BRIEF FOR EXPERT ON

CONOR MITCHELL

Introduction

1. Conor Mitchell is one of four children who are the subject of a public inquiry being conducted by John O'Hara QC.

2. Conor was born on 12th October 1987. He had a history of cerebral palsy and epilepsy.

3. On the 8 May 2003 (when Conor was 15) his mother brought him to the Accident and Emergency Department of the Craigavon Area Hospital ('CAH') as he had been unwell for about 10 days. During that time he had been managed at home with input from general practitioners.

4. At the CAH Conor was noted to have signs of dehydration. He was admitted on to the Medical Admissions Unit ('MAU') for the purposes of observation. This was an adult ward.

5. Conor's condition deteriorated in the course of the afternoon of the 8 May 2003 and into the evening. There has been a dispute in relation to whether Conor was suffering seizures during that afternoon, or whether, as nursing staff would maintain, his mother complained that he was experiencing spasms. Certainly, by 2030 hours it is undisputed that Conor suffered two episodes of seizure activity in rapid succession and stopped breathing.

6. After Conor was intubated and ventilated, a CT scan was conducted and he was admitted to the Intensive Care Unit ('ICU') of the CAH. Late on the 9 May 2003 he was transferred to the Paediatric Intensive Care Unit ('PICU') of the Royal Belfast Hospital for Sick Children ('RBHSC'). Brain stem tests were shown to be negative and on the 12 May 2003 a decision was taken to discontinue treatment. Life was pronounced extinct at 1545 on that date.

7. Conor's death was the subject of a Coroner's post-mortem. The Inquest into his death was conducted on 9th June 2004 by Mr. John Leckey, Coroner for Greater Belfast. Mr. Leckey found that the cause of Conor's death was 1(a) brainstem failure (b) cerebral oedema (c) hypoxia, ischaemia, seizures and infarction, and II cerebral palsy.[1]

8. You will note that at the Inquest the cause of Conor's death was not attributed to hyponatraemia, whether in whole or in part. That remains the position.

[1] [087-057-221]

Other Deaths Being Considered by the Inquiry

9. The other 3 children who are the subject of the public inquiry are:-

(1) Adam Strain

Adam was born on 4th August 1991. He died on 28th November 1995 in the RBHSC following kidney transplant surgery. The Inquest into his death was conducted on 18th and 21st June 1996 by John Leckey, the Coroner for Greater Belfast, who engaged as experts: (i) Dr. Edward Sumner, Consultant Paediatric Anaesthetist at Great Ormond Street Hospital for Sick Children ("Great Ormond Street"); (ii) Dr. John Alexander, Consultant Anaesthetist at Belfast City Hospital; and (iii) Professor Peter Berry of the Department of Paediatric Pathology in St. Michael's Hospital, Bristol. The Inquest Verdict identified cerebral oedema as the cause of his death with dilutional hyponatraemia as a contributory factor.

(2) Claire Roberts

Claire Roberts was born on 10th January 1987. She was admitted to the RBHSC on 21st October 1996 with a history of malaise, vomiting and drowsiness and she died on 23rd October 1996. Her medical certificate recorded the cause of her death as cerebral oedema and status epilepticus. That certification was subsequently challenged after a television documentary into the deaths of Adam and two other children (Lucy Crawford and Raychel Ferguson).

The Inquest into Claire's death was carried out nearly 10 years after her death by John Leckey on 4th May 2006. He engaged Dr. Robert Bingham (Consultant Paediatric Anaesthetist at Great Ormond Street) and Dr. Ian Maconochie (Consultant in Paediatric A&E Medicine at St Mary's, London) as experts. The Inquest Verdict found the cause of Claire's death to be cerebral oedema with hyponatraemia as a contributory factor.

(3) Raychel Ferguson

Raychel Ferguson was born on 4 February 1992. She was admitted to the Altnagelvin Area Hospital on 7 June 2001 with suspected appendicitis. An appendicectomy was performed on 8 June 2001. She was transferred to the RBHSC on 9 June 2001 where brain stem tests were shown to be negative and she was pronounced dead on 10 June 2001. The Autopsy Report dated 11 June 2001 concluded that the cause of her death was Cerebral Oedema caused by Hyponatraemia.

The Inquest into Raychel's death was conducted on the 5 February 2003 by John Leckey who once more engaged Dr. Edward Sumner as an expert. The Inquest Verdict found the cause of Raychel's death to be Cerebral Oedema with Acute Dilutional Hyponatraemia as a contributory factor. It also made findings that the Hyponatraemia was caused by a combination

of inadequate electrolyte replacement following severe post-operative vomiting and water retention resulting from the secretion of anti-diuretic hormone ('ADH').

10. The impetus for this Inquiry was a UTV Live 'Insight' documentary 'When Hospitals Kill' shown on 21st October 2004. The documentary primarily focused on the death of a toddler called Lucy Crawford (who died in hospital in 2000 and whose death was subsequently found to have been as a result of hyponatraemia). The programme makers identified what they considered to have been significant shortcomings of personnel at the Erne Hospital where Lucy had been initially treated before being transferred to the RBHSC. In effect, the programme alleged a cover-up and it criticised the hospital, the Trust and the Chief Medical Officer. The programme also referred to the deaths of Adam and Raychel in which hyponatraemia had similarly played a part. At that time, no connection had been made with the deaths of Claire and Conor.

