the supposed 'agreements' was the definition of Sepsis, even though each expert actually tendered different definitions. However, as I shall discuss, having heard Dr Bell's oral evidence, Dr Danbury accepted that Mr Berry did not meet the definition of Sepsis, partly as it had changed in 2016. The large part of the joint statement debating Sepsis then became redundant or at least needed approaching with care.

18.3 Not least because I was assisted less by the joint statement than usual in 'forming my own judgment about the subject matter' of the expert evidence, in order to understand the evidence as it was given, I needed to ask several questions of each expert as evidence went along, rather than at the end. I did try my best not to disrupt the flow of cross-examination; and when I asked questions at the end, I then allowed Counsel to ask questions arising. I am grateful for their patience.

19. Dr Danbury came under sustained and skilful challenge by Claimant's Counsel to his impartiality, competence and the logic and reasonableness of his expert opinion. However, in my view, the core of his evidence essentially withstood that challenge:

19.1 As to impartiality, Dr Danbury disclosed when instructed and in his report that he had previously worked with Dr Meyer in Royal Berkshire Hospital in 2014 as one of a number of colleagues and had seen him since at conferences. But it is clear from both of their evidence they did not know each other well (Dr Danbury only remembered Dr Meyer as one of a cohort of junior doctors and that he was 'tall') and Dr Danbury specifically raised this connection in advance. He also criticised Dr Meyer's decision in part. Understandably, Claimant's Counsel did not press this point. I find Dr Danbury was entirely independent and impartial.

19.2 As to competence, whilst there was no challenge to Dr Danbury's expertise or experience as an ICU Consultant for twenty years, he was criticised in a Court of Protection end-of life case (*An NHS Trust v DJ [2012] EWHC 3524 (COP)*). Speaking as a Judge who also sits in the Court of Protection, there is a world of difference between an ill-judged comment on best-interests and a clinical opinion squarely within a consultant's undoubted expertise. This was not pressed either.

19.3 However, Dr Danbury did have to make some concessions on the logic and reasonableness of his evidence. Firstly, he accepted whilst he had said in his report the 400mg dose would be consistent with the practice at his own previous and current hospital and attached the latter's guideline, on scrutiny this exempted those with CCR below 20 mg/l from daily doses just as the NICE guideline does. When pressed, he stated this was the guideline for the normal ward, not for ICU, which did not have one. Secondly, he accepted that in doubting the link between Gentamicin dosage and ototoxicity, he was swimming against the tide of the premise of the NICE/BNF guidelines and to an extent indulging in speculation outside his expertise. While he could point to some academic papers, again they were not within his expertise (cf. *Kennedy*) and as I said, did not address the situation of renally-impaired patients. Thirdly, as I have also said, Dr Danbury changed his position from the joint statement after hearing Dr Bell's evidence, by clarifying Mr Berry did not the 2016 revised international definition of Sepsis, but did meet the previous definition. All these issues did call into question Dr Danbury's opinion to some extent.

These were not mere 'stylistic blemishes' but I must look at the 'pith and substance' of Dr Danbury's opinion - that the 400mg dose was reasonable for Mr Berry in his clinical circumstances - and evaluate it against the rest of the evidence (*Cumbria*). Indeed, Dr Danbury's readiness to make concessions added weight to where he stuck to that 'pith' of his opinion. He accepted the Defendant's ICU guideline was 'one size fits all', but cogently explained – consistently with Dr Meyer – that in ICU the patients are by definition usually more ill than in other hospital settings, so the risk/benefit analysis with antibiotics is different, especially with infection which risks tipping into Sepsis. Dr Danbury built a case for a 'bright-line rule' as Claimant's Counsel accepted. Moreover, as I will show, Dr Danbury drew convincingly together a range of different factors explaining why Mr Berry's infection was deteriorating, despite improvements in his clinical presentation. I found the 'pith' of Dr Danbury's opinion reliable.

20. Dr Bell has been a Consultant in Anaesthesia and Intensive Care for over 25 years. In addition to his vast experience, he has held various strategic roles, including participation for the Intensive Care Society in the authorship of national guidelines. There is no question of his experience, competence, independence or indeed expertise. However, whilst Dr Bell convincingly picked off the 'low-hanging fruit' of Dr Danbury's opinion (e.g. on Sepsis and causation), he was unable to 'chop down its trunk'. More prosaically, Dr Bell's core criticism of Dr Meyer's 400mg dose as 'illogical' unravelled under cross-examination in three ways. Firstly, whilst rightly stressing (as Dr Danbury then conceded) that Mr Berry did not develop Sepsis, Dr Bell accepted Mr Berry had an infection and I was unconvinced by his attempt to pick off one by one the rising inflammatory markers rather than looking at them in the round in context (of course, something it is far easier to do in hindsight than at the time with a patient with an infection). Secondly, Dr Bell said for the first time under cross-examination that if concerned about infection on the evening of 3rd March, Dr Meyer could have 'topped up' an earlier 80mg dose of Gentamicin and it was 'illogical' for him to have waited for the trough level. However, as Dr Danbury said, the logic of Dr Bell's suggestion was itself questionable. It would have had a weaker bacteriocidal effect than waiting to give a higher dose (rather than one high peak of Gentamicin as in the graph, there would have been two lower peaks); and by not waiting for the trough level, it would have departed from all the Defendant's own guidelines and the renal handbook (which ties later doses to GFR levels) because it would have increased the risk of ototoxicity (the very injury for which Dr Bell blames Dr Meyer). Indeed, whilst I understood Dr Bell to be putting a new (unpleaded) basis for Dr Meyer's negligence, tellingly Claimant's Counsel did not rely on it, but simply suggested Dr Bell was illustrating the illogicality of Dr Meyer's approach. But it is the logic of Dr Bell's suggestion that is under more scrutiny. Thirdly, on the Defendant's ICU Gentamicin guideline, Dr Bell rather surprisingly said that he was not saying it was negligent, simply insufficiently 'nuanced' in not distinguishing between patients' extent of renal impairment. However, as I will discuss, whilst the guideline is not a drafting triumph, Dr Bell missed the nuance it does contain (my underline): "*A large first dose is still desirable. <u>In the majority of</u> patients 5 to 7 mg/kg…should be used."*. Ultimately, I am conscious following *Bolitho* Judges should not simply choose between two different but logical expert opinions and it is rare to find an expert's opinion illogical. However, on the core issue of dosage, I found Dr Bell's opinion less logical than that of Dr Danbury.

Findings of Fact

21. I now turn to my findings of fact on the balance of probabilities, with the burden of proof on the Claimant: see *Bolitho* and *Ternent v Ashford [2010] EWHC 593* (though *Bolam* does not apply to fact-finding: *Penney v East Kent AHA [2000] PNLR 323 (CA*)) The allegations of negligence are limited to the 400mg dose of Gentamicin on 4th March 2017 and damages are agreed subject to liability and causation. So, my findings of fact on the periods before and after Mr Berry's critical stay at the Defendant hospital between 28th February and 16th March 2017 will be very brief. Even within that short window, my main focus will be my findings in relation to 3rd and 4th March.

Background

22. Mr Berry was born in October 1946 and so in March 2017, he was 70 years old. According to his sister, the Claimant, Mr Berry had been a plumber by profession and led a happy life living alone in retirement. He enjoyed walking, seeing friends and horse racing. The Claimant visited him every fortnight and he regularly stayed with her. However, by age 70, Mr Berry had a number of health problems, including arthritis, glaucoma and age-related eye problems, hypertension and atrial fibrillation (as well as a suspected Asbestos-related lung condition, although that is less clear).

23. However, most relevantly Mr Berry had chronic kidney disease. Indeed, in 2006, he had undergone a nephrectomy (removal of one kidney) for renal cell carcinoma and by 2016 had end-stage renal failure with the remaining kidney only functioning at 50%. His urine output was minimal and he was dependent on dialysis. As is well-known, healthy kidneys filter out harmful waste products and excess fluid expelled through urine. When the kidneys do not work properly, dialysis may be required to do their job.

24. There are two main types of dialysis relevant to this case. Haemodialysis ('HD') is the most common type which replaces kidney function and can be undertaken at home, the community or a normal hospital ward. Mr Berry received such HD in the community three days a week. However, there is another type of dialysis which at the Defendant hospital was only available on ICU: Continuous Veno-Venous Haemodialysis ('CVVHD'), sometimes referred to in the notes as 'filtration'. This is a temporary but continuous (as the name suggests) and gentler form of haemodialysis for ill patients who cannot tolerate ordinary HD or whose bodies may be put under undue strain by it.

25. On 12th January 2017, Mr Berry was admitted to Charing Cross Hospital in London (MR 1180-2). He had a history over a few months of shortness of breath and coughing and was treated for atrial fibrillation and for his pneumonia with the antibiotic levofloxacin as he was allergic to penicillin. His condition improved and he was discharged home on 16th January 2017 with antibiotics stopped days later (MR 246).

26. However, on 28th February 2017, Mr Berry was admitted to the Defendant hospital - St Thomas' in London - by ambulance to A&E with complaints of pain in both arms and in his chest (MR 1466-1487). He reported pain on exertion since October 2016 and his mobility was limited to 100 yards with pain and shortness of breath (MR 1468). His renal history was noted and he reported passing a 'thimble' of urine each day stained red (MR 1470) and it was noted he would need assessment by the renal team and dialysis, although did not need it that day (MR 1473). He was diagnosed with non-ST Myocardial Infarction (i.e. a type of heart attack) and was admitted under the care of the Cardiology team to the Defendant's Stephen Ward (MR 1676). He had an 'ejection fraction' of 15-20% (MR 203): i.e. his heart pumping was 1/3 of normal. As Dr Bell said, this was a severe heart condition: Mr Berry's heart had been 'stunned'.

27. On 1st March (MR 1525-6) Mr Berry reported feeling weak, breathless and tired and was struggling to move even just about in his bed. He underwent dialysis which he tolerated fairly with no hypotension, although he did appear to have chest pain. As Dr Bell explained, this was due to the strain on Mr Berry's weakened heart and risked a vicious cycle of strain on the heart, leading to less intensive dialysis, causing more fluid build-up, putting more strain on the body, including the heart and so on. As a result, the Renal Registrar Dr Thom noted *"If needs further [renal replacement therapy] today, will need to [go] to ITU for filtration as less cardiac strain."*

28. On 2nd March in the morning, Mr Berry had an angiogram and stent placement for a moderate to severe proximal stenosis in the left descending coronary artery (MR 1526). It appears Dr Thom decided to review whether Mr Berry needed to go to ICU after that angiogram as Mr Berry needed dialysis that day. However, the cardiologists thought that as he now had the stent, he should be able to tolerate ordinary HD on the ward and in fact he did without significant difficulty. By 23.21, Mr Berry's heart rate and blood pressure were out of normal range and his 'National Early Warning' Score 'NEWS' (a screening tool for infection and Sepsis) was 'Medium Risk' (5) (MR 2226).

3rd March

29. 3rd March was to prove a difficult day for Mr Berry. His NEWS infection scores fluctuated (MR 2227-2241), oscillating throughout but Low (3) at 00.12 and 07.21, Medium (5/6) at 08.30 and 10.57, with consistently high heart rate around 110 bpm and low blood pressure. At around 11am (although it is possible this was the time she recorded it having seen Mr Berry earlier), Dr Thom reviewed Mr Berry (MR 1527):

> "*Currently: BP 95/60 HR 110 in [Atrial Fibrillation] [Oxygen Saturation] 94% on 1L via nasal specs Tachopnoeic [short, rapid breaths] at rest [shortness of breath] Afebrile Bilateral creps to midzones No peripheral odema. [Chest X-Ray] shows widespread airspace shadowing consistent with pulmonary oedema +/- overlying infection. Bloods [White Cell Count] yesterday increased to 16. No [C-Reactive Protein] Impression: Fluid overload the context of recent NSTEMI and very poor EF - BP borderline for tolerating HD ? Overlying infective process also. Advise:…dialysis nurses [will] perform some isolated UF and aim to take off a further litre of fluid which will take him close to his dry weight. However, I am not convinced this will be sufficient and….in his current cardiovascular state that trying to push for more fluid off than this may result in a crash on HD- it is a fine line between improving his cardiac output by reducing fluid overload and rapid fluid shifts that will exacerbate low BP. Please repeat bloods and CRP and treat with [Antibiotics] if infection markers elevated. Agree discuss with [Rheumatologist] re increasing steroids - as steroid dependant if treated for infection should have steroid dose doubled anyway for stress response. If remains hypoxic and compromised after HD today there will be no option but to refer to critical care for filtration and I suggest this is done early*."

Therefore, Dr Thom was sufficiently concerned about Mr Berry that she was contemplating moving him to ICU for filtration but also prescribing antibiotics if his infection markers remained elevated. Indeed, she requested repeat blood tests and a test for 'CRP' ('C-Reactive Protein'), that as Dr Bell accepted was an inflammatory marker which when above 30-50 had a correlation with infection and when over 100 was often indicative of infection. Dr Thom also referred to the White Cell Count ('WCC'), an inflammatory marker often also correlative with infection increasing the day before to 16, where it still was at 10.24 on 3rd March. It appears that the CRP was taken at 10.43 and was 189 (TB 320) – which was indicative of infection (but not Sepsis).

30. Moreover, at 12.15 on 3rd March, Mr Berry's NEWS hit 7 (High Risk) with a further dip in blood pressure and elevation of heart rate to 120 bpm (MR 2238). Indeed, the NEWS was taken again (still 7) at 12.25 (MR 2156) after a brief oxygen desaturation down to 89% (but it had recovered by 12.25). At that stage, the reviewing nurse noted:

> "*Looks tachypnoenic [rapid and shallow breath]. Feel [shortness of breath]… SpO2 98% on 1 L O2 [i.e. he was having oxygen]…Crackles to midzones on auscultation. Main complaint is pain in his arms from his [arthritis]… For UF today (provided by dialysis nurse). There is some concern that he may not tolerate more than 1L fluid removal and may still be hypoxic therefore, he may benefit from CVVH in Critical Care….[Chest X-Ray] Widespread airspace shadowing consistent with pulmonary oedema +/- overlying infection. Fluid overload. Chest infection. Plan: - UF as per renal SpR - Abx for chest infection - Analgesia for [Rheumatoid Arthritis] (patient informs me he usually takes steroids to help with his RA pain - already on Prednisolone) - Rheumatology review - I will discuss the patient with Dr Langrish - Critical Care Consultant*."

As I underlined, as well as the prospect of CVVHD in ICU, the plan was antibiotics for a chest infection. Mr Berry was plainly deteriorating at this point. Dr Danbury observed that a NEWS of 7 'High Risk' was very concerning and indicative of increased risk of death even if the NEWS later dropped back down - as it in fact did. At 12.56, 13.34 and 14.12, NEWS remained 6 and Mr Berry stayed on oxygen (MR 2239, 2240 and 1734).

31. Pausing there for a moment, as I have noted, having heard Dr Bell's evidence, Dr Danbury accepted that Mr Berry did not strictly meet the clinical criteria for Sepsis. However, that needs putting in context. Dr Danbury's original report annexed a 2016 paper setting out the third international definition for Sepsis (TB 722-731). According to this, Sepsis is the primary cause of death from infection, especially if not recognised and treated promptly. As Dr Bell explained, with a chest / lower respiratory tract infection (which is what Mr Berry probably had), such localised infection can spread into the body's circulation with multiplication of bacteria sources. This can trigger a systemic response which starts to damage and compromise the body's own tissues and organs: this is Sepsis. So, in the 2016 paper, its new definition was '*life threatening organ dysfunction caused by a dysregulated host response to infection'*. This can be checked against 'SOFA criteria' such as altered mental state, systolic blood pressure less than 100, or respiratory rate greater than 22/min.

32. Dr Danbury agreed with Dr Bell that Mr Berry did not at any material point in the Defendant's care develop true Sepsis by this new definition because there was no evidence of organ compromise. However, as Dr Danbury observed, Mr Berry would have been treated as having Sepsis under the old pre-2016 definition of two or more of (i) Temperature above 38' or below 36' (which he did not), (ii) heart rate above 90 bpm and; (iii) White Cell Count ('WCC') above 12,000/mm^3 (noted in the Sepsis Paper TB 723). Mr Berry's NEWS figures on 3rd March consistently showed a heart rate above 90 bpm; and the WCC taken on 2nd March and at 10.24 on 3rd March showed counts above 16,000 (stated as 16.1 and 16.2) and by 18.01 that day it was up to 17.6. As Dr Bell conceded, Mr Berry plainly did have a significant infection and whilst his condition did not actually meet the new 2016 criteria for Sepsis, unless antibiotics were given it may well have progressed into Sepsis. In short, on 3rd March, Mr Berry was at risk of Sepsis.

33. Moreover, Dr Bell accepted that Mr Berry was particularly vulnerable to a poor outcome with infection for a number of reasons: he had (i) end-stage renal failure; (ii) pulmonary oedema (excess fluid on his lungs); (iii) he was immuno-suppressed as he was on steroids for his rheumatoid arthritis; (iv) which is in itself an auto-immune disease; and (v) his heart problems amplified the other problems. Indeed, later on 3rd March, a doctor recorded Mr Berry as having four current problems (MR 4082): his heart condition, his renal failure, his 'suspected hospital-acquired pneumonia' and his fluid overload and low blood pressure arising from these other problems.

34. In short, it is quite clear that on 3rd March, Mr Berry had a significant infection that risked developing into Sepsis, which would have put his life at serious risk given all his vulnerabilities. Mr Berry urgently needed treatment with antibiotics. Accordingly, at 13.34, another ward doctor spoke with Dr Thom and noted this (MR 1734):

> "*[Chest X-Ray] shows marked pulmonary congestion, CRP 189. WBC 16. HAP protocol d/w renal registrar and advised 80 mg [Gentamicin] and 1.2 [Vancomycin]. Prescribed as advised*."