Original Terms of Reference

11. The Inquiry was established under the Health and Personal Social Services (Northern Ireland) Order 1972, by virtue of the powers conferred on the Department by Article 54 and Schedule 8 and it continues pursuant to the Inquiries Act 2005.

12. The original Terms of Reference for the Inquiry as published on 1st November 2004 by Angela Smith (then Minister with responsibility for the Department of Health, Social Services and Public Safety) were:

To hold an Inquiry into the events surrounding and following the deaths of Adam Strain, Lucy Crawford and Raychel Ferguson, with particular reference to:

i. The care and treatment of Adam Strain, Lucy Crawford and Raychel Ferguson, especially in relation to the management of fluid balance and the choice and administration of intravenous fluids in each case.
ii. The actions of the statutory authorities, other organisations and responsible individuals concerned in the procedures, investigations and events which followed the deaths of Adam Strain, Lucy Crawford and Raychel Ferguson.
iii. The communications with, and explanations given to, the respective families and others by the relevant authorities.

In addition, Mr O'Hara will:

(a) Report by 1 June 2005 or such other date as may be agreed with the Department, on the areas specifically identified above and, at his discretion, examine and report on any other relevant matters which arise in connection with the Inquiry.

(b) Make such recommendations to the Department of Health, Social Services and Public Safety as he considers necessary and appropriate.

(Emphasis added)

Changes

13. There have been a number of significant changes in the Inquiry since 2005. Firstly, following representations from the Crawford family who wished to have Lucy excluded from the Inquiry's work, the Inquiry received the following Revised Terms of Reference from the Minister:

1. The care and treatment of Adam Strain and Raychel Ferguson, especially in relation to the management of fluid balance and the choice and administration of intravenous fluids in each case.

2. The actions of the statutory authorities, other organisations and responsible individuals concerned in the procedures, investigations and events which followed the deaths of Adam Strain and Raychel Ferguson.

3. The communications with and explanations given to the respective families and others by the relevant authorities.

In addition, Mr O'Hara will:

(a) Report by 1 June 2005 or such date as may be agreed with the Department, on the areas specifically identified above and, at his discretion, examine and report on any other matters which arise in connection with the Inquiry.

(b) Make such recommendations to the Department of Health, Social services and Public Safety as he considers necessary and appropriate.

14. Secondly, Claire Roberts and **Conor Mitchell** were included into the Inquiry's work by the Chairman. In Claire's case that decision arose out of the belated acknowledgement by the RBHSC that hyponatraemia played a part in Claire's death.

15. In Conor's case the decision arose out of a concern that his fluid management might have been less than optimal. This concern was of interest to the Inquiry since, as will be discussed in greater detail below, Conor received his medical care and treatment a matter of 14 months after the publication of the *'Guidance on the Prevention of Hyponatraemia,'* a document which was designed to ensure that administration of fluids was safely managed in children's cases.

Progress

16. The Inquiry has now largely completed its public hearings into the following matters: the clinical and governance aspects of both Adam's case and Claire's

case; the clinical aspects of Raychel's case; the events which followed Lucy's death.

17. The Inquiry will continue with its public hearings in the autumn when it will examine the governance aspects of Raychel's case; Conor's case (within the parameters explained below); and wider governance issues, particularly, but not limited to, those governance issues touching upon the Department of Health Social Services and Public Safety and its interaction with the wider health and personal social services sector.

18. It has always been intended that the Inquiry's investigation into **Conor's** case would be different in nature to the investigations into the deaths of Adam, Claire and Raychel, primarily because it is clear that hyponatraemia was not a cause of his death.

19. Nevertheless, Conor's case remains an important part of the Inquiry's work.

20. In addressing the importance of Conor's case for the Inquiry's terms of reference some years ago, the Chairman stressed:

> *It is obviously a matter of concern if guidelines which have been introduced as a result of a previous death or deaths and which are aimed at avoiding similar events in the future, are not properly communicated to hospital staff and followed. It is relevant to the investigation to be conducted by the Inquiry whether and to what extent the guidelines had been disseminated and followed in the period since they were published. Another matter of interest is whether the fact that Conor was being treated on an adult ward rather than a children's ward made any difference to the way in which it appears that the guidelines may not have been followed.*
>
> *Accordingly, the Inquiry will investigate the way in which the guidelines had been circulated by the Department, the way in which they had been made known to hospital staff and the steps, if any, which had been taken to ensure that they were being followed. While this is an issue of general importance, it will be informed by an examination of the way in which the guidelines had been introduced and followed in Craigavon Area Hospital by May 2003.*

21. More recently, Conor's family have made representations to the Inquiry advising that they did not intend to attend the Inquiry's hearings in relation to his case, instead indicating that they would leave it to the Inquiry to decide which issues arising out of his death it felt it was still appropriate to address.

22. Accordingly, at the public hearing on the 2 July 2013, the Chairman made the following announcement to explain how the investigation in relation to the issues raised by Conor's case would proceed:

"What I intend now to do in Conor's case, in light of what I've heard from the family, is to obtain from an expert a review of the nursing and medical records for the purpose of seeing how they comply with the hyponatraemia guidelines which had been issued in 2000 [sic – guidelines were in fact issued in March 2002] When that report is received, it will be forwarded to what I think is now the Southern Trust, the successor to Craigavon. I will forward it to the Southern Trust so that the Trust can indicate the extent to which it accepts or rejects that report. I will then arrange to call some witnesses who were involved in Craigavon in 2003, but it is the overall idea that the Conor segment might probably be dealt with in one week rather than two, in the autumn, in early October."

Role of the Experts

23. The Role of the Experts to the Inquiry is set out in 'Protocol No.4: Experts,' with which you are familiar. There are 4 categories of expert assistance:

    (i) Expert Advisors to assist the Inquiry in identifying, obtaining, interpreting and evaluating the evidence within their particular area of expertise, currently: (a) Paediatrician; (b) Paediatric Anaesthetist; (c) Nurse in Paediatric Intensive Care; and (d) National Health Service Hospital Management
    (ii) Experts appointed to 'peer review' the work of the Expert Advisers, currently: (a) Internal Medicine/Nephrology; (b) Paediatric Anaesthetist; and (c) Paediatric Intensive and Critical Care Nursing
    (iii) Experts on a case by case basis as Expert Witnesses
    (iv) Experts to provide commissioned 'Background Papers'

24. You have been identified as an expert whose role falls within category (iii) above. You are asked to consider Protocol No. 4 from this perspective.

Developments that Preceded Conor's Death

25. As appears from the descriptions set out above, Conor's death occurred some two years after Raychel's death.

26. Even before the results of a post mortem declared that Raychel's death had been caused by cerebral oedema due to hyponatraemia, clinicians at the Altnagelvin Hospital where Raychel had been treated, were suspicious that poor fluid management practices had been a significant factor in her case.

27. Raychel's death occurred six years after Adam's and was the second death to be publicly recognised as being related to hyponatraemia and where fluid management was a cause of concern. After Conor's death, the deaths of Lucy and Claire were also recognised as being hyponatraemia related.

28. The concerns that surrounded Raychel's treatment and death were quickly disseminated to the wider medical community, chiefly by the Medical and Clinical Directors of Altnagelvin Hospital. Raychel's death was discussed at a meeting of the Directors of Public Health on the 2 July 2001. A multidisciplinary working group was established by the Department of Health and Social Services and Public Safety which examined the causes of hyponatraemia in children.

29. By the 26 March 2002 Dr. Henrietta Campbell (the Chief Medical Officer) was in a position to circulate, *'Guidance on the Prevention of Hyponatraemia,'*[2] which had been formulated by this multidisciplinary working group. A copy of this Guidance is included with the attached papers for your consideration.

30. In an explanatory letter issued by Dr. Campbell on the 25 March 2002, the Guidance was brought to the attention of a broad range of clinicians practising in Northern Ireland including the Medical Directors of Acute Trusts, Directors of Nursing in Acute Trusts, Consultants in A&E Medicine, Consultant Surgeons and Consultant Paediatricians.[3] A copy of that letter is also included for your attention.

31. In that letter Dr. Campbell explained that,

> "The Guidance emphasises that every child receiving intravenous fluids requires a thorough baseline assessment, that fluid requirements must be calculated accurately and fluid balance must be rigorously monitored."[4]

32. The Guidance was issued in the form of an A2 sized poster. Dr. Campbell asked that the Guidance be "prominently displayed in all units that may accommodate children." It was anticipated that the Guidance would be complemented by the development of 'fluid protocols' at a local level and that such protocols would provide more specific direction to junior staff than was contained in the Guidance itself.[5]

33. The Guidance was prescriptive in relation to five matters: baseline assessment, fluid requirements, choice of fluid, monitoring and the seeking of advice. With regard to the need to monitor children who are in receipt of intravenous fluids the following guidance was provided:

> "**MONITOR**
>
> - **Clinical state:** including hydrational status. Pain, vomiting and general well-being should be documented.

[2] [007-003-004]
[3] [007-001-001]
[4] [007-001-001]
[5] [007-001-001]

- **Fluid balance:** must be assessed at least every 12 hours by an experienced member of clinical staff.

  Intake: All oral fluids (including medicines) must be recorded and IV intake reduced by equivalent amount.

  Output: Measure and record all losses (urine, vomiting, diarrhoea etc) as accurately as possible.

  If a child still needs prescribed fluids after 12 hours of starting, their requirements should be reassessed by a senior member of medical staff.

- **Biochemistry:** Blood sampling for U&E is essential at least once a day – more often if there are significant fluid losses or if clinical course is not as expected.

  The rate at which sodium falls is as important as the plasma level. A sodium that falls quickly may be accompanied by rapid fluid shifts with major clinical consequences….."[6]

  (Emphasis as per original text)

34. On the 23 June 2003, 6 weeks after Conor's death, the Clinical Resource Efficiency Support Team ('CREST') launched Guidance on the Management of Hyponatraemia in the Adult Patient.