A later note (MR 4083) suggested both antibiotics were administered at 2pm. As Dr Danbury explained, Vancomycin is only effective on gram-positive bacteria and so antibiotics to address gram-negative bacteria were also needed. However, the choice was limited as Mr Berry was allergic to Penicillin and related drugs and Quinalone would affect his vulnerable heart. Dr Bell accepted Gentamicin was the right choice.

35. Instead, Dr Bell's criticism was Dr Meyer's 400mg dose of Gentamicin on 4th March and he endorsed Dr Thom's decision on 3rd March only to prescribe 80mg of it. Much has been made of this, not least as days later, Dr Thom criticised Dr Meyer's dose (to which I return). However, Dr Thom was a Renal Registrar working on the ordinary wards, not a Consultant working on ICU like Dr Meyer. So, she would not have been applying the same ICU guideline which is central to this case. Given Mr Berry's renal impairment, she presumably had reference to the Defendant's general ward guideline *'Antibiotic Use for Patients with Renal Impairment'* ('the General Renal Impairment Guideline') - in force in March 2017. As I have noted, that Guideline for Gentamicin (internal page 21) with patients with CCR of less than 20 ml/min not on Haemodialysis was 3 mg/kg up to a maximum of 280 mg. However, if on 'intermittent dialysis', the dose is 2 mg/kg (other than in cases of Sepsis / Septic Shock which is 3 mg/kg). I add the international Renal Handbook recommends 2mg/kg of Gentamicin for patients in the lowest category of renal function like Mr Berry (in GFR not CCR, but that makes no difference to this point), whether on ordinary dialysis or not on dialysis (it is different for CVVHD, but he was not yet on that).

36. Either way, given Mr Berry's dry weight was 84.5g, even assuming he was rather overweight, Dr Thom's dosage of 80mg was less than 1mg/kg and appears significantly *below* the guideline rate 'in-house' and internationally. It is not suggested that such a low dose was itself negligent - Dr Bell says Mr Berry's renal function was so poor that it would have an equivalent effect to a higher dose in a less renally-impaired patient. However, Dr Thom's 80mg dose was significantly lower than guidelines even outside of ICU. Dr Danbury said – and I accept – that he could not recall ever giving an ICU patient with an infection only 80mg of Gentamicin. That is only one ampoule (although presumably not necessarily the minimum dose). Given the risk of Sepsis which Mr Berry was facing midway through the 3rd March, illustrated by the NEWS scores of 7 and 6, I accept that to Dr Meyer, 80mg was a surprisingly conservative dose.

37. In any event, at 15.21 on 3rd March, about 90 minutes after those doses, Mr Berry was admitted to ICU. A note over 24 hours later at 18.21 on 4th March (MR 1736) states *'Thought unlikely to tolerate haemodialysis therefore critical care for CVVHD'* and another said (MR 4086) *"Admitted post-procedure with pulmonary oedema and fluid overload for CRRT."* However, it is important not to take such lines out of context:

37.1 Firstly, it is true that Dr Thom was raising the possibility of transfer to ICU for CVVHD if Mr Berry could not tolerate ordinary dialysis back on 1st March (MR 1526) and expressed herself on the morning of 3rd March (MR 1527) as there being 'no option but referral to critical care for filtration' if the 'isolated UF' (i.e. fluid drainage) did not work. However, as Dr Meyer says, admission to ICU is not up to a Renal Registrar. It is a clinical decision for ICU - on ICU criteria.

37.2 Secondly, I have detailed already the clinical indications on the morning and early afternoon of 3rd March suggesting that Mr Berry had a significant infection that risked developing into Sepsis. The doctor's discharge note from Stephen Ward at 15.21 on 3rd March (MR 4082) refers to the four problems noted above. It does not mention Mr Berry's need for CVVHD, let alone as the main reason for ICU.

37.3 Thirdly, the note prepared at the same time by the same doctor for ICU (MR 4083-5) does note in the admission plan CVVHD with a target of 1-2 litres of fluid removal (noting he last had dialysis for 4 hours on 2nd March and 2 hours on 1st March). But he also noted several other targets, including heart rate control, oxygen saturation of greater than 92%, doubling steroids following rheumatology advice and continuing both Vancomycin and Gentamicin, with the latter to be checked at 10am on 4th March with blood cultures if the temperature spiked. The 'Surviving Sepsis' box was ticked with the White Cell Count of over 12,000 (one of the pre-2016 diagnostic tools for Sepsis as noted above), indeed that morning it had been 16.2 (thousand) and the C-Reactive Protein marker had been 189: indicative of infection: it had been only 30 when last taken on 28th February. This may be why the doctor recorded 'suspected hospital-acquired pneumonia'.

I accept CVVHD was one advantage for Mr Berry of being in ICU, but from clinical notes, it was not the only, nor even the main, reason for his admission to ICU. That was concern about his clinical presentation, his infection and indeed the risk of Sepsis.

38. Indeed, as Dr Danbury records (TB 319) at 16.45 the clinical notes stated: *"Review need for filter based on VBG* [Venous Blood Gases] *and results."* Following a rheumatology review at 17.13, all the results came back at around 6pm (TB 218), including a White Cell Count of 17.6 (up from 16.2 earlier in the day) and a C-Reactive Protein result of 240 (up from 189 earlier in the day). I will come back to the trajectory of these inflammatory markers, although I say now Dr Bell accepts their rise might suggest a rise in infection, but said it could also be contributed to by other factors.

39. A nursing review at 19.59 on 3rd March (TB 212-3), recorded 'Day Evaluations' in a number of domains. Mr Berry presented a mixed picture. On one hand, the CVVHD had started at 19.00 and was progressing well with no issues although Mr Berry was still anuric (not passing urine); he was still on oxygen but had 'nil respiratory distress'; his gastrointestinal function was stable and his abdomen was large but soft and non-tender; and his skin was thin but intact. On the other, his heart was still having atrial fibrillation with an irregular heartbeat: on occasion very fast (125 bpm) reducing after medication; and he had a weak pulse with cool limbs.

40. However, what Mr Berry himself was most concerned with rheumatoid arthritis. He was reviewed by the Rheumatologist at 17.08 (with a higher heart rate and comparably low blood pressure and oxygenation date as when NEWS had hit 7 earlier) (MR 220-1):

> "*Complaining of generalised joint pain, worst in shoulders, hands and elbows. On examination, [Heart Rate] 130 bpm, [Blood Pressure] 91/66, Respiratory 96% ...Extremely restricted [back left ?] shoulder movement. Left elbow restricted. Seen by the Renal team who advised increasing steroids to 40mg….Impression: Ongoing RA flare + pulmonary oedema +/- [Lower Respiratory Tract Infection] Plan… Note increased Prednisolone to 40mg for now…In view of risk of fluid overload with steroids, kindly monitor closely. We will review steroids on Monday*."

However, the increased steroids were not prescribed until 20.47 (MR 4043) (in fact by Dr Meyer). When Mr Berry was seen by the nurses around 20.00, he was still in pain:

> "*Rheumatoid arthritis flare – pain ++ in shoulders and arms. IV paracetamol given with little effect, await doctor review for more analgesic*."

41. Dr Meyer then became involved in Mr Berry's care around 20.00 on 3rd March. He undertook a ward round between then and 20.42 (TB 218-219) noting that Mr Berry was lying flat comfortably and tolerating CVVHD well, with a target of 1-2 litres fluid removal. As I noted, he prescribed the increased steroids for administration the next morning. Other targets on admission were slightly adjusted: on infection, he noted:

> "*Continue Vancomycin, send pre-dose level tomorrow. Blood cultures if spikes*".

Notably, given Dr Bell's suggestion that Dr Meyer could have 'topped up' the Gentamicin, there appears to be no reference to that at all. However, the plan in the box (TB 219) still refers to checking the Gentamicin level at 10 am the following morning.

42. This note read in context is consistent with Dr Meyer still waiting for the Gentamicin level to drop to 1mg/l, in accordance with not only the Defendant's ICU Guideline for it, but its General Guideline for Renal Impairment. As he admitted of the following day, 4th March, he did not know when the Gentamicin level would drop to that 'trough level' so it could be re-prescribed. However, as I have discussed in more detail above, I accept Dr Danbury's criticism of Dr Bell's suggestion that Dr Meyer could have 'topped up' the Gentamicin that evening. It would have created a 'twin peak' of Gentamicin levels with a weaker bacteriocidal effect than a higher peak dose after waiting for the trough level to fall; and it would also have raised the risk of ototoxicity (and gone against all the Defendant's in-house guidelines). Certainly, Claimant's Counsel did not argue this was negligent by Dr Meyer, despite my raising it with Defence Counsel due to my understanding that Dr Bell had suggested precisely that.

4th March

43. According to the Night Evaluation in the nursing notes (TB 212-3), whilst the CVVHD continued overnight without complications and Mr Berry's heart rate was slightly down on what it had been in the day, he did not have a particularly comfortable night. Firstly, there were more notes recorded overnight on his respiratory function relating to reduced air entry and expectorating yellow secretions. Secondly, his abdomen was distended, not just large as it had been in the day - bowel sounds were heard and he was only drinking a small amount of water and eating some yoghurt due to a sore throat. Thirdly, his rheumatoid arthritis remained painful and he did not like to change position, so he started to get marking which risked pressure sores. However, after a stronger painkiller Oxycodone, Mr Berry settled and slept well after 01.00.

44. On 4th March, it appears those painkillers and the increased prescription of steroid Prednisolone had made Mr Berry significantly more comfortable with his arthritis. According to the nursing notes on 4th March (TB 214), his pain in his shoulders, wrists and hands settled to 'mild' and he could move in the bed (which also reduced concern about bed sores). Mr Berry was also eating and drinking better: with a full breakfast lunch and dinner. He even told nurses he was looking forward to watching football on the television that evening. However, whilst Mr Berry's chest was also clearer and he was bringing up fewer secretions, he was still on oxygen. Likewise, whilst his cardio-vascular function seemed more stable, he was still in atrial fibrillation.

45. Moreover, the experts agree (TB 524) the tests undertaken around 05.30 on 4th March showed three concerning inflammatory markers. Firstly, whilst the White Cell Count ('WCC') had barely increased from 16.1 to 16.2 from 2nd to 10.24 on 3rd March, it had increased to 17.6 at 18.01 on 3rd March but then jumped to 22 at 05.35 on 4th March (normal being around 11 as Mr Berry had been on 28th February). Secondly, whilst the C-Reactive Protein ('CRP') (with a normal level of 4) had increased from 189 at 10.43 to 240 at 18.01 on 3rd March, it had then almost doubled overnight to 432 at 05.35 on 4th March. Finally, a new test was done on Procalcitonin ('PCT') which was 6.6 (normal being 0.05). (Indeed, Dr Danbury criticises the lack of a second PCT check).

46. Dr Danbury accepted in some ways Mr Berry was 'feeling better' on 4th March than on 3rd March. His arthritis flare-up was settling a little with painkillers and increased steroids. His heart was starting to recover from what Dr Bell had called the 'stunning' by the myocardial infarction days earlier. Nevertheless, Dr Danbury's clear opinion was that Mr Berry's infection was progressing, as shown by those three inflammatory markers in combination, especially against the background of the previous day's NEWS scores (which are not taken on ICU given the constant monitoring). As Dr Danbury observed, even after Dr Thom's modest doses of Vancomycin and Gentamicin the previous day, the infection markers had continued to rise steeply.

47. Dr Bell disagreed, relying on Mr Berry's improved presentation on 4th March. He accepted the PCT score was high and suggestive of systemic infection rather than Sepsis (TB 524), but there was only one reading which could not track its progress. He said the near-doubling of the CRP overnight did not prove Sepsis and while it might suggest Mr Berry's infection was worsening, the picture was complicated by lots of other factors. The elevated WCC might be explained by the flare-up of the arthritis.

48. I am very conscious of Dr Bell's long experience and unquestionable expertise in ICU medicine. I am also conscious that Dr Danbury made a number of concessions, including his error relating to his own ICU Guideline in Southampton, on causation and on Sepsis, indeed after hearing Dr Bell's evidence. However, there lies the rub. When he was giving evidence on this subject, Dr Bell was being cross-examined by Defence Counsel on Dr Danbury's previous opinion that Mr Berry had Sepsis. Dr Bell's main focus in evidence was to rebut that view, which he successfully did. However, he also accepted that Mr Berry clearly did have an infection, just not Sepsis.

49. Once the expert evidence was able to move beyond what at times felt like a slightly arid debate about whether Mr Berry strictly met the criteria for Sepsis, in my judgement, the distance between Dr Bell and Dr Danbury on the progress of the infection narrowed. It became essentially a difference of emphasis. Dr Danbury was keen to emphasise the inflammatory markers and how they had progressed overnight from the previous day, notwithstanding that Mr Berry plainly felt more comfortable. Dr Bell acknowledged the inflammatory markers were generally indicative of infection, but was keen to emphasise other factors, such as the arthritis and tissue injury etc, as well as the improved clinical presentation. I was also conscious both experts were undertaking this exercise not only in support of their respective sides, but also in retrospect (and knowing that Mr Berry received a large 400mg dose of Gentamicin later that day). So, the issue must be seen through two different lenses. Firstly, the actual progress of Mr Berry's infection at the time in the light of all the evidence, including the expert evidence in retrospect. Secondly, how it would have appeared to clinicians at the time.

50. On the former: the actual progression of Mr Berry's infection, while it came down to a difference in emphasis rather than irreconcilable opinions, I found Dr Danbury's emphasis more realistic and logical than Dr Bell's, for three reasons:

    50.1 Firstly, whilst Dr Bell understandably focussed on Mr Berry's improved clinical presentation on 4th March, this must be seen against Mr Berry's consistently concerning clinical presentation the previous day which led to admission to ICU (I have found, not simply for CVVHD, although that was also a benefit of ICU). Moreover, Dr Bell agreed Mr Berry still had an infection – probably a lower respiratory tract or chest infection. Dr Bell's dispute with Dr Danbury (aside from whether it met the clinical criteria for Sepsis) was whether it was *worsening*. Dr Bell argued it was not, pointing to Mr Berry's improved presentation, both in his feeling more comfortable and less concerning respiration, heart function etc. However, Dr Danbury illustrated how the clinical picture could be complicated by Mr Berry's heart recovering from its 'stunning' by the heart attack days previously and effectiveness of treatment of rheumatoid arthritis with painkillers and steroids which would have made Mr Berry more physically comfortable. So, it is understandable why Dr Danbury looked for a more solid objective measure of infection progress than Mr Berry's presentation: the consistent rise in inflammatory markers overnight- all pointing towards worsening infection.

50.2 Secondly, in the joint statement when commenting on PCT, CRP and WCC (TB 524-8), they agreed that all three were biomarkers of infection, albeit Dr Bell distinguished that from systemic infection and from Sepsis. Although they disagreed on Sepsis, Dr Bell and Dr Danbury agreed PCT of 6.6 was 'associated with the likelihood of systemic infection', although Dr Bell rightly pointed out that there was only one PCT reading, so it could not track its progress. Other than (rightly) arguing that none of the biomarkers individually or cumulatively proved Sepsis, Dr Bell suggested the rise in WCC may be explained by the Rheumatoid Arthritis flare-up. However, Dr Bell could not explain why the WCC of 17.6 at 18.01 on 3rd March – just after the rheumatology review – had marginally increased from 16.2 that morning but then jumped to 22 overnight at 05.33 on 4th March. Dr Bell also said while the rise in CRP might be associated with infection, it was complicated by other organ dysfunction and renal failure. However, as Dr Danbury pointed out, the CRP would be the most reactive to infection and antibiotic treatment and a jump like this showed the infection had worsened overnight (when other organ functioning - e.g. the heart - seemed to improve). This conclusion was not inconsistent with Mr Berry's improved clinical presentation given the complexities in picture Dr Danbury described. However, Dr Bell's attempt to 'pick off' each of the biomarkers individually ignored that he had agreed the PCT suggested systemic infection and whilst that was a 'snapshot', the other markers were rising. In short, Dr Bell was looking at the inflammatory markers in isolation not in the round like Dr Danbury.

50.3 Thirdly, Dr Bell accepted Mr Berry on 4th March still had an infection which required treatment with antibiotics – his view was just the second dose should have been similar to the first of 80mg prescribed by Dr Thom the day before. However, as Dr Danbury observed and as I have discussed, that was a low dose which was more likely to have been bacteriostatic than bacteriocidal and it did not prevent the rise in the inflammatory markers. As Dr Meyer rightly said, the 80mg proved 'inadequate': it had been intended to treat Mr Berry's underlying infection, but it had failed to prevent it getting worse overnight.

Therefore, on all the evidence, I find on the balance of probabilities that by 4th March, as indicated by the biomarkers, Mr Berry had a worsening systemic infection, which was not true Sepsis but risked developing into it, even though in many ways Mr Berry's clinical presentation was better than the previous day, for the reasons Dr Danbury gave.

51. However, it is one thing to make that findings as I have on the balance of probabilities on all the evidence with hindsight. That is not something Dr Meyer had when he saw Mr Berry again on his ward round at lunchtime on 4th March. He could see that a renally-compromised patient admitted to ICU with a suspected infection and for CVVHD presented as better than on the previous day. However, he could also see that the inflammatory markers had increased which on the face of it suggested an increasing infection (as I have found was in fact the case). Mr Berry was therefore presenting a complicated mixed clinical picture, possibly requiring a mixed clinical response. From the contemporaneous clinical notes, this is precisely what Dr Meyer did.