35. On the 4 March 2004 Dr. Campbell asked the Trusts to provide confirmation that both sets of Guidance had been incorporated into clinical practice.[7]

36. Dr. C. Humphrey (Medical Director) addressed this issue on behalf of the Craigavon Area Hospital Group Trust in a letter dated 7 April 2004.[8] He explained Craigavon's response to the Guidance for children as follows:

> *"The guidelines….have been adopted throughout the Trust including where children are treated by surgical teams. The guidance is included in the induction for junior doctors and detailed fluid protocols are available to medical staff. Junior medical staff are also guided to seek consultant input in the management of hyponatraemia in both adults and children. The Trust has participated in a regional audit of the guidance on the prevention and*

[6] [007-003-004]
[7] [007-067-137]
[8] [007-073-145]

> *management of hyponatraemia in children which has been coordinated through the SAC Paediatrics Committee."*[9]

Background to Conor

Conor Becomes Unwell

37. At the age of six months Conor was diagnosed as suffering from cerebral palsy. The epilepsy from which he suffered was reportedly a mild form of the condition. Conor's mother, Joanna Mitchell, has said that he was generally in good health and she has described him in the following terms:

> "Conor was extremely intelligent, loved maths, science, poetry and exciting stories. Through home teaching and facilitated communication he passed his eleven plus exam when he was 10. The result was an 'A' pass. Conor did not have formal speech but his ability to communicate non-verbally was excellent. Conor had recently started to crawl and was well on the way to creeping. Conor required physical assistance when eating and when going to the bathroom, though he was fully continent. In spite of his disability Conor was extremely healthy and his only prior visit to hospital since birth was to have his Epilim requirements assessed at age 3. Conor never had the flu, tummy bugs or diarrhoea and rarely succumbed to the common cold. Conor was last prescribed antibiotics seven or eight years ago for an ear infection. Although Conor was small for his age (although aged 15 Conor had the physique of an 8-9 year old and weighed approximately 25 kilos** on admission to hospital) he was physically very strong and had great determination for independence and showed great enthusiasm for all high speed sports and games."[10]
>
> ** In fact Conor was found to weigh 22 kg on admission to CAH.

38. In late April 2003 Conor became unwell and was managed at home with input from general practitioners. However, he failed to show any significant improvement and the illness became prolonged. By the 8 May 2003 his general practitioner decided that it would be prudent to refer him to hospital.

39. The deposition of Ms. Mitchell helpfully summarises the events which occurred prior to Conor's admission to the CAH[11] :-

- On the 27 April 2003 Conor vomited. On the morning of the 28 April 2003 Conor complained of a sore throat and he was seen by Dr. Patterson

[9] [007-073-145]
[10] [087-002-014]
[11] [087-002-015] – [087-002-018]

(General Practitioner) of Moores Lane Surgery who diagnosed an upper respiratory infection and advised that this should be treated with paracetamol.

- On 30 April Conor was brought to the out of hours clinic at Moylinn where he was examined by Dr. Pickering. She found that Conor's ears and throat were red and prescribed a course of penicillin.

- On 1 May Conor vomited again. Dr. Pickering advised on a change of antibiotic (to amoxycillin in liquid form) and directed Ms. Mitchell that Conor should receive 30 ml of water orally per hour in order to avoid dehydration.

- On 2 May Conor was examined by Dr. Doyle (General Practitioner) of Moores Lane Surgery who found that his ears and throat were clear. Later that day Conor vomited again, bringing up yellow liquid and water. It was decided to discontinue the amoxicillin. Dr. Wilson at Moylinn out of hours clinic advised that Conor should be given an analgesic and allowed to rest, rather than be pressed to consume more water.

- On 3 May Conor appeared quite a bit better. He received water at 30ml per hour and ate some yogurt. He again vomited the remains of the yellow antibiotic.

- On 4 May Conor experienced "slight vomiting" and his stomach appeared upset. He suffered from 'hiccups' and 'burps'. He appeared tired. He consumed some yogurt.

- On 5 May Conor appeared much improved and did not sleep as much during the day. While he again experienced "slight vomiting" he consumed soup and kept down fluid. His mother gave him 60ml of water per hour.

- On 6 May Conor ate more normally but appeared extremely tired. Dr. Patterson advised that Conor had contacted a viral infection which was rife in the locality. That night Conor urinated in bed which was unusual for him and his mother detected a cream coloured residue from the urine. She contacted the out of hours service and was advised that the residue was from Conor's bladder and was as a result of him not being well.

- On 7 May Conor appeared to be continuing his improvement and ate and consumed fluids. However, by late evening he was in periodic discomfort and would arch his legs and back. The out of hours service was contacted and advice was sought. However, the doctor expressed his opinion that Conor was not suffering from anything more serious than the diagnosed viral infection.

- On 8 May Conor appeared lethargic and unwell. At 1000 Dr. Doyle made a house call and examined Conor. She advised that Conor should be brought to hospital for blood tests and observation.

40. Dr. Doyle prepared a referral letter indicating "Referral to RBHSC," which would appear to indicate that she assumed that Conor would be brought to the Royal Belfast Hospital for Sick Children.[12] The letter went on to state:

> "Unwell for 10 days. Not feeding. ↓ fluid intake. ↑ drowsiness. Poor colour. Had URTI at start of illness. Had short course of penicillin (2-3 days). Chest clear, HR 62/min reg. Well perfused, abdo tender: no guarding. Family refuse admission to local hospital. Cerebral palsy. ? Cause of deterioration."

Conor is Brought to Craigavon Area Hospital

41. Conor was in fact brought to the Accident and Emergency Department of the CAH where he was seen at 1051. His mother decided to bring him to the local hospital as opposed to the RBHSC as Dr. Doyle intended, because it was closer to home.[13]

42. The notes and records relating to the care and treatment of Conor while he was a patient of CAH can be found in **File 88.** Unfortunately, the notes were not assembled in chronological order when they were supplied to the Inquiry. A copy of the notes as they were presented to the Inquiry is now enclosed for your attention.

43. As appears from the records of the Accident and Emergency Department, Conor was seen by Dr. Suzie Budd (Staff Grade Doctor in Accident and Emergency) and by Staff Nurse Carragher.[14] You will see the history which was taken and recorded.

44. The Inquiry's understanding of the events which took place in the Accident and Emergency Department is assisted by the depositions taken from Dr. Budd[15] and Ms. Mitchell[16] at the Coroner's Inquest into Conor's death.

45. On examination Conor was found to be pale with signs of dehydration. He was apyrexic but was haemodynamically stable and breathing spontaneously with normal oxygen saturation on room air. On examination of his abdomen there was no local tenderness. Bowel sounds were present.

[12] [088-002-022]
[13] [087-002-031]
[14] [088-002-020 & 021]
[15] Dr. Suzie Budd's deposition [087-029-133]
[16] [087-002-013]

His temperature was recorded as 36.6˚C, his pulse rate was 77 and his blood pressure 118/69.

46. Dr. Budd obtained IV access and routine blood tests were sent, including blood cultures and a venous blood gas. The biochemical results for Conor which were available at 12:09 showed Urea 7.8; Cre 57; Alb 45; HC03 21.0; Gluc 7.6; CRP ‹ 5; sodium 138 and CL 97.[17] Dr. Budd has said that the results demonstrated that Conor was not hypoglycaemic and that there was no acidosis.[18]

47. In her deposition Dr. Budd has stated that paracetamol was given and that she recommended intravenous antibiotics which after some discussion, were accepted and administered.

48. Dr. Budd has indicated in her deposition that IV fluids were administered to Conor. The fluid selected was Hartmann's Solution. The issue of Conor's fluid management is discussed in greater detail below.

49. Dr. Budd referred Conor to the Paediatric team for further management. In fact the note that she made on the Accident and Emergency Department record states "admit paeds."[19] However, she has stated in her deposition that she was later advised that Conor's age meant that he was not suitable for the Paediatric Ward, and so admission was arranged via the Medical Team.[20]

50. The Inquiry is aware that when Sister Irene Brennan gave evidence at a hearing of the Nursing and Midwifery Council's Conduct and Competence Committee on the 11 July 2011 (which considered allegations against Staff Nurse Bullas), she explained that at that time it was hospital policy to admit patients over the age of 14 into the Medical Admissions Unit ('MAU').[21]

51. Dr. Budd has commented that Conor's condition gave cause for concern, although she was not able to diagnose what was wrong with him. She has also stated that she asked Ms. Mitchell whether Conor had suffered any fitting but was told that there had not been any.[22]

52. However, whilst in the Accident and Emergency Department Conor was found to be experiencing seizure activity. As appears from the deposition of Dr. Paul Kerr (Consultant in Accident and Emergency Department) he attended Conor at the request of Sister Campbell to examine the placement of a cannula which was causing irritation.

[17] [088-002-023]
[18] [087-029-133]
[19] [088-002-020]
[20] [087-029-134]
[21] Page 74 of NMC Transcript
[22] [087-029-134]

53. Whilst attending Conor, Dr. Kerr witnessed several jerks in Conor's arm which were of brief duration. He thought that the jerks were unrelated to the cannula but might be a typical seizure activity.[23] Ms. Mitchell has stated that what she saw was "a completely untypical seizure…"[24]

54. Dr. Kerr did not feel that there was a need for treatment at that time because the jerking was of short duration and did not recur. He told the Coroner that he did not make a note of what he saw.[25]

Conor is Admitted to the Medical Admissions Unit

55. Conor was admitted to the MAU by Staff Nurse Ruth Bullas. He was accommodated in a side room within the ward. This was an adult ward.

56. Staff Nurse Bullas made a note which she timed at "1.30pm" (13:30) relating to Conor's history and presentation at the time of admission.[26] It is recorded that Conor was observed to be having spasms "several times" and that he had been seen by the senior house officer.