52. In Dr Meyer's ward round note at about 12.30 (TB 221), he noted a range of indications from Mr Berry's improved clinical presentation, that he had tolerated well CVVHD at the slower rate of 2000 ml/h and his heart rate and respiratory rate had improved. However, Dr Meyer also noted the raised inflammatory markers. His note records:

> "*Seems much better than described on admission, after fluid removal. Inflammatory markers still high….Plan (AM): Attempt fast dialysis rate 4000 CVVHD to mimic ward IHD If tolerated can step down to Stephen Ward Continue [Vancomycin and Gentamicin] **according to levels** & steroids Warfarin reloading with dalteparin cover Digoxin level Could step down to VHDU note or Stephen Ward once proven to tolerate IHD*".

Whilst that does not record what dosage Dr Meyer prescribed, that is clear from Mr Berry's drug chart showing 'PRN' prescriptions (i.e. *'Pro Re Nata'* - 'as circumstances arise' – here it was conditional on trough level falling below 1 mg/l) (MR 4040/4043):

> "*INACTIVE Gentamicin Inj (PRN • Course) 400 mg IV PRN Start 04/03/2017 1236 Schedule for 3 days Stop; 07/03/17 1237 Indication HAP Prior to giving check when STAT dose given and that a gentamicin level has been taken Redose when level is less than 1 mg/L as per protocol Use ideal body weight for dose calculation For obese patients use dose determining weight Maximum dose... JM 04/03/2017 1237*."

53. Dr Meyer accepted that many of these details about protocols etc were from standard 'drop-down menus' on the ICU computer system. They refer to and in effect incorporate the ICU Guideline on Gentamicin, which I repeat in full for convenience:

> "*This guideline is for use within adult critical care areas only. Treatments, medicines and monitoring methods contained within this document may not be clinically appropriate outside these settings. DO NOT USE outside adult Critical Care areas*

without consulting with the Critical Care consultant on call and/or Critical Care pharmacist. Critical care pharmacy team / Critical care consultants. This Guideline is for reference only and for interpretation by clinical healthcare professionals working in the critical care setting.

Patients with normal renal function

Prescribe between 5 mg/kg to 7 mg/kg (ideal body weight) to a maximum of 480mg. Ideal Body Weight (kg) for men = 50kg + [(height (cm) – 154] x 0.9) Ideal Body Weight (kg) for women = 45.5kg + [(height (cm) – 154] x 0.9) Obese patient dosing should be based on dose determining weight (obesity is defined as actual body weight (ABW) >20% higher than ideal body weight IBW) again to a maximum of 480mg per dose: DDW (kg) = IBW + [0.4 x (ABW – IBW)] Please check if previous aminoglycoside therapy has been administered to the patient. If a dose of amikacin or gentamicin has been given within last 24 hours, the timing of the gentamicin dose should be confirmed with the ICU medical team.

Patients with impaired renal function

A large first dose is still desirable. In the majority of patients 5 to 7 mg/kg (to a maximum of 480 mg) should be used. The continuation of gentamicin in renal failure must be reviewed after the initial dose in accordance with the critical care empirical antibiotic guidelines and microbiology. If gentamicin it is still the preferred agent, consider reducing subsequent doses, discuss dosing regimen with critical care pharmacy. Re-dose according to levels (see therapeutic drug monitoring section). For further advice on dosing in renal impairment and CRRT, discuss with critical care pharmacy team.

Administration - Administer in 100 mL glucose 5% or sodium chloride 0.9% over 30 minutes. Therapeutic drug monitoring - Samples should be taken 20 hours post-dose If gentamicin level is less than 1 mg/L, patients may be re-dosed. If gentamicin level is greater than 1 mg/L, re-check levels in another 12 hours. Do not re-dose gentamicin until the trough level is less than 1 mg/L Length of Treatment - Initial dose should always be prescribed on "Stat" section of medication record…. If a course is required, subsequent doses should be prescribed on the "PRN" section for a total maximum duration of five days.

Summary - All patients should initially receive 5-7 mg/kg administered in 100 mL of glucose 5% or sodium chloride 0.9% over 30 minutes. Dosing is based on Ideal/Dose

> *Determining weight. Maximum dose is 480 mg Levels should be requested from the ICU laboratory 20 hours post-dose. If levels are below 1 mg/L patients may be re-dosed if levels are greater than 1 mg/L, re-check in 12 hours."*
>
> *This Guideline is for reference only and interpretation by clinical healthcare professionals working in clinical care setting…***"**

54. There was also debate in the ICU experts' joint statement whether Dr Meyer considered Mr Berry's renal function before deciding on dose, as he did not mention it in the notes (TB 533-3). On the evidence, I find Dr Meyer specifically considered it and the 400mg dose as part of a deliberate 'strategy' to address Mr Berry's complex clinical picture:

    54.1 On one hand Mr Berry's presentation had improved overnight – as Dr Meyer could see for himself having seen Mr Berry the previous evening. He was also tolerating CVVHD well at 2,000 ml/hr. If he could tolerate it at 4,000 ml/hr, that would be comparable to ordinary HD on the normal ward and he might not need to stay on ICU. However, on the other hand, Dr Meyer still remained concerned about Mr Berry's worsening infection given the inflammatory markers which had risen dramatically (the CRP almost doubling). This was despite the 80mg dose the previous day Dr Meyer rightly felt proved 'inadequate' to address the infection. Moreover, even after only 80mg, almost 24 hours later the Gentamicin trough level had still not been reached and Dr Meyer did not know when it would be reached, even with an increase to 4,000 ml/hr CVVHD. Nor did he know how long after a higher dose it would take to reach trough level for a third dose, nor what state Mr Berry would be in then. Therefore, Dr Meyer realistically only had 'one shot' (as Dr Danbury put it) to tackle the worsening systemic infection, before it deteriorated and tipped over into true Sepsis. That could be life-threatening given Mr Berry's underlying vulnerabilities. As Defence Counsel argued, the nub of the issue was as Dr Meyer put it in his statement (TB 156/160):

> "*Mr Berry was at high risk of further deterioration due to underlying medical conditions including….heart disease, chronic kidney disease, hypertension, arthritis and impaired immunity from long term steroid therapy….In patients who have life-threatening infection, the risk of under treatment and death outweighs the risk of rare drug-related ototoxicity.*"

54.2 Faced with this mixed clinical picture, Dr Meyer adopted a mixed clinical strategy. Given Mr Berry's improvement in presentation and tolerance of 2,000 ml/hr CVVHD, Dr Meyer decided to trial 4,000 ml/hr closer to the speed of ordinary HD, to see whether he could tolerate dialysis back on the ordinary ward. If he could, Dr Meyer was comfortable with Mr Berry leaving ICU with a bacteriocidal dose of Gentamicin. Hopefully that would cause improvement (but Dr Meyer knew Stephen Ward could manage Sepsis anyway, provided Mr Berry did not need ventilation. So, if Mr Berry could tolerate 4,000 ml/hr and receive a suitable dose of Gentamicin (especially given it may be a while before he could be re-dosed), he no longer needed to stay on ICU. That is criticised by Dr Danbury, but in fairness to Dr Meyer, he decided on a *trial* of 4000 ml/hr then a later review – as he noted (TB 212) *'Need to demonstrate tolerance of IHD before step down'*. Only once that was shown at 15.45 did he authorise the step-down. Whilst I have found Mr Berry's need for CVVHD was not the main reason he was *admitted* to ICU on 3rd March, by the afternoon of 4th March, whether he needed CVVHD rather than ordinary HD was the main issue *keeping* him there.

54.3 However, the other part of this mixed strategy was addressing the infection with a bacteriocidal dose of Gentamicin. It is unreal to suggest Dr Meyer 'ignored' or 'overlooked' either Mr Berry's condition or indeed his renal impairment, whether or not he formally noted the latter. Dr Meyer was well-aware of Mr Berry's renal function – it was why he decided on the 4,000 ml/hr trial. Dr Meyer was also aware of the risk of ototoxicity from Gentamicin, although he said and I accept he had not come across a case of it after ICU (even with follow-up clinics) and it was not easy to predict. So, for Dr Meyer, it was understandable the risk from the infection which could be life-threatening outweighed uncertain risk of ototoxicity. Dr Meyer did not 'ignore' that risk or the extent of Mr Berry's renal impairment, he simply considered as the infection had got worse despite the 80mg dose, he only had 'one shot' and a much higher dose was required to have a bacteriocidal effect. Even then, he did not apply the guideline 'automatically'. Indeed, his dose level of 400mg given Mr Berry's weight was 4.73mg/kg, slightly below the 5-7 mg/kg range 'for the majority of patients'. Moreover, this was not the 'first dose', so rather than giving it immediately, Dr Meyer applied the spirit of the guideline in setting a precondition that the 400mg should only be administered once the trough level fell below 1mg/l. So, he specifically addressed the risk of ototoxicity.

55. There are three more factual findings to make about Dr Meyer's prescription decision:

55.1 Firstly, when Dr Meyer used the word 'Sepsis' in evidence, it was evidently in a loose sense he (but not the experts) equated with severe/systemic infection. For the reasons I have given above, whilst Mr Berry's infection did not meet the strict new 2016 criteria for Sepsis, on 4th March, it was indeed a worsening systemic infection which met the older criteria and risked turning into true Sepsis. I accept that given Mr Berry's vulnerabilities that would have put his life at grave risk (indeed severe Sepsis would eventually kill him in 2019). Therefore, Mr Berry's infection was truly 'life-threatening', at least if not properly treated.

55.2 Secondly, as one would expect from a clinician who is Chair of the Clinical Guidelines Committee at his hospital, Dr Meyer had clearly thought about the application of guidelines. He recognised guidelines are neither mandatory nor a substitute for individual clinical judgement and that sometimes different ones said different things and it was important to consider which was most appropriate to the particular clinical situation. Dr Meyer readily accepted that for Mr Berry, he did not consult the NICE/BNF guidelines, nor did he measure the 'Creatinine Clearance Rate' ('CCR') or the 'GFR', but he (correctly) worked on the basis it was in the lowest category. Indeed, Dr Danbury observed – and I accept - that once on ICU where condition can change so quickly, it is impractical to work out the exact CCR or GFR which takes a considerable time (to which I return). Moreover, Dr Meyer did not consult a renal specialist like Dr Thom (although her dose had already proved 'inadequate'). Ultimately, Dr Meyer had confidence in the ICU Guideline at the time. It had been through rigorous governance checks by the drug sub-committee and was in place across several hospitals with many staff and thousands of patients and he was unaware of any incidents of ototoxicity. Dr Meyer was also conscious that one of the main reasons why the ICU Gentamicin guideline favoured the large initial HDEI dose of at least 5 mg/kg was that almost half of patients were previously under-dosed with Gentamicin.

55.3 Thirdly, whilst Dr Bell was critical of the decision to administer 400 mg/l of Gentamicin on the evening of Saturday 4th March when Mr Berry had finished dialysis and would not start it for 48 hours until Monday 6th March, when Dr Meyer made the prescription decision, Mr Berry was still on CVVHD. Indeed, Dr Meyer decided to increase the CVVHD rate. When he did so, he did not know there would be a delay of several hours before the Gentamicin was administered.

56. Moving beyond the actual prescription decision, Dr Meyer saw Mr Berry again at around 15.45 on 4th March (TB 222). A note from 15.23 (TB 214) suggests this was just after Vancomycin had been re-dosed, but the trough level for the Gentamicin was still not reached so Mr Berry could still not have the 400mg dose. Dr Meyer noted he:

> *"Tolerated CVVHD 4000/h very well. Stop [Renal Replacement Therapy] for now. Can step down to Stephen Ward providing we have informed renal team and that they are happy to provide ongoing RRT."*

It appears from the notes that CVVHD was discontinued about 16.00. As I have said, Dr Bell is critical of this quite aside from the dosage. Indeed, at one point I understood him to say his complaint was not the dose in itself, but its administration with no dialysis due for 48 hours – which was not pleaded. However, Dr Meyer explained that CVVHD had been effective and it was usual to discontinue it to allow patients a period of rest, eating and drinking. Dr Danbury was clear that one would not normally continue CVVHD simply to filter out a Gentamicin dose and Dr Bell did not go that far.

57. Indeed, Claimant's Counsel was clear the forensic target remained the 400mg dose, especially its administration after dialysis had finished when Mr Berry was moving back down to Stephen Ward. Therefore, under the Defendants' general renal impairment antibiotics guidelines, Mr Berry would have been given a much lower dose than under the ICU Gentamicin Guideline (although he acknowledged Dr Danbury's point about 'bright line rules'). On the face of it, this feels like more fertile ground for the Claimant's complaint, not least as Dr Danbury was critical of the decision to step down from ICU before it was clear the infection was under control, indeed almost contemporaneously with the Gentamicin administration. Moreover, as Dr Meyer accepted, he did not revisit his dosage decision when stopping the CVVHD at 1545.

58. Indeed, Dr Meyer also accepted there appears to have been a delay in the administration in the Gentamicin. Records suggest (TB 237 / MR 3836-7) that whilst samples were sent for Gentamicin testing around 13.00 on 4th March, they do not appear to have been received by the lab. They were then re-taken by a nurse around 18.21. The Gentamicin level recorded at 18.51 was recorded at less than 0.78 mg/L, suggesting it fell below 1mg/L some time earlier, yet it was still not administered. This appears to have been overlooked. However, when the Gentamicin level was checked again at 20.28, it was less than 0.6 (MR 3837). 400mg was finally administered at 20.32 (MR 4097).

59. However, again, this delay in itself is not pleaded as negligence, nor indeed causative. Again, the target remains the dose of 400mg itself, but here on the basis it was administered 8 hours after Dr Meyer prescribed it and almost 5 hours after Dr Meyer last examined Mr Berry with dialysis stopping soon afterwards. It is suggested by then Mr Berry had improved still further – consistently with his 'step down' to Stephen Ward (a decision Dr Danbury criticises but which the Clamant contends was correct). So, whilst I consider *Bolam*-negligence below, the factual question arises as to what Mr Berry's clinical state was at 20.30 when the Gentamicin was administered. There are some descriptions of Mr Berry's clinical presentation on ICU on the evening.

60. At about 17.00 (MR 4086) or 18.20 (MR 1736) a doctor prepared 'ICU Discharge Information'. Various aspects of this note have been referred to by Claimant's Counsel:

> *"Admitted post-procedure with pulmonary oedema and fluid overload for CRRT. Started on empiric Antibiotics for possible lower respiratory tract infection as well. Achieved negative fluid balance and tolerated high flow (4l/hr) CRRT and improved significantly….Currently stable, off CRRT and can be [stepped-down] to the ward for further cardiology, rheumatology and renal care…..CRP / PCT / WCC still high, but not septic'."*

However, this document is not entirely easy to interpret, since despite being timed as 16.57 by one doctor, it refers to the Gentamicin dose having been given. Whilst the drug chart is timed by a different doctor at 19.30, the Gentamicin still had not been given at this point either. Therefore, I am rather wary how much weight I can attach to this document. It is likely to be one of those entries Dr Meyer said are completed by cut and pasting information from other sources, rather than any detailed examination.

61. More promising is the review of Mr Berry by the nurse who re-took Gentamicin samples at 18.21 whose discharge summary at 18.52 (TB 210) noted the NEWS was down to 4, with lower heart rates and higher blood pressure than 24 hours earlier. She noted the oedema had improved with the dialysis having removed about 1600ml. It was also noted he had improving shoulder pain. However, she also noted the inflammatory markers (which were not re-taken at that stage) and ongoing atrial fibrillation, as well as some markers of lactic acid. Dr Meyer recalled there had also been another brief incident of oxygen desaturation on ICU, although appears to have recovered by 18.52 and Mr Berry's respiratory function was described as 'comfortable'.

62. However, a physio whose note is timed 19.29 saw Mr Berry (TB 215) noted that his mobility was limited due to shortness of breath although he had no respiratory needs and a full functional assessment was not possible due to staffing levels. However, she also noted that Mr Berry *'appeared a little confused when I returned to him later in the day, this should be monitored'*. I have been unable to find a closer clinical review to the point an hour later at 20.32 when the Gentamicin was finally administered. Mr Berry was then moved back down to Stephen Ward about 21.00. His NEWS reading at 21.42 was Low Risk (MR 2242) as it was at 07.12 on 5th March (MR 2243)

63. I asked Dr Danbury whether in the absence of further inflammatory markers being taken on the evening of 4th March, whether it would be possible to extrapolate likely levels from the readings taken the following morning 5th March at 08.00, just under 12 hours after the Gentamicin had been administered. This was 19 on WCC (falling from 22 at 05.35 on 4th March) and 415 on CRP (falling from 432 at 05.35 on 4th March) (TB 524). PCT was not re-taken, which Dr Danbury criticises. I was conscious Dr Bell said the peak effect of a dose of Gentamicin was about 30-60 minutes after the dose. Dr Danbury said such a small reduction from the CRP and WCC readings 24 hours earlier, even after that peak effect of a 400mg dose of Gentamicin, showed the levels if taken shortly before it was administered on 4th March would have been higher than they had been in the morning – especially the CRP level which is particularly responsive.