57. The senior house officer was Dr. Catherine Quinn (Medical SHO). She made a note of her attendance with Conor[27] and she also provided a deposition to the Coroner.[28]

58. It was Dr. Quinn's impression that Conor was suffering from a urinary tract infection. Her note referred to a treatment plan for Conor which provided for a full blood test and the performance of a mid stream urine sample, chest x-ray and the provision of analgesics PR. Reference was also made in the plan to the provision of IV fluids, and Dr. Quinn wrote up a prescription for 3 litres of intravenous fluids over 24 hours (1 litre of normal saline for 8 hours, then 1 litre 5% dextrose for 8 hours, followed by 1 litre of normal saline).[29]

59. Dr. Quinn also noted the results of a dipstick urine test which had been carried out in the Accident and Emergency Department which showed that Conor had protein, blood and large ketones in his urine. She recorded his blood results. She prescribed the antibiotic ciproxin at a dose of 200mg to be given intravenously twice a day. She asked the medical registrar to see Conor.

[23] [087-027-127]
[24] [087-002-019]
[25] [087-027-128]
[26] [088-004-091]
[27] [088-004-037 & 038]
[28] [087-015-081]
[29] [088-004-064]

60. The medical registrar was Dr. Murdock. He saw Conor at 13:00. A deposition prepared by him helps to clarify the sequence of events at or about the time of Conor's admission to MAU and thereafter[30]. He also made a note of his attendance with Conor.[31]

61. Ms. Mitchell has commented on Dr. Murdock's attendance at that stage, although not identifying him by name. According to her, he said that it was urgent to get fluids into Conor.[32]

62. In his deposition Dr. Murdock explained that he carried out an examination of Conor and diagnosed a urinary tract infection. He also considered that Conor might possibly have a viral illness. He felt that it was appropriate for Conor to continue with the course of antibiotics which had been started by Dr. Quinn. He has stated in the deposition that taking account of Conor's "apparent low weight and size for his age" he directed Dr. Quinn to reduce the rate of fluids being administered to Conor.[33]

63. Sister Irene Brennan (nee Dickey) was the "F" Grade Sister in charge of the MAU on the afternoon of the 8 May 2003. She allocated Staff Nurse Bullas and Staff Nurse Lavery to care for Conor. It would appear from the evidence that was adduced before a Conduct and Competence Committee of the Nursing and Midwifery Council that neither of these nurses had paediatric training or experience.[34]

64. The intake/output chart indicates that the Venflon extravasated at some time around 2.00pm.[35] Fluids were not reconnected until 4.10pm. The nursing notes indicate that Dr. Totten was contacted a number of times to re-site the Venflon, and that the family was concerned that Conor was not receiving fluids.[36]

65. At or around 6.30pm Conor was seen by Dr. Murdock. Concern had been expressed about a rash on the abdomen. The nursing notes also refer to episodes of spasm. Dr. Murdock found no abnormalities on the abdomen.[37] After concluding his examination he reported Conor's history to Dr. David McEnaney (Consultant Cardiologist) with a view to determining whether a transfer to the RBHSC was indicated, as this had been requested by Ms. Mitchell.[38] Dr. McEnaney expressed himself satisfied with Conor's current management but it was agreed that Conor should be seen by a member of the Paediatric team.

[30] [087-025-116]
[31] [088-004-045]
[32] [087-002-020]
[33] [087-025-117]
[34] Page 68 of NMC Transcript
[35] [088-004-063]
[36] [088-004-091]
[37] [088-004-046]
[38] [087-002-020]

66. Dr. Murdock contacted Dr. Marian Williams (Paediatric Registrar) and she agreed to examine Conor. Dr. Murdock proceeded to review Conor's chest x-ray, which was normal, and he prescribed cyclizine for nausea.[39]

Conor Suffers a Seizure

67. Dr. Williams attended Conor at or about 20:30 in order to assess him. She has expressed the view that when she arrived at Conor's bed she saw nothing to indicate that this was an urgent situation.[40] She proceeded to take a history of Conor's condition from his family, and while she was doing this Conor suffered a stiffening episode which she diagnosed as a seizure which resolved within seconds. She examined Conor's abdomen and while she was doing this Conor suffered a more prolonged seizure during which he stopped breathing and stopped making attempts to breathe.[41]

68. Dr. Murdock was present at the time of the second seizure. Dr. Smith (Consultant Paediatrician) was also in attendance as he happened to be on the ward at that time. Dr. Murdock made a note relating to the events which occurred at the time of the attendance by Dr. Williams[42], and he has also addressed those events in his deposition where he has stated[43] :-

> "At approximately 20:45 while being assessed by the Paediatric Registrar Conor suffered a generalised seizure lasting seconds. A second seizure closely followed again lasting seconds after which no respiratory effort was made by Conor. I was not present during the first seizure but present during the second seizure. A bag and mask with supplemental oxygen was immediately applied and Conor was attached to the cardiac monitor on the 'Crash' trolley. There was no appreciable delay between the ceasing of respiratory effort and application of respiratory support. I placed a Guedal airway and applied 'Bag and mask' ventilatory support until the anaesthetist was able to intubate Conor. At no point was cardiac output lost. Dr. Smith the Consultant Paediatrician arrived and the Anaesthetic team were called. Examination showed a blood pressure of 112/78 with a good cardiac output. No signs of intracranial pressure were noted. The pupils were dilated and unresponsive to light. No new cardiac murmurs were audible. Conor was intubated and ventilated by the Anaesthetist and repeat arterial gases were performed to ensure adequate oxygenation was being received. Intravenous Phenytoin and

[39] [088-004-047]
[40] [087-035-166]
[41] [087-035-164]
[42] [088-004-119]
[43] [087-025-119]

intravenous Acyclovir was given with the dosage being calculated from the British National Formula."[44]

69. The anaesthetist who attended Conor was Dr. Aoibhin Hutchinson (Specialist Registrar Anaesthesia) who provided an account of her involvement in a statement dated 28 October 2003.[45]

70. Subsequently an urgent CT scan was conducted by Dr. Paul Rice (Consultant Radiologist) who wrote up a provisional report in which he described a "very abnormal scan."[46] In his opinion there were appearances which were suggestive of sub-arachnoid blood. Dr. Rice has also provided an account of his involvement in his deposition to the Coroner.[47]

71. The scan was sent electronically to the Neuro Surgical Registrars Office in the Royal Victoria Hospital. It was reviewed by Dr. Cooke (Consultant Neurologist) who reported that there was no indication for surgical intervention at that time.[48]

72. Dr. Murdock discussed with Dr. Smith how Conor had been managed. One of the issues which was considered was the appropriateness of the fluids which had been given. According to the note Dr. Smith was "happy that appropriate fluids has been given and "feels that appropriate management has been given to date."[49] A side note on that record states "250 mls [normal] saline over 4 hours given." Dr. Smith also made a note of his involvement with Conor's care.[50]

Conor Admitted to Intensive Care Unit of CAH

73. When Conor was transferred to the Intensive Care Unit ('ICU') at 22:00 he was placed under the care of Dr. Liam McCaughey (Consultant Anaesthetist). On arrival at the ICU his pulse was 80 bpm, blood pressure was 84/48 and his Glasgow Coma Scale was 3/15. He was not sedated.[51]

74. Dr. Charles McAllister was the consultant in charge of the ICU in the CAH. He was responsible for Conor's care within the ICU from the morning of the 9 May 2003. He received a handover report from Dr. McCaughey who advised him that Conor was comatose following an apparent respiratory

[44] [087-025-119]
[45] [087-054-197]
[46] [088-004-050]. The typed version of the report appears at [088-004-131]
[47] [087-046-185]
[48] [088-004-055]
[49] [088-004-049]
[50] [088-004-052&053]
[51] [088-004-052]

arrest the night before.[52] There had been no change in his condition overnight.

75. Dr. McAllister reviewed the CT scan (from the night before) and proceeded to conduct a detailed neurological assessment. There was no neurological response to stimulation[53] save that Dr. McAllister could elicit flexion to supra-orbital stimulation.[54]

76. Dr. Richard Brady was the senior house officer in ICU who worked alongside Dr. McAllister. He has recorded that due to the poor responses to stimulation it was decided to formally test Conor's basic brain stem responses.[55] The responses to the test were minimal. The notes record that, "All appearances are that this unfortunate young fellow is brain stem dead."[56]

77. Following discussions with Conor's family a decision was made to request a transfer to the Paediatric Intensive Care Unit ('PICU') of the RBHSC.

78. Dr. Linda McDonald (Staff Grade in Paediatrics) was asked to examine Conor in order to ascertain whether he was suitable for admission to PICU, given that he was outside the normal paediatric age range for that unit, which she has stated was up to 14 years.[57] She examined Conor and found that he had the body habitus of an 8-9 year old.[58]

79. Dr. McDonald spoke to Dr. Anthony Chisakuta (Consultant Paediatric Anaesthetist at the PICU)[59] and explained her findings following which a transfer to the RBHSC was agreed.[60] Dr. McAllister prepared a letter of transfer addressed to Dr. Chisakuta.[61]

80. Prior to transfer to the RBHSC Conor's Glasgow Coma Scale was found to have increased to 6-7, on the basis that he was moving all limbs to stimulus and moving his toes on command.[62]

81. Conor was catheterised in preparation for transfer.[63] The notes record that there had been difficulties in a previous attempt at catheterisation: "No

[52] [087-044-182]
[53] [088-004-055]
[54] [087-044-182]
[55] [087-040-178]
[56] [088-004-056]
[57] [087-053-195]
[58] [088-004-057]
[59] [088-004-033 & 034]
[60] [088-004-058]
[61] [088-004-033 & 034]
[62] [092-001-001]
[63] [088-004-058]

output recordings due to difficult catheterisation last night."[64] The reason for the transfer was written up in the following terms: "In view of weight and complex problems → transfer to RBHSC."[65]

Conor Admitted to the PICU of the RBHSC

82. Conor was admitted into the PICU at the RBHSC at 19:00 hours on the 9 May 2003 where his condition was closely monitored.

83. By the 12 May it was noted that Conor's neurological condition had not changed. It was recorded in the notes that the paediatrician and the anaesthetic team were of the opinion "that he cannot survive this episode."[66]

84. At 15:15 hours a decision was made to withdraw treatment with the agreement of Conor's family. Conor was pronounced dead at 15:45 on the 12 May 2003.