64. That seems to me common sense. As a relatively large dose of 400mg on the balance of probabilities would have caused the CRP at least to fall by more than 17, its level as at 20.30 on 4th March must have been higher than 432. As I accept biomarkers are the best evidence of infection progress, I find on the balance of probabilities Mr Berry's infection (and the risk of Sepsis) had worsened during the day of 4th March. Moreover, it also suggests Dr Bell's suggested 160mg dose, may well have left the infection markers around or even above where they had been at 05.35 that morning. Dr Danbury said the Defendant 'got away with' stepping down Mr Berry given the ongoing infection. Yet, without further dose after 4th March, Mr Berry's infection improved and he did not develop Sepsis. In Dr Danbury's clinical judgement, it was right to prescribe 400mg on the afternoon of 4th March and to administer it on the evening, when the risk of Sepsis was even closer. Indeed, I accept Dr Danbury's opinion that on the balance of probabilities, Mr Berry would have developed Sepsis but for the Gentamicin dose.

Mr Berry's Ototoxicity

65. Given that the ENT evidence and quantum is agreed, I can take my remaining findings of fact much more shortly. There are very few entries on Sunday 5th March, where Mr Berry was back on Stephen Ward having had the 400mg Gentamicin dose. In addition to that NEWS score at 07.12 and those inflammatory marker levels at 08.00, I note Mr Berry's estimated GFR was 15 and Creatinine level (rather than CCR) was 359, although no-one has suggested those readings assist me in the findings I am asked to make. It appears that Mr Berry had a quiet day and it is also agreed he had no dialysis.

66. The dialysis re-started on Monday 6th March after Dr Thom saw Mr Berry against about 13.00 as she was concerned about his fluid overload and difficult breathing. Indeed, Dr Thom called for review by the Cardiology and Microbiology teams as she considered that Mr Berry was *'not responding biochemically to antibiotics'* (MR 1528). This needs to be read alongside her comment at 15.07 (MR 1528) that the "*Gentamicin dose is approximately 3-4x what I would normally recommend in haemodialysis patient and runs the risk of severe ototoxicity."* Nevertheless, Dr Thom recommended the level should 'unusually' be taken after dialysis and if less than 1mg/L, then a dose of 80mg be given. In fact, the reading taken at 17.10 was 9.67 mg/l and at 21.41 was 4.59 mg/l. Mr Berry was noted as 'dizzy and feeling sick' (MR 1529).

67. It seems to me important to make three points about Dr Thom's entries on 6th March:

    67.1 Firstly, she plainly felt the dose of 400mg was far too high. It was certainly far higher than the Defendant's guideline for renally-impaired patients outside of ICU. It was far higher than Dr Thom herself had dosed Mr Berry. She was concerned it risked ototoxicity, which it is now agreed did eventuate. It is not clear whether she had been on duty on 4th March, but had Dr Meyer consulted her about the dose, she certainly would have raised concerns about 400mg. However, as Dr Meyer pointed out, Dr Thom was a more junior doctor, working in a different department – indeed, it was not clear she had much if any ICU experience. Her focus was Mr Berry's renal function and the risk of ototoxicity. Dr Meyer's focus had been Mr Berry's infection progress. It was natural they would strike the risk/benefit analysis in quite different ways. So too did the guidelines that each of them applied, because as Dr Meyer said, the context on ICU was different than the normal ward. I will have to consider that.

67.2 Secondly, for all Dr Thom's concern about the 'excessive' dose of Gentamicin, she was keen to prescribe even more and asked for Gentamicin levels to be checked even after dialysis so she could evaluate whether another dose could be given. Of course, the levels showed that it could not be. However, her keenness to re-dose if possible so soon after such a high dose reflected that even she was still concerned about Mr Berry's infection, which appeared to be *'not responding biochemically to antibiotics'*. This gives a quite different picture than Dr Bell sought to paint about 4th March. Indeed, in his initial report I cannot see any reference to this, for all the highlighting of Dr Thom's criticism of 400mg.

67.3 Whilst it is unclear where the suggestion came from to the Claimant that her brother *'had been given an overdose of Gentamicin and rushed to ICU'*, it is quite likely that she was told that he had been 'given an overdose *on* ICU' – and the most likely 'junior doctor' who would have told the Claimant this was Dr Thom. That information is likely to have fuelled an understandable sense of grievance both in Mr Berry and the Claimant who then looked after him due to ototoxicity. But I must decide later whether that was actually a fair criticism of Dr Meyer.

68. The Gentamicin levels stayed elevated for a considerable time. It was 5.54 mg/l on 7th March (MR 3846) and 4.27 mg/l on the morning of 8th March (MR 3849). Mr Berry reported feeling unwell and that his back hurt (MR 1529). Whilst the Gentamicin level was recorded as 1.93 mg/l later that day, this may have been a misreading, as it raised again to 2.26 mg/l on the morning of 9th March [MR 3854], which no-one has explained. On that day however, Mr Berry reported feeling "*slightly "spaced out" today"* and "*feels hearing has deteriorated in last few days… also occasionally feeling dizzy now."* Dr Thom explained to Mr Berry that he had been given a very high dose of antibiotics and that as the levels were so high, this might have affected his hearing. Mr Berry was told that damage to his hearing was more likely to occur where there was prolonged use of antibiotics, and he was told that Gentamicin was no longer being administered to him (MR 1530, 1766, 1770). Mr Berry's Gentamicin level finally fell below 1 on the morning of 10th March (MR 3855), although no more Gentamicin was prescribed. Tympanometry showed hearing loss in both ears on 13th March [MR 1807] and Mr Berry was discharged home on 16th March. It is not suggested the 400mg of Gentamicin failed to address Mr Berry's apparently hospital-acquired infection, rather but that it was a 'sledgehammer to crack a nut'.

69. As I noted above, it is agreed evidence between the ENT Surgeons the Gentamicin did cause ototoxicity leading to balance problems. Whilst it was not agreed it caused hearing loss, given Mr Berry had no previous hearing issue, those contemporary notes strongly suggest that it also caused hearing loss and I am prepared to make that assumption although nothing turns on it, as the causation of injury is accepted and damages agreed (the causation question is whether a lower dose would have been causative). For those reasons, I can deal with the aftermath for Mr Berry and the Claimant very briefly indeed, although without in any way minimising how difficult it was for them both. It is simply that it is no longer disputed that it had this effect.

70. Only days after his discharge, on 18th March 2017, Mr Berry complained of pain in his back and arm and collapsed into his chair and was re-admitted to St Thomas Hospital and diagnosed with tissue inflammation. In entries in April, he was recorded as restricted to bed due to dizziness and so experienced postural hypotension. Records noted dizziness and bilateral hearing loss and tinnitus. In May, the dizziness was diagnosed as Gentamicin-associated vestibular ototoxicity and a back fracture was located. As the Claimant says, Mr Berry was re-discharged on 13th May. She recalled:

> *"I was very concerned about his wellbeing. His vision had deteriorated, and his hearing wasn't so good. He was unable to stand on his own and he was not in a condition to be able to go back and stay at his own home. After the discharge from St Thomas' Hospital a special bed was ordered for him and John stayed with me at my house. Other than the special bed there were some other bits of equipment to help his condition, and I was there to help him most of the time."*

In June, the limitations on his mobility were noted and in July, he was using a wheelchair, which his consultant attributed to the Gentamicin dosage. Whilst there are disputes about the effect on his sense of taste and smell, it is unnecessary to resolve the causation of those, although I accept Mr Berry experienced them. Certainly, the effects of the Gentamicin dose cast a shadow over the rest of the year. Mr Berry moved in with the Claimant and I accept she spent many, many, hours diligently caring for him. However, by 2018, Mr Berry's difficulties were compounded by unrelated problems with his left foot leading to amputations on his toes. By June, he was suffering from necrosis to his right heel and after a month in hospital in September 2018, he was re-admitted in December with Sepsis. He sadly died in hospital on 23rd January 2019.

Law on Bolam-Negligence and Clinical Guidelines

71. Both Counsel helpfully referred me to the classic discussions of breach of duty in *Bolam* and *Bolitho,* to which I referred briefly above. McNair J's classic direction I quoted above is a feature of almost all professional negligence cases, let alone clinical negligence ones. However, in the present case, it pays to repeat it once more:

> "[A clinician] "*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*" [and not] "*merely because there is a body of opinion which would take a contrary view."*

72. In *Maynard v WMRHA [1984] 1WLR 634 (HL)* at 689 and 683 Lord Scarman said:

> *"... I have to say that a judge's 'preference' for one body of distinguished professional opinion to another also professionally distinguished is not sufficient to establish negligence in a practitioner whose actions have received the seal of approval of those whose opinions, truthfully expressed, honestly held, were not preferred….In the realm of diagnosis and treatment negligence is not established by preferring one respectable body of professional opinion to another….*
>
> *…..Differences of opinion and practice exist and will always exist in the medical and other professions. There is seldom only one answer exclusive of all others to problems of professional judgement. A Court may prefer one body of opinion to the other, but that is no basis for a conclusion of negligence".*

73. In *Bolitho*, in addition to dealing with the burden of proof being on the Claimant (see also *Ternent v Ashford NHS [2010] EWHC 593*) and 'counter-factual causation' (which does not arise here), Lord Browne-Wilkinson addressed *Bolam*-negligence itself at pg.241-2 and 243. I have quoted this in part already, but it all bears quotation:

> *"In my view, the court is not bound to hold that a defendant doctor escapes liability for negligent treatment or diagnosis just because he leads evidence from a number of medical experts who are genuinely of opinion that the defendant's treatment or diagnosis accorded with sound medical practice. In the Bolam case itself, McNair J. at pg.587 stated that the defendant had to have acted in accordance with the practice accepted as proper by a "responsible body of medical men." Later, at p. 588, he referred to "a standard of practice recognised as proper by a competent reasonable body of opinion'….*

.....Again, in the passage which I have cited from Maynard's case at pg.639 [quoted above], *Lord Scarman refers to a "respectable" body of professional opinion. The use of these adjectives—responsible, reasonable and respectable—all show that the court has to be satisfied that the exponents of the body of opinion relied upon can demonstrate that such opinion has a logical basis. In particular in cases involving, as they so often do, the weighing of risks against benefits, the judge before accepting a body of opinion as being responsible, reasonable or respectable, will need to be satisfied that, in forming their views, the experts have directed their minds to the question of comparative risks and benefits and have reached a defensible conclusion on the matter…*

These decisions demonstrate that in cases of diagnosis and treatment there are cases where, despite a body of professional opinion sanctioning the defendant's conduct, the 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 the conclusion that views genuinely held by a competent medical expert are unreasonable. The assessment of medical risks and benefits is a matter of clinical judgement which a judge would not normally be able to make without expert evidence. As the quotation from Lord Scarman [again from *Maynard*, again quoted above] *makes clear, it would be wrong to allow such assessment to deteriorate into seeking to persuade the judge to prefer one of two views both of which are capable of being logically supported. It is only where a judge can be satisfied that the body of expert opinion cannot be logically supported at all that such opinion will not provide the benchmark by reference to which the defendant's conduct falls to be assessed."*

74. The approach in *Bolitho* has been helpfully analysed many times since (a relatively recent example is ps.117-119 of *Dowson v Lane [2020] EWHC 642* by HHJ Auerbach) However, both Counsel cited the analysis of Green J (as he then was) in *Cumbria*. Again, I have cited it partly already, but again it bears repeating. Having discussed *Bolam, Maynard* and *Bolitho*, Green J helpfully (and with the assistance of very experienced Counsel (including Martin Spencer J as he now is) sought to pull the threads together from those cases into further guidance on the standard of care at p.25:

> *"…[I]n the light of the case law the following principles and considerations apply to the assessment of such expert evidence in a case such as the present:*
>
> *i) Where a body of appropriate expert opinion considers that an act or omission alleged to be negligent is reasonable a Court will attach substantial weight to that opinion.*
>
> *ii) This is so even if there is another body of appropriate opinion which condemns the same act or omission as negligent.*
>
> *iii) The Court in making this assessment must not however delegate the task of deciding the issue to the expert. It is ultimately an issue that the Court, taking account of that expert evidence, must decide for itself.*
>
> *iv) In making an assessment of whether to accept an expert's opinion the Court should take account of a variety of factors including (but not limited to): whether the evidence is tendered in good faith; whether the expert is "responsible", "competent" and/or "respectable"; and the opinion is reasonable and logical.*
>
> *v) Good faith: A sine qua non for treating an expert's opinion as valid and relevant is that it is tendered in good faith. However, the mere fact that one or more expert opinions are tendered in good faith is not per se sufficient for a conclusion that a defendant's conduct, endorsed by expert opinion tendered in good faith, necessarily accords with sound medical practice.*
>
> *vi) Responsible/competent/respectable: In Bolitho Lord Brown Wilkinson cited each of these three adjectives as relevant to the exercise of assessment of an expert opinion. The judge appeared to treat these as relevant to whether the opinion was "logical". It seems to me that whilst they may be relevant to whether an opinion is "logical" they may not be determinative of that issue. A highly responsible and competent expert of the highest degree of respectability may, nonetheless, proffer a conclusion that a Court does not accept, ultimately, as "logical". Nonetheless these are material considerations.*

In the course of my discussions with Counsel, both of whom are hugely experienced in matters of clinical negligence, I queried the sorts of matters that might fall within these headings. The following are illustrations which arose from that discussion. "Competence" is a matter which flows from qualifications and experience. In the context of allegations of clinical negligence in an NHS setting particular weight may be accorded to an expert with a lengthy experience in the NHS. Such a person expressing an opinion about normal clinical conditions will be doing so with first-hand knowledge of the environment that medical professionals work under within the NHS and with a broad range of experience of the issue in dispute. This does not mean to say that an expert with a lesser level of NHS experience necessarily lacks the same degree of competence; but I do accept that lengthy experience within the NHS is a matter of significance. By the same token an expert who retired 10 years ago and whose retirement is spent expressing expert opinions may turn out to be far removed from the fray and much more likely to form an opinion divorced from current practical reality. "Respectability" is also a matter to be taken into account. Its absence might be a rare occurrence, but many judges and litigators have come across so called experts who can "talk the talk" but who veer towards the eccentric or unacceptable end of the spectrum. Regrettably there are, in many fields of law, individuals who profess expertise but who, on true analysis, must be categorised as "fringe". A "responsible" expert is one who does not adapt an extreme position, who will make the necessary concessions and who adheres to the spirit as well as the words of his professional declaration (see CPR35 and the PD).

vii) Logic/reasonableness: By far and away the most important consideration is the logic of the expert opinion tendered. A Judge should not simply accept an expert opinion; it should be tested both against the other evidence tendered during the course of a trial, and, against its internal consistency. For example, a judge will consider whether the expert opinion accords with the inferences properly to be drawn from the Clinical Notes…A judge will ask whether the expert has addressed all the relevant considerations which applied at the time of the alleged negligent act or omission. If there are manufacturer's or clinical guidelines, a Court will consider whether the expert has addressed these and placed the defendant's conduct in their context. There are two other points which arise in this case which I would mention.

> *First, a matter of some importance is whether the expert opinion reflects the evidence that has emerged in the course of the trial. Far too often in cases of all sorts experts prepare their evidence in advance of trial making a variety of evidential assumptions and then fail or omit to address themselves to the question of whether these assumptions, and the inferences and opinions drawn therefrom, remain current at the time they come to tender their evidence in the trial. An expert's report will lack logic if, at the point in which it is tendered, it is out of date and not reflective of the evidence in the case as it has unfolded. Secondly….. It seems to me that it is good practice for experts to ensure that when they are reciting critical matters, such as Clinical Notes, they do so with precision. These notes represent short documents (in the present case two sides only) but form the basis for an important part of the analytical task of the Court. If an expert is giving a précis then that should be expressly stated in the body of the opinion and, ideally, the Notes should be annexed and accurately cross-referred to by the expert. If, however, the account from within the body of the expert opinion is intended to constitute the bedrock for the subsequent opinion then accuracy is a virtue. Having said this, the task of the Court is to see beyond stylistic blemishes and to concentrate upon the pith and substance of the expert opinion and to then evaluate its content against the evidence as a whole and thereby to assess its logic. If on analysis of the report as a whole the opinion conveyed is from a person of real experience, exhibiting competence and respectability, and it is consistent with the surrounding evidence, and of course internally logical, this is an opinion to which a judge should attach considerable weight."*

75. However, in a less often-cited passage in *Cumbria*, Green J also addressed the issue of clinical guidelines – indeed as in this case relating to dosage of medication, albeit in a very different context. In *Cumbria* itself, the question was whether it was negligent for a midwife to administer a second dose of a drug to induce labour. It tragically caused a placental abruption and the death of the mother in childbirth and life-long catastrophic injuries to the baby. The BNF Guideline stated that the dose was 3mg *'followed after 6-8 hours by 3mg if labour is not established. Max 6mg'*. The midwife gave the second dose after 7½ hours and it was accepted that labour was not 'established'. The Trust argued that compliance with the BNF Guideline itself showed the decision was (what I term) '*Bolam*-compliant'. As Green J said at p.84iii-v:

> "*A midwife within the guidelines should, prima facie, not be acting unreasonably. I use the expression "prima facie"…. because it is important to observe that both of the Defendant's experts accepted that even if labour was not established it was still not necessarily always reasonable to administer a second dose of Prostin and that the midwife (or other medical professional) had to take account of all of the other circumstances which might indicate that second dose should not be administered even if labour was not yet established. This is important since on one view it is hard to see why a professional whose actions accord with the approved guidelines should be held to be negligent when the consequences later turn out to be adverse. But in this case there was consensus that the guidelines were not complete or comprehensive….The Defendant's experts (and the midwife herself in evidence) thus took a more cautious approach than do the guidelines themselves and they formed their views on a broader range of considerations….*
> *In conclusion my view is that prima facie a midwife who acts in accordance with the guidelines should be safe from a charge of negligence. However, in the present case since it is common ground that in some regards the guidelines are not satisfactory, I do not decide this case upon the basis that adhering to guidelines is sufficient. I consider the fact the…midwife…acted in accordance with the guidelines is a factor militating against negligence, but I also assess her conduct against a benchmark of the other surrounding facts and circumstances."*

So, Green J stopped short of saying that compliance with a clinical guideline is itself '*Bolam*-compliant'. At first sight it may be, but the guideline may not be complete, comprehensive or otherwise fully 'satisfactory'. (But even then, it is still relevant).

76. The use in *Cumbria* of a clinical guideline by a Defendant as a 'shield', as the Semanta article would term it, has an authoritative basis noted in that article, albeit it is unlikely that Green J in *Cumbria* would have been referred to it, as it is not a clinical negligence case at all. In *Airedale Trust v Bland [1993] AC 789 (HL)*, the Lords decided it would be lawful for the hospital turn off the life support system of Tony Bland, left in a persistent vegetative state ('PVS') by the Hillsborough tragedy. In reaching that conclusion, the Lords accepted there was a responsible body of medical opinion that people in PVS derived no benefit from being kept alive. As support for that view, Lord Goff at pg.871 briefly touched on to the British Medical Association's PVS Guidelines:

> *"Study of this document left me in no doubt that, if a doctor treating a P.V.S. patient acts in accordance with the medical practice now being evolved by the Medical Ethics Committee of the B.M.A., he will be acting with the benefit of guidance from a responsible and competent body of relevant professional opinion, as required by the Bolam test [1957] 1 W.L.R. 582."*

That brief *obiter* observation about a particular guideline in a radically different context can hardly found a general principle in clinical negligence cases that compliance with a guideline will guarantee a '*Bolam*-compliant' decision. However, it does offer some authoritative support to the nuanced analysis of Green J in *Cumbria*, which I respectfully consider to be a logical extrapolation from *Bolam* and *Bolitho*.

77. This approach builds on this observation of Lord Browne-Wilkinson in *Bolitho*:

> "*It would be wrong to allow...assessment to deteriorate into seeking to persuade the judge to prefer one of two views both of which are capable of being logically supported. It is only where a judge can be satisfied that the body of expert opinion cannot be logically supported at all that such opinion will not provide the benchmark by reference to which the defendant's conduct falls to be assessed."*

As Foskett J observed in *Sullivan v Guy's and St Thomas' NHS [2017] EWHC 602*, whether relevant conduct fell within (what I term) a *Bolam*-compliant clinical body of opinion or practice at the time can be determined by a wide body of evidence, including expert opinion and medical textbooks etc, even if NICE had not produced a guideline. However, as in *Jones v Taunton NHS [2019] EWHC 1408,* a later guideline 'codifying' a *Bolam*-compliant practice may also evidence such a practice at an earlier point. After all, NICE, BNF and other 'national guidelines' (e.g. the Royal College of Gynaecologists guidelines in *Jones*) are the product of a national pooling of experience and expertise, subject to detailed national consultation and intended to benchmark national good practice. So, depending on their relevance to the particular context, authoritativeness, comprehensiveness and whether they are 'satisfactory' (as Green J put it in *Cumbria),* national clinical guidelines may *evidence,* or even sometimes *constitute,* a *Bolam*-compliant body of clinical opinion or practice. If the national guideline is 'unsatisfactory', it may still 'militate against negligence' as in *Cumbria* itself. However, if a 'satisfactory' national guideline *constitutes* a *Bolam*-compliant body of clinical opinion or practice, compliance with it may help prove the decision can be logically supported, so is not negligent (*Bolitho*), at least 'prima facie' (*Cumbria*).

78. However, such a '*Bolam* shield' argument relying on compliance with a NICE, BNF or other 'national guideline' (or even arguably a 'regional one') is one thing. Such an argument relying on an 'in-house guideline' of a particular GP, CCG, hospital or even a large trust of hospitals (as with the Defendant's guidelines here) is quite another. I am conscious this point is without authority that Counsel or I have been able to find and was accepted by them without adversarial argument when I raised it. Nevertheless, in my judgement, an 'in-house guideline' - even spanning several hospitals and tens, if not hundreds, of clinicians - is not of the same status as a national guideline. Of course, it may (indeed, quite often will) *reflect* a wider reasonable '*Bolam*-compliant' body of clinical opinion, but it is unlikely by itself to *constitute* one. I say this for three reasons:

78.1 Firstly, there is the fundamental point about the tort of negligence which both Counsel accepted. The standard of care in negligence is not subjective but objective (hence the many judicial references over the decades to the 'reasonable person' on an ever-evolving range of public transport). If an in-house guideline could itself amount to a 'responsible body of clinical opinion' without more, a defendant trust could effectively determine their own standard of care, which would seem wrong in principle. Of course, as Dr Danbury says, particular trusts or hospitals serving particular local communities may need to adopt particular practices, but it is surely implicit in *Bolam, Maynard, Bolitho* and other cases that this would need to be measured (or even justified) against an external and wider 'reasonable body of opinion', not simply asserted to amount to one by itself.

78.2 Secondly, subject to Dr Danbury's local considerations, the resources and data available to Dr Meyer and his colleagues on the Clinical Guidelines Committee, even at a large NHS Trust like the Defendant, are not the same as those available to NICE, the authors of the BNF, or national professional organisations like the Intensive Care Society for which Dr Bell has authored national guidelines.

78.3 Thirdly, it is debatable whether 'in-house guidelines' carry the same regulatory obligations for an individual clinician under the GMC guidance as NICE and other national guidelines do. On the face of it and without the benefit of adversarial argument, a requirement to comply with 'in-house guidelines' would appear to be more a question of obligation under an employment contract than professional responsibility intrinsically relevant to the *Bolam* standard of care.

79. Of course, the relevant NICE/BNF or other national guideline may be less than complete and comprehensive, as Green J discussed in *Cumbria*. It is quite possible in those circumstances that a properly thought-out and well-drafted 'in house guideline' which diverges from a limited or 'unsatisfactory' national one would carry real weight. However, it would do so insofar as it is *compliant with* a 'reasonable body of opinion or practice' assessed in the usual way with expert evidence, it would rarely *constitute* one.

80. However, none of this is to say that even a national guideline relieves any clinician of their responsibility to exercise their own clinical judgement. No guideline, however comprehensive, can ever be a substitute for clinical judgement in the particular circumstances of the particular patient at the particular time. The regulatory framework recognises that. The NICE website itself does not generally regard its own guidelines as inflexible 'rules', but as 'recommendations' to clinicians (and other practitioners) to be used in conjunction with their own clinical judgement and in discussion with patients:

> *"NICE guidelines make evidence-based recommendations on a wide range of topics… Many guideline recommendations are for individual health and social care practitioners, who should use them in their work in conjunction with their own judgement and discussion with people using services."*

Moreover, as I also noted, the 2021 GMC Guidance to doctors states their obligation as:

> *"You should follow the advice in the BNF on prescription writing….You should take account of the clinical guidelines published by NICE [and]…Royal Colleges and other authoritative sources of specialty specific clinical guidelines."*

So, the professional obligation since 2021 (perhaps the expectation before that) is to 'take account' of the NICE and other similar national guidelines. Perhaps the obligation relating to the BNF is phrased slightly more strongly, but the principle is the same.

81. For that same reason, clinical guidelines are not a substitute for expert evidence either. The Semanta article quotes Stuart-Smith LJ in <u>Loveday v Renton</u> *[1990] Med LR 117* (approved in *Penney*) as saying:

> *'The…contraindications against pertussis vaccination published from time to time in this country by the DHSS and similar bodies in other countries cannot be relied upon as though it was evidence of qualified experts not called in witness'*

If guidelines are no substitute for clinical judgement in a particular situation, it follows they are no substitute for expert evidence about that clinical judgement in that situation.

82. However, experts would be well-advised to consider at least national clinical guidelines because they may be better evidence of what is or is not a *Bolam*-compliant body of clinical opinion or practice than an assertion based on only their own experience. As said in a different context of expert evidence in *Kennedy* at p.48, a bare 'ipse dixit' assertion of opinion carries very little weight. National guidelines may offer support for such expert opinion, in addition to the expert's particular expertise, experience, etc.

83. The point that clinical guidelines are not a substitute for clinical judgement leads on to a different situation: where clinical guidelines are deployed not as a 'shield' by the Defendant as in *Cumbria*, but as a 'sword' by the Claimant. That raises different issues because of the nature of the *Bolam/Bolitho* test itself. *Compliance* with a 'reasonable body of clinical opinion' which can be logically supported (which as noted a clinical guideline could in principle constitute or evidence, depending on the circumstances) on the *Bolam/Bolitho* test is <u>not</u> negligent. But it does not logically follow that *non-compliance* with a guideline amounting to such a 'reasonable body of clinical opinion' (which can be logically supported) <u>is</u> negligent. This is because there may be a *different* 'reasonable body of clinical opinion' from the clinical guideline at the time which can also be logically supported and so <u>not</u> negligent. So, in *Dowson*, a GP was found not to have been negligent in 2014 in failing to refer to a foot clinic a type-1 diabetic patient with a swollen foot. A 2015 NICE guideline would arguably (it was debated on the facts) have recommended referral, which as in *Jones*, HHJ Auerbach considered could evidence a reasonable body of practice the year before. However, the evidence showed that before the guideline there was another reasonable body of practice which would not have referred, so on classic *Bolam/Bolitho* principles, the GP was not negligent. So, guidelines feed into the *Bolam/Bolitho* approach rather than circumventing it. (This also is the view in *Charlesworth & Percy on Negligence (2022)* 15th Ed ps.10-144-5).

84. In <u>*Montgomery v Lanarkshire Health Board*</u> *[2013] CSIH 3,* a baby sustained a serious birth injury because his pregnant diabetic mother was not warned of a raised risk of shoulder dystocia during birth, which had she been she would have opted for caesarean-section. She also contended the obstetrician failed to follow draft national clinical guidelines (with a similar proviso as on the NICE website) in how to react to a 'pathological' CTG trace. In rejecting the appeal against the dismissal of the claim, the Inner House of the Court of Session said at p.59:

> *"While guidelines are undoubtedly relevant in the exercise of clinical judgement, they are not determinative of the course of action to be followed by the clinician. Guidelines are merely indications of possible courses of action in particular circumstances and they are not set in tablets of stone…"*

As is well-known, the Supreme Court (*[2015] AC 1430*) reversed the Inner House's decision on the 'duty to warn' point and there was no specific consideration of the 'guidelines' point. However, the Court (at ps.77-79) did refer to GMC guidelines on 'informed consent' in deciding that the duty to warn should not apply a *Bolam* standard.

85. Sanderson v Guy's & Thomas NHS *[2020] PIQR P9* (another case involving this Defendant), like *Montgomery* was a catastrophic hypoxic birth injury case, although *Montgomery* was not cited, only *Bolam*, *Maynard* and *Bolitho*. Again, the claimant relied on NICE guidelines on responding to 'pathological' CTG traces she alleged the defendant failed to follow. Dismissing the claim, Lambert J observed at ps.78-80:

> *"…[T]he Guidelines on their face appear to advocate two contradictory management options in response to a single prolonged deceleration lasting longer than three minutes… On the critical question…the Guidelines point in two, entirely different, management directions. The difficulty posed by this contradiction is intractable if, as [the Claimant's expert] appears to suggest, the Guidelines are intended to provide the practitioner with the complete description of appropriate management in the presence of a particular trace feature. [The Defendant expert] however provides the answer to the conundrum. He told me the Guidelines do not provide a complete compendium of either definitions or clinical management options. The Guidelines are useful so far as they go, but they are limited. The Guidelines do not provide a substitute for clinical judgement but must be interpreted by the clinician and then applied in the light of that judgement. …The contradiction within the Guidelines pulls the rug from under [the Claimant's expert's] thesis. His opinion on labour management relies on his almost formulaic application of sections of the Guidelines taken out of context."*

Lambert J's analysis in *Sanderson* turned on the particular guidelines in that case. Yet it underlines the point that clinical guidelines are not a substitute for clinical judgement and indeed they will be of less weight as a 'sword' if not 'satisfactory' (to use the word Green J used in *Cumbria* in the context of guidelines as a 'shield').

86. *Price v Cwm Taf University Health Board [2019] PIQR P14* goes a little further. Birss J (as he then was) dismissed an appeal from the County Court where a judge had dismissed a claim in respect of a knee operation. This included an allegation that undertaking a second arthroscopy on a knee, although not done negligently, was contra-indicated by a NICE guideline in force at the time. The guideline explicitly said it did not override individual responsibility of clinicians to make decisions appropriate to the circumstances of the individual patient (see p.21). The judge found that the operation departed from the guidelines but, not least given what it said itself, this was not 'prima facie evidence of negligence'. In dismissing the appeal, Birss J said at p.22:

> *"I decline to be drawn into what could be a far-reaching debate about whether any departure from any aspect of the NICE Guidelines is or is not prima facie evidence of negligence. I agree with the judge that this departure from these guidelines is not prima facie evidence of negligence. Nevertheless, what must be right is that a clinical decision which departs from the NICE Guidelines is likely to call for an explanation of some sort. The nature and degree of detail required will depend on all the circumstances. The only relevant question on this appeal is whether the particular decision in this case, which does depart from the guidelines, has been adequately explained and justified. The answer is that the departure has been justified, for the reasons already given."*

It would be wrong to build too much onto Birss J's deliberately-cautious observation. Nevertheless, it shows that departure from NICE guidelines is not necessarily *prima facie* evidence of negligence, but '*is likely to call for an explanation of some sort. The nature and degree of detail required will depend on all the circumstances'*. Such circumstances can include the 'satisfactoriness' of the guidelines, as in *Sanderson*, but it may also include whether the 'steer' of the guidelines is imperative in tone or more as 'recommendations' in the sense on the NICE website and as in *Price* itself.

87. Finally, since guidelines are not a substitute for clinical judgement, as Davis LJ said in *Hewes v West Hertfordshire NHS* [2020] EWCA Civ 1523 at p.96, Courts should be careful to avoid using them to make generalised pronouncements on the obligations of doctors in medical situations; and instead stick to applying *Bolam/Bolitho* to the facts. This is the approach which I shall endeavour to adopt in the present case. Nothing I say should be interpreted as stating what approach clinicians should take to prescribing Gentamicin. Every situation – and every patient – is of course different.

88. This review of the authorities can I think be summarised into the following points:

(1) Even 'national' clinical guidelines are not a substitute for clinical judgement in an individual case. This is made clear by NICE and many of its actual clinical guidelines, by the GMC and by Courts e.g. *Montgomery*, *Sanderson* and *Hewes.*

(2) It follows even 'national' clinical guidelines are not a substitute for expert evidence about that impugned clinical judgement (*Loveday*). However, they may inform expert evidence, e.g. as additional evidence of a *Bolam*-compliant body of practice at a particular time, even if the guideline comes later (*Jones*, *Dowson*).

(3) Departure from a national guideline is not necessarily *prima facie* evidence of negligence, but is likely to call for some explanation: with the nature and detail required depending on the circumstances, including the strength of the guideline's 'steer' (*Price*). So, departure from an 'unsatisfactory' (e.g. incomplete, flawed or contradictory) guideline may not require so detailed an explanation (*Sanderson*).

(4) Compliance with a national guideline may be *prima facie* inconsistent with negligence if the guideline *constitutes* a *Bolam*-complaint body of opinion or practice (*Bland*). It may not do so if 'unsatisfactory' (in a similar sense), but it may still 'militate against negligence' depending on the circumstances (*Cumbria*). However, these points do not apply to 'in-house' guidelines, as a defendant cannot in principle (or probably in practice) set their own *Bolam* standard of care.

(5) What ultimately matters is whether the conduct fell within a *Bolam*-compliant practice in the usual way (*Hewes*, *Cumbria*, *Price*). Just as guidelines are no substitute for clinical judgement and expert evidence, they are no substitute (nor a shortcut) for the *Bolam/Bolitho* approach. However, as clinical guidelines are relevant, practitioners and experts should consider whether any national clinical guidelines were applicable - and if any 'in-house' guidelines should be disclosed.

89. Finally, Claimant's Counsel argued the 'steers' in the NICE/BNF guideline on Gentamicin and Renal Handbook are in imperative terms for renally-impaired patients: '*…a once-daily, high-dose regimen <u>should be avoided</u> in patients with [CCR <20 mg/min]."* This is much stronger than in many other NICE guidelines (e.g. in *Price*). Yet Claimant's Counsel rightly did not submit that departure from even the NICE/BNF guideline was *itself* negligent – that would require it to be found as the <u>only</u> *Bolam*-compliant practice at the time. But he did submit the reason for departure from it would have to be 'cogent'. *In this particular case*, I agree and will apply that approach.

Conclusions

90. I turn finally to my conclusion on the three issues I outlined at the start of my judgment;
    (a) What were the circumstances leading to and following from Dr Meyer's decision to prescribe Mr Berry 400mg on 4th March 2017 ?
    (b) Having regard to the answer to (a), was Dr Meyer's prescription of 400 mg of Gentamicin and/or its later administration *Bolam*-negligent ?
    (c) If so, did the 400mg dose cause ototoxicity which a lower dose would not have ?

Issue (a): Circumstances leading to and following from 400mg Gentamicin dose on 4th March

91. I have already dealt with (a) in my findings of fact, but I can summarise my conclusion. On 3rd March 2017 Mr Berry was admitted to ICU not simply to enable CVVHD but also because of his infection, with his NEWS reaching 7. Whilst Mr Berry's main concern was his arthritis, as Dr Bell accepted he had an infection and he was also particularly vulnerable given his end-stage renal failure, pulmonary oedema, rheumatoid arthritis requiring steroids and the 'stunning' of his heart. These, along with 'suspected hospital-acquired pneumonia' were the factors in the ICU admission plan. Fluid overload needing CVVHD was another, but one of several, not the main one. So concerned was Dr Thom about infection, she prescribed 80mg of Gentamicin.

92. As I also found above, on 4th March, Mr Berry was considerably more comfortable in the morning of 4th March (albeit following an initially difficult night) and he was given steroids which plainly helped ease his arthritic pain. His heart rate slowed, his blood pressure rose and his respiratory issues decreased. So, when Dr Meyer saw him at around 12.30, as he recorded *'Seems much better than described on admission, after fluid removal'*, indeed better than when Mr Berry saw him. However, as Dr Meyer then noted *'Inflammatory markers still high'*. The PCT was 6.6, which Dr Bell accepted was consistent with systemic infection. The CRP had nearly doubled overnight from 240 to 432. The WCC had jumped from 17.6 to 22. I found it was a worsening systemic infection risking developing into true Sepsis. As Dr Meyer said in his statement:

> "*Mr Berry was at high risk of further deterioration due to underlying medical conditions including….heart disease, chronic kidney disease, hypertension, arthritis and impaired immunity from long term steroid therapy….In patients who have life-threatening infection, the risk of under treatment and death outweighs the risk of rare drug-related ototoxicity.*"

93. I found far from ignoring or overlooking Mr Berry's condition or renal impairment, Dr Meyer therefore deliberately decided on a mixed clinical strategy. Mr Berry's improvement in presentation and tolerance of CVVHD suggested he might be able to return to Stephen Ward. However, his escalation in inflammatory markers showed there was worsening systemic infection which given the risk of Sepsis and his underlying vulnerabilities was life-threatening if untreated. That clear and serious risk outweighed the uncertain risk of ototoxicity. Indeed, Dr Thom's cautious 80mg dose the day before had been inadequate to prevent the infection from worsening overnight. Moreover, it had not reached trough level almost 24 hours later and Dr Meyer did not know when it would - so enabling a second dose - or when it would after that to enable a third: or indeed what state Mr Berry would be in then. Therefore, Dr Meyer realistically only had 'one shot' at a bacteriocidal dose to stem the infection. This required a much higher dose than the inadequate 80mg. Dr Bell would not have criticised 160mg. In deciding upon 400mg, Dr Meyer did not pick the maximum dose of 480mg, which would have fallen within the guideline range of 5-7 mg/kg. Instead, he picked a slightly lower dose of 400mg equating to 4.73mg/kg which he considered necessary to have a bacteriocidal effect and address the worsening systemic infection. That was the priority, though he also considered Mr Berry's renal function and risk of ototoxicity by deferring the administration of the dose until Mr Berry's Gentamicin level fell below the trough level of 1 mg/l. At the time, Mr Berry was still on CVVHD. As he tolerated the increase, at 15.45, Dr Meyer decided dialysis could stop and he could step-down to the ward. Despite Dr Danbury's misgivings this was premature, that is not said to be negligent.

94. Whilst Mr Berry's Gentamicin level had fallen well below 1mg/l by 18.51, due to administrative delays, the 400mg was not immediately administered. As earlier, Mr Berry presented a mixed clinical picture. He was broadly comfortable in the nursing review (and doctor ICU discharge, insofar as that was an examination). Yet he was less comfortable in the rheumatology review an hour before the Gentamicin was eventually administered at 20.32 and he moved down to Stephen Ward at around 21.00 as planned. I accepted Dr Danbury's opinion extrapolating from inflammatory markers at 08.00 on 5th March, that shortly before the Gentamicin dose around 20.30 on 4th March, they would on the balance of probabilities have been higher than on the morning of 4th March; and but for the dose of Gentamicin, Mr Berry would have developed Sepsis.

95. The notes of Mr Berry's condition on 5th March are exiguous - I do not recall either expert or Counsel referring to any other than the inflammatory marker readings. It is agreed there was no dialysis planned that day. However, those readings at 8am on 5th March – nearly 12 hours after the Gentamicin's bacteriocidal 'peak' within an hour or so – show that the CRP (which as Dr Danbury said was the most responsive) had barely come down at all. Indeed, by 6th March when Dr Thom saw Mr Berry again, despite her misgivings over Dr Meyer's high dose which she felt risked severe ototoxicity, she 'unusually' asked for a Gentamicin level check after dialysis to see if another 80mg dose could be given as the infection was *'not responding biochemically to antibiotics'*. Ironically, in my judgment the significance of this entry is less Dr Thom's criticisms of Dr Meyer's dose, but her concern that it had still not got the infection under control. This perhaps is a clear illustration of how dangerous the infection was by 4th March for someone with all the vulnerabilities of Mr Berry, as Dr Bell accepted. It is agreed Mr Berry did indeed develop ototoxicity.

Issue (c): Causation

96. Logically, the next issue is negligence, as it would be ordinarily impossible to determine whether a 'non-negligent' dose would have caused the same effects as the 'negligent' dose until you have determined that the latter dose was in fact 'negligent'. However, Dr Bell's evidence was the actual dose of 400mg was negligent but a dose of 160mg would not have been negligent. He also said 160mg might have caused ototoxicity to an extent, but not the balance problems the ENT experts agree that 400mg of Gentamicin did cause (or indeed the hearing loss which remains disputed, but I accept it probably caused). If Dr Bell is right about that, then as damages are agreed, causation in principle is established, even if Dr Bell is not right about negligence itself.

97. Therefore, I prefer to address causation first. This is also partly because it flows from my findings of fact which as I have discussed showed both new balance and hearing problems within days of the 400mg dose. It is partly because in my judgment causation is straightforwardly established for the reasons Dr Bell gave: these symptoms were not simply coincidence or correlation but clear causation. So, I also address it first as it is only fair to the Claimant and her brother's memory, given all they went through I accept due to that 400mg Gentamicin dose, to consider whether it was negligent with its causal effects firmly in mind. In the circumstances, I can deal with the issue briefly.

98. On causation, I prefer the evidence of Dr Bell because it is actually consistent with the premise of all the Gentamicin guidelines that excessive dosage can cause ototoxicity. Dr Meyer accepted it was a known risk although he had never encountered it in ICU. It is discussed extensively in many of the papers to which the ICU experts referred me. Even where the link was doubted in some of the papers Dr Danbury referred to, they did not address patients with the level of renal impairment Mr Berry had, who would therefore have Gentamicin in their system longer than non-renally-impaired patients so be at higher risk. Moreover, Dr Danbury slightly ruefully accepted in cross-examination that by questioning the effectively proportionate link between Gentamicin dosage and ototoxicity on which so much academic thought and so many guidelines were based, he was rather outside his expertise. I accept that I do not have biochemical proof that a dose of 160mg would not have caused the effects the 400mg plainly did, but I accept Dr Bell's opinion that it would not. I infer on the balance of probabilities the Claimant has proved causation that a dose of 160mg would not have caused Mr Berry's injuries.

Issue (b): Negligence

99. Therefore, this case turns not on debates about causation – or indeed the definition of Sepsis – but on a simple question, albeit with a complex answer: was the decision to prescribe Mr Berry 400mg on 4th March 2017 *Bolam*-negligent ? The Claimant's Particulars of Claim (TB 15) plead that the Defendant was negligent in that it:

> *"(a) Failed, on 4 March 2017, to consider or to appreciate adequately the association between high levels of Gentamicin and ototoxicity; [or]*
>
> *(b) Failed, prior to administering….a 400mg dose of Gentamicin, to heed, adequately or at all, Mr Berry's advanced age or degree of renal impairment…*
>
> *(c) Administered, at or around 20.32… an excessively high dose of Gentamicin."*

The point about not heeding Mr Berry's 'age' has not been pursued, neither could it be on my findings of fact, nor failing to heed his condition and infection. There is also significant overlap between those pleaded points, especially as to Mr Berry's renal impairment and risk of ototoxicity from a high dose of Gentamicin. While the pleadings do not refer to guidelines, as the case has developed since, they have become central and I raised this with Counsel before the evidence started. During Dr Bell's evidence I understood him to allege negligence by Dr Meyer not 'topping up' Gentamicin on the evening of 3rd March, but Claimant's Counsel clarified it was not pursued as an allegation (not least as it was not pleaded). In any event, I have explained why I reject it

100. Therefore, rather than simply going through those points exactly as they are pleaded, following discussion with Counsel in submissions, the pleaded points can be re-framed into three distinct allegations. I take them in turn, but there is still considerable overlap so I will be able to consider allegations (ii) and (iii) more quickly than allegation (i):

(i) Firstly, was Dr Meyer's 400mg dose 'excessively high' because he simply applied the ICU Gentamicin guideline that was *itself Bolam*-negligent in failing adequately to take into account both the extent of a patient's renal impairment and the association between high Gentamicin dosage and ototoxicity and in departing from other national and in-house guidelines for no good reason ?

(ii) Secondly, irrespective of that ICU Gentamicin guideline, was Dr Meyer's *prescription* of 400mg of Gentamicin on 4th March 'excessively high' and *Bolam*-negligent in all circumstances including the extent of Mr Berry's renal impairment, the risk of ototoxicity to him and the departure from guidelines ?

(iii) Thirdly, even if Dr Meyer's *prescription* of 400mg at 12.30 on 4th March was not, was the Defendant's decision to *administer* it around 20.30 that day '*Bolam*-negligent in all the circumstances including the extent of Mr Berry's renal impairment, the risk of ototoxicity to him and the departure from guidelines ?

It will be appreciated the real target of (i) is the ICU guideline itself, with the other guidelines, material and Dr Bell's opinion being deployed by the Claimant as a 'sword'. However, the Defendant seeks to justify the ICU guideline; indeed, to use it as a 'shield' - which I will also consider as a step on the path to my conclusion on (i). (ii) is a more typical *Bolam/Bolitho* challenge to Dr Meyer's clinical judgement at 12.30 in deciding on a 400mg dose in all the circumstances, one of those circumstances being departure from non-ICU guidelines again deployed by the Claimant as a 'sword'. The target of (iii) is the Defendant not revisiting that dosing decision later on the 4th March, on an otherwise similar basis to (ii). In each allegation, guidelines are important but in (i) they are clearly central, which is why I have addressed the principles in detail.

101. Turning to the first argument, I will quote the ICU guideline again, with my underline:.

> "*This guideline is for use within adult critical care areas only. Treatments, medicines and monitoring methods contained within this document may not be clinically appropriate outside these settings. DO NOT USE outside adult Critical Care areas without consulting with the Critical Care consultant on call and/or Critical Care pharmacist, pharmacy team or Critical care consultants.*

Patients with normal renal function

Prescribe between 5 mg/kg to 7 mg/kg (ideal body weight) to a maximum of 480mg. Ideal Body Weight (kg) for men = 50kg + [(height (cm) – 154] x 0.9) Ideal Body Weight (kg) for women = 45.5kg + [(height (cm) – 154] x 0.9) Obese patient dosing should be based on dose determining weight (obesity is defined as actual body weight (ABW) >20% higher than ideal body weight IBW) again to a maximum of 480mg per dose: DDW (kg) = IBW + [0.4 x (ABW – IBW)] Please check if previous aminoglycoside therapy has been administered to the patient. If a dose of amikacin or gentamicin has been given within last 24 hours, the timing of the gentamicin dose should be confirmed with the ICU medical team.

Patients with impaired renal function

A large first dose is still desirable. In the majority of patients 5 to 7 mg/kg (to a maximum of 480 mg) should be used. The continuation of gentamicin in renal failure must be reviewed after the initial dose in accordance with the critical care empirical antibiotic guidelines and microbiology. If gentamicin it is still the preferred agent, consider reducing subsequent doses, discuss dosing regimen with critical care pharmacy. Re-dose according to levels (see therapeutic drug monitoring section below). For further advice on dosing in renal impairment and CRRT, discuss with the critical care pharmacy team.

Administration - Administer in 100 mL glucose 5% or sodium chloride 0.9% over 30 minutes. Therapeutic drug monitoring - Samples should be taken 20 hours post-dose If gentamicin level is less than 1 mg/L, patients may be re-dosed. If gentamicin level is greater than 1 mg/L, re-check levels in another 12 hours. Do not re-dose gentamicin until the trough level is less than 1 mg/L

Length of Treatment - Initial dose should always be prescribed on "Stat" section of medication record…. If a course is required, subsequent doses should be prescribed on the "PRN" section for a total maximum duration of five days.

Summary - All patients should initially receive 5-7 mg/kg administered in 100 mL of glucose 5% or sodium chloride 0.9% over 30 minutes. Dosing is based on Ideal/Dose Determining weight. Maximum dose is 480 mg Levels should be requested from the ICU laboratory 20 hours post-dose If levels are below 1 mg/L, patients may be re-dosed If levels are greater than 1 mg/L, re-check in 12 hours.

This Guideline is for reference only and for interpretation by clinical healthcare professionals working in the clinical care setting…"

102. As I started this judgment by saying, this ICU guideline is the 'odd one out' amongst those before me: both national and 'in-house' at the Defendant and elsewhere:

102.1 The Renal Handbook, authored in 2014, states that for the worst category of renal impairment (which is what Mr Berry was and what Dr Meyer believed he was), the appropriate dose subject to 'local policy' is 2mg/kg every 48-72 hours if there is no dialysis or ordinary haemodialysis; but for CVVHD, the dose is 3-5 mg/kg.

102.2 The NICE Guideline is even clearer and states (my underline):

> "*If there is impairment of renal function, the interval between doses must be increased; if the renal impairment is severe, the dose itself should be reduced as well. Excretion of aminoglycosides is principally via the kidney and accumulation occurs in renal impairment. Ototoxicity and nephrotoxicity occur commonly in patients with renal failure. In adults, a once-daily, high-dose regimen of an aminoglycoside should be avoided in patients with a creatinine clearance less than 20 ml/ minute*."

102.3 The undated Gentamicin guideline on the wards at Dr Danbury's hospital in Southampton goes slightly further than the NICE Guideline (TB 336):

> "*Do NOT use extended interval dosing for the following groups of patients ...Renal impairment (Creatinine Clearance < 20ml/min, unstable or deteriorating renal function*." Dr Danbury could not produce one from ICU.

102.4 The *Antibiotics in Patients with Renal Impairment'* guideline ('Renal Impairment Guideline') from 2014 (doubtless familiar to Dr Thom) states if the patient is not on dialysis, the dose is 3mg/kg up to 280 mg. However, if on 'intermittent dialysis', the dose is 2 mg/kg up to a max of 180mg (or 3 mg/kg up to 280mg for first dose in 'severe Sepsis' cases when risk of death outweighs side effects).

102.5 For good measure, Dr Bell was able to point to an academic paper from the *'Pharmaceutical Journal*' in August 2015 (TB 831-41) which stated:

> "*Extended interval regimens should also be avoided in… patients with a creatinine clearance of less than 20ml/min*."

Therefore, although the NICE guideline is dated 2018, I accept Dr Bell's view it simply codified best practice already established in 2017 (c.f. *Jones/Dowson*). Dr Bell's view was the Defendant's ICU guideline even in 2017 was out of step with all of these. He said it was insufficiently nuanced in failing to distinguish between degrees of renal impairment and this would lead a clinician to treat a patient with normal renal function the same as a patient with no native renal function at all, contrary to that consensus.

103. Claimant's Counsel added that the Defendant's ICU guideline was fundamentally flawed, not just in diverging from other guidelines without cogent reasons, but also in not reflecting antibiotics' 'primary goal' quoted in its own Renal Impairment guideline:

> "*To optimise clinical outcomes while minimising unintended consequences of antimicrobial use, including toxicity…."* (pg.3)

Claimant's Counsel argued that Dr Meyer simply applied the ICU guideline without consideration of Mr Berry's condition or extent of renal impairment – what might be termed 'automatically'. Moreover, the ICU guideline was 'one size fits all' (which Dr Danbury accepted, as I explain). Yet Dr Danbury could not provide any evidence that was standard practice, even in his own hospital. It also created illogical results at the edges, as with Mr Berry: given 400mg at 20.32 on 4th March but if Gentamicin had been administered on Stephen Ward 30 minutes later, under the Renal Impairment guideline it would have been much less (with no dialysis, up to 3mg/kg so c.240mg). If there was going to be a 'bright line rule' for all of ICU, it had to be more nuanced as Dr Bell said. Moreover, Dr Meyer had accepted that the ICU guideline may lead to the same first dose for a renally-impaired patient as a renally-unimpaired one. Waiting for the trough level of 1mg/l was simply closing the door after the horse had bolted. Indeed, it was not clear why Dr Meyer prescribed then deferred the dose rather than just waiting. Counsel queried whether Dr Meyer even complied with the ICU guideline which focussed on a 'large first dose' not a 'large second dose' of 400mg on 4th March after Dr Thom's 80mg on 3rd March. All in all, the ICU guideline was 'an accident waiting to happen'. I will consider all these points in my conclusion on allegation (i).

104. I can certainly go some of the way with Claimant's Counsel on the ICU Guideline. I appreciate it was created as a practical document '*for reference only and for interpretation by clinical healthcare professionals working in the clinical care setting'*. It should not be read as if it were a statute. Yet it is surprisingly sloppily-drafted:

104.1 Firstly and most concerningly, it is internally inconsistent. As I shall discuss, the 'impaired renal function' section states: "*A large first dose is still desirable. In the <u>majority</u> of patients 5 to 7 mg/kg…..should be used."* Yet in the summary, that nuance is squashed out of it: "*<u>All patients</u> should initially receive 5-7 mg/kg."* It is easy to see that a busy ICU clinician might simply see the summary and give a dose of 5-7 mg/kg or even a re-dose of one and miss the 'nuance' above. So, the guideline creates a trap. I consider below whether Dr Meyer fell into it.

104.2 Secondly, the ICU guideline jars with the Defendant's own non-ICU 'Renal Impairment' guideline which would have indicated a much lower dose for Mr Berry. Whilst Dr Meyer and Dr Danbury argue there is a rational distinction between ICU and non-ICU settings, which I will consider below, you would not know that from the ICU guideline. The normal ward Gentamicin guideline 'signposts' to the renal impairment one – they are 'joined up'. The ICU guideline does not and a busy ICU clinician would not necessarily know that their guideline is quite different from their colleagues' on a neighbouring ward. This is likely to lead to misunderstandings on dosing, as between Dr Thom and Dr Meyer here.

104.3 Thirdly, the ICU guideline does not explain why it distinguishes (as I will find it actually does) between renally impaired and unimpaired patients. Moreover, whilst its prohibition on re-dose until the Gentamicin falls below 'trough level' of 1 mg/l is clearly to address the risk of ototoxicity, that word does not even appear, still less that explanation. Nor is there any explanation why the guideline diverges from the Defendant's other guidelines (and indeed the NICE guideline). Perhaps the space taken up by the (inaccurate) summary – of a one-page document – might have been better used with a very short such explanation.

(I should add these same flaws are even worse with its 2019 replacement but thankfully nothing turns on that and I say no more about it until after I have made my decision). Of course, this 2015 ICU guideline does not itself amount to a '*Bolam*-compliant' 'shield' because it is an 'in-house guideline', for the reasons of principle I discussed above. However, for these further reasons, it is of limited weight in any event because it is flawed. Therefore, unlike in *Cumbria* where Green J found compliance with an incomplete BNF guideline to 'militate against negligence', I cannot even go that far.

105. Having said that, the fact that Dr Meyer used a flawed guideline does not prove his decision was negligent. Indeed, in my judgment, in adapting and not simply blindly applying the logical and sound underlying approach of the 2015 ICU guideline (as opposed to its sloppy wording) in Mr Berry's circumstances on 4th March, Dr Meyer made a '*Bolitho*-logical', *Bolam*-compliant clinical judgement in accordance with a sound body of practice confirmed by Dr Danbury. In other words, Dr Meyer's decision to prescribe 400mg of Gentamicin was not *Bolam*-negligent for five reasons which individually and cumulatively address the Claimants' criticisms: not only from Claimant's Counsel and Dr Bell, but also the departure from other guidelines.

106. Firstly, I do not accept the underlying premise of the argument that Dr Meyer simply 'applied' the ICU guideline, still less 'automatically', nor do I accept that he 'ignored' or 'overlooked' Mr Berry's condition or extremely limited renal function.

106.1 For the reasons I have given in detail and indeed summarised already above, Mr Berry's renal function was central to Dr Meyer's 'mixed clinical strategy'. On one hand, given Mr Berry's improved presentation and tolerance of 2,000 ml/hr CVVHD, this involved planning a trial of 4,000 ml/hr CVVHD and if he tolerated it, stepping him back down to Stephen Ward. On the other – and not inconsistently as I found – it involved prescribing a high, bacteriocidal dose of Gentamicin to stem the worsening systemic infection (which I accepted from Dr Danbury was to an extent masked by Mr Berry's improved presentation).

106.2 Indeed, I have also accepted Dr Meyer deliberately chose a high bacteriocidal dose of Gentamicin for deliberate and considered reasons. The 80mg dose the day before had proved inadequate even to hold the infection, let alone reduce it. This showed a higher dose was necessary and even Dr Bell would not have criticised 160mg. Moreover, as I also found, even after that 80mg dose, almost 24 hours later, the Gentamicin trough level was still not met (indeed it was still not met when Dr Meyer last saw Mr Berry about 15.45). Dr Meyer did not know when it would reach trough level or how long it would be after a higher second dose to reach trough level again or how Mr Berry's infection would progress in the meantime. He did know that Mr Berry had been ill enough to warrant admission to ICU only the previous day and whilst his clinical presentation had improved, his underlying systemic infection had worsened and he risked true Sepsis. Given his vulnerabilities, his infection was life-threatening if untreated. Therefore, there was only 'one shot' at a bacteriocidal dose as Dr Danbury put it. Dr Meyer's concern was the risk from that rising infection, which he considered clearly outweighed the risk of ototoxicity, that he had only rarely encountered and he addressed by deferring the dose until the Gentamicin level fell below 1 mg/l.

106.3 In that context, it is clear Dr Meyer did not simply 'apply' the ICU guideline, still less 'automatically'. He 'adapted' rather than 'adopted' it, in three respects.

(1) Firstly, Dr Meyer's 400mg dose amounted to 4.73 mg/kg. So it follows he not only rightly ignored the misleading 'Summary' in the ICU guideline, he also must have at least implicitly considered Mr Berry did not fall into the 'majority' of renally-impaired patients who should be given 5-7 mg/kg.

(2) Secondly, whilst the guideline does not explain the risk of ototoxicity, Dr Meyer was aware of it, although had not come across a case of it from Gentamicin dosing on ICU. In any event, he did not consider that risk changed the appropriate dose, but it was relevant to when it was given and he directed it not be administered until the level was <1mg/l (to which I return). That is not something the guideline required for its 'first dose'.

(3) Thirdly, this shows that Dr Meyer applied the principles of the ICU guideline's 'first dose' of Gentamicin to Mr Berry's second dose of it. The guideline envisaged for renally-impaired patients a high first dose and reduced re-doses. However, the ineffectiveness and delay caused by the 80mg dose the day before justified Dr Meyer in reversing the usual order and following an inadequate first dose with a bacteriocidal second dose. Indeed, at one point, Claimant's Counsel argued that this departure *from the ICU guideline* showed Dr Meyer was negligent, but he wisely did not pursue that. He could hardly castigate the ICU guideline and Dr Meyer for following it; and then at the same time castigate him for not following it.

In any event, I find that Dr Meyer, faced with Mr Berry's mixed clinical picture and the complications of adjusting for a previous inadequately low dose of Gentamicin, followed the spirit rather than the letter of the ICU guideline in administering a high bacteriocidal dose of 400mg, equivalent to 4.73 mg/kg, just below the normal range of 5-7 mg/kg HDEI bacteriocidal doses. However, he addressed the risk of ototoxicity by deferring the dose until the Gentamicin level fell below 1 mg/l. I find Dr Meyer independently exercised his clinical judgement which was logical and in Dr Danbury's view (and my own) reasonable.

107. Secondly, even if I am wrong about that and Dr Meyer did 'apply' or 'adopt' rather than 'adapt' the ICU Guideline, those different circumstances show that despite its flaws, contrary to Dr Bell's view, it was sufficiently 'nuanced' for him to do so. In cross-examination, Dr Bell criticised the ICU guideline for departing from other guidelines and being 'insufficiently nuanced' in not distinguishing between degrees of renal impairment – it certainly does not explicitly distinguish between patients above and below CCR of 20 ml/min like the Renal Impairment and NICE/BNF guidelines. Nevertheless, Dr Bell clarified he was <u>not</u> saying the ICU guideline was negligent. This rather pulls the rug out from under Claimant's Counsel's argument it <u>was</u> negligent.

108. In any event, I do not agree with Dr Bell that the ICU guideline fails to distinguish between degrees of renal impairment, even if it does not do so in the same way as the other guidelines – distinguishing patients with different CCR/GFR. To start with, the guideline draws a clear and rational distinction between renally-normal and renally-impaired patients. For renally-normal patients, there is a simple *rule*: "*Prescribe between 5 mg/kg to 7 mg/kg (ideal body weight) to a maximum of 480mg".* However, for renally-impaired patients, there is only a *steer*: "*A large first dose is still desirable. In the majority of patients 5 to 7 mg/kg (to a maximum of 480 mg) should be used."* I underline this because, as I have already observed, Dr Meyer's dose of 400mg for Mr Berry equated to 4.73 mg/kg and so he did not fall within that 'majority' of patients. Therefore, a clinician can distinguish between a renally-impaired patient who falls into the 'majority' and one (like Mr Berry) in the minority. The guideline is much softer and more discretionary for renally-impaired patients than renally-normal ones, even on the first dose. It therefore leaves more for individual clinical judgement. This is reinforced by the guideline being '*for reference only and for interpretation by clinical healthcare professionals working in clinical care'.* Indeed, for second doses in renally-impaired patients after the envisaged first high dose (so not in Mr Berry's case as discussed), the guideline is even more nuanced: it says consideration should be given to *reducing* doses

109. Thirdly, even if Dr Meyer simply adopted rather than adapted the ICU guideline and even if it is insufficiently 'nuanced', there are cogent reasons for taking a 'one size fits all' approach in ICU. That may mean a renally-impaired elderly patient receiving the same dose as an otherwise fit young sportsperson of the same size (I come back to the same patient being given different doses on different wards). However, as Dr Danbury said, an ICU needs one guideline. It is a busy environment with a lot of different staff and very ill patients. It needs a simple clear guideline applicable to everyone, not a confusion of different guidelines where applying the wrong one could lead to someone's death. If the ICU guideline is insufficiently nuanced for individual patients (which I do not accept) the dose must be left as a matter for clinical judgement. It is true Dr Danbury was not able to produce a similar ICU Gentamicin guideline to the Defendant's, but neither did Dr Bell produce dissimilar examples and the burden of proof is on the Claimant. In any event, it has always been the role of expert witnesses like Dr Danbury to give evidence of their experience. I accept that in his experience (and that of Dr Meyer) it is common to give renally-impaired ICU patients HDEI doses.

110. The other reason why a guideline not calibrated to CCR/GFR is justified on ICU is that as Dr Danbury said, in that clinical setting, it would be impractical. Of course, if CCR/GFR are known prior to admission onto ICU, that will be information which a clinician can and will bear in mind in deciding whether the particular patient falls into the 'majority' who is prescribed 5-7 mg/kg or not. However, Dr Danbury explained that calculating CCR/GFR was an extremely labour-intensive exercise involving collecting urine over a period and careful measurement and calculation. That is fine on an ordinary ward where a patient is broadly stable. Presumably this is why his own hospital in Southampton outside of ICU echoes the NICE guideline in excluding HDEI dosage in patients with CCR below 20 ml/min. However, I accept his opinion (and that of Dr Meyer) that this is unrealistic and simply not done on ICU wards – patients' conditions often change too quickly for it to help (and Mr Berry was anuric in any event). So, I accept it would be impracticable for an ICU ward guideline dosage to depend on CCR/GFR - available for some patients but not others. Clinicians may have to assume a patient is in a given category, as Dr Meyer did for Mr Berry (accurately). This is yet another reason the ICU guideline must leave more to clinical judgement.

111. Fourthly, this factor is also one reason why there are good, logical and indeed 'cogent' reasons (applying Claimant's Counsel's approach) for ICU guidelines or practice to depart from national guidelines which turn on CCR/GFR levels. To put it another way, those national guidelines constitute a reasonable body of clinical practice generally, but there is another reasonable body on ICU wards. I fully accept all the other guidelines contra-indicate a HDEI dose for patients with CCR/GFR in the lowest category like Mr Berry due to the ototoxicity risk. For severely renally-impaired patients on ordinary wards especially with a relatively-mild infection, the risk/benefit analysis points firmly against a ototoxicity-risking HDEI dose. However, as Dr Danbury and Dr Meyer said, quite aside from the impracticality of measuring CCR/GFR on ICU, the balance of risk (within the context of antibiotics' 'primary goal') on ICU will often be different than other settings – sometimes almost by definition. 'Intensive Care' means what it says. Patients will not be there unless their underlying condition warrants it. For 'seriously-ill dialysis-dependent ICU patients' (if I can call them that), vulnerable and fighting a serious infection risking Sepsis like Mr Berry, that imminent risk will often if not always outweigh the established but not inevitable risk of ototoxicity. I accept Mr Berry sustained that. But I also accept from Dr Meyer and Dr Danbury that it is not common.

112. However, as Dr Meyer observed, this different balance for such 'seriously-ill dialysis-dependent ICU patients' is not something which any of the other guidelines, including the NICE guideline, factor in at all. For those reasons, this renders them 'incomplete' or even 'unsatisfactory' to that extent (*Sanderson*). Indeed, the Defendant's own non-ICU Renal Impairment guideline caps the dose at 3mg/kg with a maximum of 280mg even in cases of 'Severe Sepsis' or 'Septic Shock'. I have considered whether that questions the 'ICU is different' analysis. In my judgment, on the contrary, that analysis questions that provision, which seems to 'cap' potentially life-saving antibiotics to avoid an uncommon risk of ototoxicity. By contrast, whilst the Defendant's 2015 ICU guideline was badly-drafted (if better than its successor), I find it was not intrinsically *Bolam*-negligent, it simply left a great deal to clinical judgement in renally-impaired patients. However, in my judgment, it did have a good, logical and cogent reason to depart from NICE and other general Gentamicin guidelines when risk to a 'seriously-ill dialysis-dependent ICU patient' from a severe infection (including the risk of Sepsis) outweighed the risk of ototoxicity. I accept from Dr Danbury and Dr Meyer this is often the case on ICU. The real question here is whether it was the case for Mr Berry.

113. Finally, on that question, in my judgment Dr Meyer departing from the NICE/BNF guideline for Mr Berry was justified by good, logical, cogent reasons. Indeed, departure from the Defendant's Renal Impairment guideline was in my judgement justified too even though it meant that if the Gentamicin had been given 30 minutes later on Stephen Ward, I accept that it would have been a significantly lower dose. My reasons are:

    113.1 Not every renally-impaired patient on ICU will need a high bacteriocidal dose of Gentamicin. However, in my judgment, Dr Meyer was justified in considering that Mr Berry did need that, for the reasons already discussed. In short, Mr Berry had a worsening systemic infection which had progressed despite an ineffectively low dose, which had achieved little but to delay the next dose. Given the slow fall to trough level after that dose and any second dose (especially if higher), Dr Meyer only had 'one shot' to stem the rising infection. The risk from that infection, including of Sepsis for someone as vulnerable as Mr Berry, outweighed the uncertain risk of ototoxicity. A low, cautious, dose had failed. A high, bacteriocidal, dose like 400mg was now needed. Deferring that dose until the trough level of 1mg/l was reached was not closing the door after the ototoxicity horse had bolted, it was trying to secure the door to stop it. Sadly, it did not do so.

113.2 In my judgment, the fact that Mr Berry received that dose just before he moved to a ward where the dose would probably have been lower does not make the higher dose illogical. If a high bactericidal dose was required - as Dr Meyer, supported by Dr Danbury believed it was – and which for reasons given above and elaborated on below I entirely accept – there was all the more reason to give it on ICU before Mr Berry was moved to a ward where there was a risk of another inadequate dose, like the one on 3rd March. If anything, it would be illogical and indeed negligent for an ICU clinician to return a vulnerable patient with a worsening systemic infection to a ward without first giving them a high bacteriocidal dose of antibiotic, especially if (as here) it was not clear when that could safely be given below trough level, let alone when a future dose could be.

113.3 Indeed, this also seems to me the best answer to Claimant's Counsel query why Dr Meyer chose to prescribe 400mg of Gentamicin but then defer its administration until the Gentamicin level fell below 1 mg/l, rather than just waiting for that, reviewing Mr Berry and deciding on an appropriate dose then. As Dr Meyer pointed out, he did not know when the level would be low enough for a bacteriocidal dose to be administered, but he did know that the low dose had not worked and that given the delays until the dose could be given (and then further delay before any further dose), there was only 'one shot'. If it was otherwise appropriate to prepare for Mr Berry to be 'stepped down' to an ordinary ward (which is criticised by Dr Danbury, but not on behalf of the Claimant), then that dose needed to be administered as soon as that level was reached, which meant it needed to be prescribed and 'set up ready to go'. However, the level was still not reached when Dr Meyer saw Mr Berry again at 15.45. It was reached at some point between 15.45 and 18.51 but owing to administrative delays, it was not administered until 20.38. Had Dr Meyer simply 'waited and seen' he may not have seen Mr Berry again before the move, Mr Berry might not have got that 400mg dose. Although he would not then have developed the ototoxicity, depending on what the dose had been, he may very well have developed Sepsis and risked death given his vulnerability. Delaying the prescription would have entailed 'passing the buck'. Dr Meyer could see that a high bacteriocidal dose was needed, he grasped the nettle and prescribed it on the basis it could always be reversed. In fact, it was not, which I consider under allegation (iii) in a moment. Having now addressed the allegation (i), I now turn to allegation (ii).

114. Allegation (ii) is a more traditional *Bolam*/*Bolitho* challenge to Dr Meyer's prescription decision. I remind myself of *Bolam* and re-quote some of Lord Browne-Wilkinson observations in *Bolitho* (although I bear well in mind all of them quoted above):

> "*In particular in cases involving, as they so often do, the weighing of risks against benefits, the judge before accepting a body of opinion as being responsible, reasonable or respectable, will need to be satisfied that, in forming their views, the experts have directed their minds to the question of comparative risks and benefits and have reached a defensible conclusion on the matter….*
>
> *…[I]t would be wrong to allow such assessment to deteriorate into seeking to persuade the judge to prefer one of two views both of which are capable of being logically supported. It is only where a judge can be satisfied the body of expert opinion cannot be logically supported at all that such opinion will not provide the benchmark by reference to which the defendant's conduct falls to be assessed*."

Likewise, as this is not a case raising real questions of the experts' 'good faith', 'respectability', 'competence' or 'responsibility', I remind myself of some of Green J's helpful observations in *Cumbria* on 'logic' and 'reasonableness' following *Bolitho*:

> "*A Judge should not simply accept an expert opinion; it should be tested both against the other evidence tendered during the course of a trial, and, against its internal consistency. For example, a judge will consider whether the expert opinion accords with the inferences properly to be drawn from the Clinical Notes…A judge will ask whether the expert has addressed all the relevant considerations which applied at the time of the alleged negligent act or omission. If there are…..clinical guidelines, a Court will consider whether the expert has addressed these and placed the defendant's conduct in their context…The task of the Court is to see beyond stylistic blemishes and to concentrate upon the pith and substance of the expert opinion and to then evaluate its content against the evidence as a whole and thereby to assess its logic. If on analysis of the report as a whole the opinion conveyed is from a person of real experience, exhibiting competence and respectability, and it is consistent with the surrounding evidence, and of course internally logical, this is an opinion to which a judge should attach considerable weight.*"

115. I can deal with this second challenge to Dr Meyer's prescription decision much more briefly because I have already covered most of the ground in my findings of fact and conclusions on allegation (i). In short, as may already be clear, I consider that Dr Meyer's decision to prescribe 400mg to Mr Berry, despite his improvement in clinical presentation and the planned step down to Stephen Ward if he tolerated faster dialysis, was logical, reasonable and in accordance with a responsible body of clinical opinion, as confirmed by Dr Danbury, notwithstanding Dr Bell's criticisms and the other guidelines. Indeed, even if I am wrong not to find the ICU guideline *Bolam*-negligent in allegation (i), Dr Meyer's actual clinical prescription decision in Mr Berry's clinical circumstances at 12.30 on 4th March avoided its negligence and was *Bolam*-complaint in an entirely orthodox sense following *Bolam, Bolitho, Cumbria* etc.

116. In this more traditional *Bolam/Bolitho* challenge to Dr Meyer's individual clinical judgement, Claimant's Counsel argued by prescribing Mr Berry 400mg of Gentamicin, Dr Meyer was not acting in accordance with a *Bolam*-compliant reasonable body of clinical opinion. This was not only because Dr Bell's opinion showed Dr Danbury's opinion was not just illogical but also that he had not evidenced Dr Meyer's approach was in accordance with any mainstream ICU practice. Dr Meyer's approach was also flatly contrary to the established reasonable approach of his colleagues on the Renal team such as Dr Thom, as reflected in the Defendant's Renal Impairment guideline, with whom Dr Meyer could have but failed to consult before deciding on a 400mg dose. That body of opinion was also consistent with NICE and other guidelines from which Dr Meyer departed from without good logical and cogent reasons. I have already rejected a number of these points, but as they are framed in a different way, at risk of repeating myself, I will briefly explain why I reject this challenge, for three reasons.

117. Firstly, it is important to remember that this challenge is to Dr Meyer's prescription decision at c.12.30 on 4th March, not the administration at 20.38 I address below. At 12.30, Dr Meyer was faced with Mr Berry's mixed clinical picture and adopted a mixed clinical strategy I have described. At that stage, Mr Berry was still on CVVHD, indeed Dr Meyer decided to increase fluid removal from 2,000 ml/hr to 4,000 ml/hr. So, whilst Dr Meyer did not know when the Gentamicin level would fall below 1mg/ml to enable his planned 400mg dose of Gentamicin to be administered, I accept he probably believed it would be much sooner than the 8 hours it actually took.

118. For Dr Bell in evidence (as opposed to in the pleaded allegations – a point I return under allegation (iii)), it was the combination of the high dose and the planned lack of dialysis from the evening of 4th to the morning of 6th March which was negligent. But, at the time of prescription at 12.30, the Renal Handbook guideline would permit a dose of 400 mg equating to 4.73 mg/kg in a lowest-category renal-impairment patient like Mr Berry because he was on CVVHD – therefore the range would be 3-5 mg/kg daily. By comparison to that Renal Handbook, it is the NICE Guideline which is 'one-size fits all' - in not distinguishing between renally-impaired patients on renal replacement therapy of one kind or another and those who are not on any. Moreover, as Dr Meyer noted, the Defendant's Renal Impairment guideline does not have a category for CVVHD (presumably as it is only available on ICU which has its own guideline). In any event, in complying with the more 'nuanced' Renal Handbook, Dr Meyer was acting consistently with a *Bolam*-compliant reasonable body of opinion, indeed the most authoritative body of opinion available. Whether he knew he was is not the point: the standard of care is objective, not subjective.

119. Secondly, even if one forward-winds to Dr Meyer's decision to stop CVVHD at 15.45 on 4th March where the Defendant can no longer rely on this point, he still did not have the Gentamicin level available, so he still did not know when the dose would be administered, still less any future dose or how Mr Berry would be then. So, he still only had 'one shot' to stem that with a high bacteriocidal dose. I accept Dr Meyer's view, supported by Dr Danbury, that for Mr Berry, the risk from that rising infection was of developing Sepsis from which he was vulnerable to a poor outcome as Dr Bell accepted, indeed death as Dr Danbury rightly and realistically said. Therefore, as both Dr Meyer and Dr Danbury rightly said (but which Dr Bell down-played, if not ignored at times), for Mr Berry, the infection was truly 'life-threatening'. I also accept that Dr Meyer and Dr Danbury's clinical judgement (supported by the latter's wide ICU experience even without other ICU guidelines) as compliant with *Bolam/Bolitho*. This risk from a life-threatening infection so outweighed the uncertain risk of ototoxicity that it justified a bacteriocidal dose just under the usual 5mg/kg for non-renally impaired patients. So, in the words of Lord Browne-Wilkinson in *Bolitho*, Dr Meyer 'directed his mind to the question of comparative risks and benefits and reached a defensible conclusion'. To look at it another way, this was a good, logical and cogent reason to depart from national (and the Defendant's Renal Impairment) guidelines.

120. Thirdly, I also reject the argument that Dr Meyer's dose was not in accordance with a *Bolam*-compliant reasonable body of clinical practice because it was contrary to Renal practice reflected by the Defendant's Renal Impairment guideline and Dr Thom, with whom Dr Meyer did not consult. In my view, even if the ICU was otherwise *Bolam*-negligent contrary to my finding, there was a good reason it envisaged consultation with ICU pharmacists, not non-ICU renal colleagues. Of course, all doctors' ultimate role is the same, but the focus of renal specialists is different from that of ICU specialists. It makes sense they would strike the balance differently- there are good cogent reasons for the ICU guideline to differ from the Renal Impairment one as I have discussed. Moreover, I have no expert Renal evidence – Dr Meyer must be judged by the standards of his own specialism, Intensive Care. I accept his decision was in accordance with a reasonable body of opinion within intensive care, typified by Dr Danbury, even if there is another reasonable body of opinion within intensive care typified by Dr Bell. I cannot choose between the two of them except on the basis that one cannot be logically supported (*Bolitho*). Indeed, given the legitimate concerns about the risks to Mr Berry's health and life, Dr Danbury and Dr Meyer's approach seems to me with respect more logical than Dr Bell's suggestion of a 160mg dose. This is less than half the usual 5mg/kg dose under the Renal Impairment guideline for patents with CCR above 20ml/min and within the NICE and Renal Handbook guidelines. As I have said, there was a cogent reason to depart from them as they do not address the situation where risk from infection outweighs risk of ototoxicity. But Dr Bell here seems to prioritise Mr Berry avoiding balance and hearing problems over his risk of developing Sepsis and indeed to his life. In any event, it is hardly surprising Dr Meyer, an experienced ICU Consultant, saw no need to consult with the on-call Renal Consultant. Indeed, he may have seen even less need given that a Renal Registrar the previous day had prescribed a 80mg dose which proved inadequate and indeed inconsistent with the Renal Impairment guideline suggesting a 2mg/kg dose for intermittent dialysis (c.160mg for Mr Berry). Finally, it is true that Dr Meyer did not consult with ICU pharmacists but that is as he knew the risk of ototoxicity, he just reasonably considered it was outweighed. In conclusion on allegation (ii), I would also make this simple point. Mr Berry had a worsening systemic infection which risked tipping into true Sepsis and was life-threatening if untreated. To give him less than the usual c.5mg/kg dose (so here, c.400mg), because he was renally-impaired and had a higher risk of balance and hearing problems, would have been a very risky decision.

121. Finally, I turn to allegation (iii). As I observed above, during the evidence this felt like more fertile ground for the Claimant given Dr Bell's criticism in evidence focused on the combination of administering a high dose of Gentamicin just before a step-down to ordinary ward with a planned 48-hour hiatus in any dialysis, let alone CVVHD. Moreover, Dr Meyer last saw Mr Berry at 15.45 on 4th March, almost five hours before the administration at 20.32. There was no other witness from the Defendant who had seen or examined Mr Berry that evening and exercised a conscious clinical judgement that the 400mg dose prescribed but deferred by Dr Meyer should still be given. Dr Meyer was not responsible for that administration eight hours after his prescription (nor the administrative delay in doing so for around two hours). However, after all, the Defendant was the Trust, not Dr Meyer. What evidence could the Trust deploy to address Dr Bell's criticism of its *administration* of 400mg of Gentamicin that evening, quite apart from the criticism of Dr Meyer's *prescription* of it that afternoon?

122. I start with this observation. Claimant's Counsel rightly observed, he had originally pleaded *administration* of an 'excessively high dose' not *prescription* of it. Yet until Dr Bell's evidence there was no distinction in the challenge between them. Naturally 'administration' was challenged because an unadministered prescription went nowhere. Whilst it was pleaded that Mr Berry's renal status was not considered and renal expertise not consulted before administration (TB 12-3), this was not on the basis that 'even if Dr Meyer was not at fault on prescription, someone else was at fault on administration', nor was any other such distinction drawn elsewhere in the Particulars. Moreover, nor did Dr Bell's report (TB 242-264) draw such a distinction or present such an alternative allegation of negligent, so far as I can see. Indeed, he said at p.3.28:

> "*....I would therefore define the prescription and administration of 400 mg of gentamicin on 4 March 2017 as <u>a breach of duty</u>.*"

I underline that to emphasise 'a breach', not 'different (still less 'alternative') breaches'. I consider one final time into the ICU Joint Statement. There is no such distinction between prescription and administration there either. Indeed, despite so many rather repetitive questions at times (which doubtless did not help but cannot excuse the experts' discursive answers), not one of those 27 questions seeks even to investigate such a distinction. The hiatus of dialysis is also no part of the pleaded case, as Defence Counsel's Skeleton rightly pointed out and as Claimant's Counsel accepted in submissions.

123. This is not to say the administration is not challenged, it is just that the administration of 400mg of Gentamicin is not challenged in the *alternative* to its prescription. This may explain why the Defendant has not called evidence about administration itself, nor is that criticised. Therefore allegation (iii) does not add a huge amount to allegation (ii), but it does add this legitimate question: Had anything changed in the intervening eight hours since prescription to make administration of 400mg at 20.32 *Bolam*-negligent? My answer to that question is that 400mg was still justified, for three reasons.

124. Firstly, in submissions I posited scrutinising whether the 'notional ICU doctor' (I assume in fairness to the Claimant rather than the more likely nurse, given I have no nursing expert evidence) administering the dose of 400mg at 20.32 on 4th March was *Bolam*-negligent on the information they then had (i.e. not the biomarkers from 5th March, nor Dr Thom's observations on 6th March). As I have said, it is far from clear the ICU doctor preparing the discharge summary at around 17.00 actually examined Mr Berry – and in any event the challenge is to conduct at 20.32, not 17.00: the Defendant cannot benefit from their own administrative delay. That ICU discharge and the later nursing review that evening do show Mr Berry's positive clinical presentation. Yet so too did Dr Meyer's note at 12.30 and the closest record to the administration – the rheumatology note at 19.30 - suggests Mr Berry was more confused than earlier. However, the fundamental point is there is no evidence of any significant change in clinical circumstances between Dr Meyer seeing Mr Berry at 15.45 (after the Vancomycin dose) and sanctioning the end of CVVHD and step-down to Stephen Ward, other of course than the Gentamicin level falling below 1mg/l (probably closer to 15.45 than 20.32). Moreover, the notional ICU doctor's decision to administer must be scrutinised in fairness on the basis there was no evidence of improvement in the infection, unsurprisingly as it had not yet been treated with *any* Gentamicin that day. I have already rejected that it was negligent to prescribe a dose of 400mg just prior to transfer to a ward where it would not have been given. As I said, if anything that was all the more reason to administer it if it was clinically justified, as I have found it was. There remained a good 'cogent' reason to depart from national (and other 'in-house' guidelines for the reasons already discussed. In short, the notional ICU doctor at 20.32 was just as entitled to consider 400mg the appropriate dose as Dr Meyer had been at 12.30. He or she was just as supported by a responsible body of ICU opinion reflected by Dr Danbury, who confirmed his view on administration was the same as prescription

125. Secondly, even if I am wrong about that, there does seem to me a consequence to the Claimant's challenge to the administration of Gentamicin at 20.32 on 4th March but not to the separate circumstances of that administration. In particular, it is not a pleaded allegation of negligence that updated biomarkers on PCT, CRP or WCC were not obtained on the evening of the 4th of March before administration. Dr Danbury criticised the failure to update the PCT the next day, but the Claimant has not adopted that. Given that and Dr Danbury's evidence (at the start of it) that his opinion was the same for administration at 20.30 as 12.30 on 4th March, it seemed to me relevant (later in his evidence) to ask him to extrapolate back from the biomarkers at 08.00 on 5th March nearly 12 hours after the administration of the Gentamicin to just before it around 20.00 on 4th March. Given that Dr Bell's evidence had opened up this distinction between prescription and administration, there seemed to me a potential '*Bolitho*-causation' point (c.f. *Bolitho* pgs.239-240) whether if the prescription had been negligent at 12.30, whether it was even open to the Defendant to try and argue it was no longer negligent at 20.32. Whilst that does not arise on my conclusions, Dr Danbury's answer to my question that the markers would have been higher on the evening of 4th March (which was not challenged by Claimant's Counsel, who did not seek to recall Dr Bell on the issue) is highly relevant here. It led me to find a fact the infection had got worse during the day on 4th March and therefore, the notional ICU doctor's assumption that it had not got any better was justified and cannot be criticised.

126. Either way, if for the reasons I gave, that prescription of 400mg of Gentamicin at 12.30 was logical, reasonable and consistent with a responsible body of ICU opinion, so was its administration at 20.32, when the infection was actually worse and certainly there was no evidence at the time it was any better. If the risk from the infection outweighed that of ototoxicity at 12.30, it did so just as much if not more at 20.32 when Gentamicin was administered. I find this was a reasonable, logical clinical decision in accordance with a responsible body of ICU opinion, just as its prescription earlier had been.

127. Finally, even if I am wrong about that and the notional ICU doctor was *Bolam*-negligent in administering the Gentamicin without checking the progress of the infection, those biomarkers and indeed Dr Thom's examination on 6th March demonstrate on the balance of probabilities that had this been done, it would have been clear the infection was worse and the 400mg of Gentamicin would still have been administered. Therefore, on this limited (and academic basis), causation is not proven.

128. Therefore, I dismiss the claim because for the reasons I have given I consider Dr Meyer's prescription of 400mg of Gentamicin at 12.30 on 4th March and indeed its administration at 20.32 on 4th March was not negligent. However, that does not mean the Defendant's clinical guidelines have no need of revision. I return to the 2019 ICU guideline replacing the 2015 guideline. I considered it irrelevant and ignored it despite the Defendant seeking to use it to buttress its position. It failed to do so as it states:

> "*No adjustment of the initial dose is required in renal failure or renal replacement therapy, although the dosage interval and/or the magnitude of future doses may need to change based on plasma levels. The continuation of gentamicin in renal failure must be reviewed after the initial dose in accordance with the critical care empirical antibiotic guidelines and microbiology. If gentamicin is still the preferred agent, consider reducing subsequent doses, discuss dosing regimen with critical care pharmacy.*"

This therefore not only still fails to include any explanation of ototoxicity risk, it effectively scraps the subtle 'steer' with renally-impaired patients in favour of a blunt 'rule' at least on the first dose. I am bound to say in the light of Mr Berry's case that this departure from national guidelines would have been much harder to justify. This may or not matter for any legal cases. But it does matter for real people and their health. I earnestly hope the Defendant will review and revise this guideline urgently. However, I stress it is not for the Court to write clinical guidelines and nothing I say should be taken as specifying what clinical practice should be – I have just applied *Bolam/Bolitho* to these facts (*Hewes*). Clinical guidelines are very important clinical tools and should be considered and written to reflect best practice in clinical situations, not with one eye on 'the judge over your shoulder', in the old Civil Service expression.

129. I turn finally to the Claimant. I have found the 400mg of Gentamicin on 4th March was not negligent even though I accept it caused Mr Berry ototoxicity with balance problems and I am prepared to assume hearing loss as well. I was conscious that as the Claimant did not give evidence – I only had her experience in writing. I am even more conscious she and her late brother endured many months of the effects of that ototoxicity, before other health problems unassociated with it took him from her. From reading her statement very carefully, I do understand and indeed I genuinely sympathise with their ordeal through those symptoms together and the effects it had on both their lives. Nothing I have said or decided should minimise that in any way.

130. Therefore, I cannot blame the Claimant if she disagrees with or is even not interested in my final observation. But I will make it nevertheless. I have found that her brother had a worsening systemic infection which risked Sepsis on 4th March. Dr Bell accepted that if he had not been given Gentamicin he would have developed Sepsis. Given Mr Berry's vulnerabilities, the prospects of him surviving Sepsis were limited – indeed severe Sepsis finally took him almost two years later in January 2019. I know the Claimant believes that Dr Meyer erred. I have explained why I respectfully disagree. However, I hope it may give her some comfort to feel that as she believes Dr Meyer erred, he did so on the side of Mr Berry's life.

HHJ TINDAL