Conor's Fluid Management

85. The fluids which were ordered by the medical staff prior to Conor's collapse in CAH are noted at [088-004-064].

86. On this document Conor's weight was given as 22 kg and what would appear to be the applicable formula was expressed as "10 ml/kg." It was also recorded that 220 ml of Hartmann's was to be given over 30 minutes, with 110 ml given at 11:20 and 110 ml given at 11:45.

87. On the same document it can be seen that 3 x 1 litre of normal saline (with added potassium for the first 16 hours) was prescribed, to be given over 24 hours. However, this prescription was deleted. It is unclear from the records how much, if any, of this fluid prescription was given.

88. Again on this document, it can be seen that a further prescription was written up with a commencement time of "4.10pm" on the 8 May 2003. This provided for normal saline at 250 ml. In the column "time to be commenced" the instruction "4 hr," followed by "6 hr" and then "8 hr". It is unclear whether this was intended to convey the message that 250 ml was to be given over the first 4 hours, followed by 250 ml over the next 6 hours, and then 250 ml to be given over the next 8 hours. Evidence given by Dr. Murdock to the Coroner's Inquest (see below) suggests that this was the intention.

[64] [088-004-056]
[65] [088-004-059]
[66] [092-017-057]

89. The intake/output chart can be found at [088-004-063]. As with the document at [088-004-064] there is a reference to 110 ml of Hartmann's being administered at 11:20 and again at 11:45. However, you will note that on this document 110mls is written for a third time, alongside 12 mid-day. It is unclear whether this indicates that an additional 110 ml of Hartmann's was given. It would appear from this chart that 200 ml of ciproxin was given at or about 1:00pm.

90. The intake/output chart indicates that the Venflon became extravasated at 1400, and that fluids were not then reconnected until 4.10pm. It is unclear why it took over two hours for fluids to be reconnected but there is a nursing note which indicates that Dr. Totten was informed about the issue at 14:00, 14:30 and 14:45. Following an expression of concern from the family, Dr. Nicholson was contacted and at 16:00 Dr. Totten attended to reconnect the fluids.[67]

91. There is then an entry in the intake/output chart at 5.00pm indicating that 250 ml was the "volume in". It is unclear what this refers to. Was this the volume infused between 4.10pm and 5.00pm?

92. There is then a further entry timed at 7.40pm which states, "250 ml normal saline erected to run for 6.°"[68]

93. The intake/output chart contains no details relating to Conor's output.

94. After his collapse Conor was treated in the Intensive Care Unit (as described above). A new intake/output chart was commenced when he was admitted to that unit at 22:00.[69] While it appears from this chart that an effort was made to record output we know that Conor wasn't catheterised and therefore no precise measurement of output could be recorded.

95. Conor's biochemistry was analysed at various times during the period of his treatment in CAH:

    - At 10:59 on 8 May 2003, shortly after his arrival at the Accident and Emergency Department, his serum sodium measured 135.7 mmol/L[70]

    - At 12:09 on 8 May, after a decision had been made to admit Conor and after he had received at least 220 ml of normal saline, his serum sodium measured 138.0 mmol/L[71]

[67] [088-004-091]
[68] [088-004-063]
[69] [088-003-026] and continued at [088-003-030]
[70] [088-004-036]
[71] [088-002-023]

- At 21:25 on 8 May, about an hour after Conor's collapse, his serum sodium measured 134.4 mmol/L[72]

- At midnight on 9 May, Conor's serum sodium measured 139.0 mmol/L[73]

- At 08:00 on 9 May, approximately 12 hours after Conor's collapse, his serum sodium measured 149 mmol/L[74]

96. Following transfer to the PICU of the RBHSC, further biochemistry tests were carried out. Serum sodium had increased to 164 mmol/L on analysis of a specimen taken at 22:15 on the 9 May 2003.[75]

97. Issues relating to Conor's fluid management were addressed by a number of witnesses in the depositions taken by the Coroner.

98. In his deposition Dr. Murdock explained how he had directed Dr. Quinn to decrease the rate of fluids being "administered" to Conor, taking account of his apparent low weight and size for his age.[76] Dr. Quinn has explained that following a discussion with Dr. Murdock she reduced the infusion rate.[77] This would explain why the prescription on [088-004-064] was scored out.

99. At the inquest Dr. Murdock went on to further explain the change to the prescription and the fluid regime which was then implemented for Conor:

    "The first bag of fluids initially prescribed was changed from 1 litre of Normal Saline over 8 hours to 250 mls of Normal Saline over 4 hours. The second and third bags were also changed from 1 litre 5% dextrose and 1 litre of Normal Saline both over 8 hours to 250 mls Normal Saline over 6 hours and another bag of 250 mls Normal Saline over 8 hours."[78]

100. In his deposition Staff Nurse Lavery explained that Conor's family expressed concerns that Conor was not getting fluids. He said that it took three calls for Dr. Totten to come to re-site the cannula[79]. For her part, Dr. Totten has simply said that she replaced a venflon at 16:10; she did not explain why there was a delay in attending to this task.[80]

[72] [088-004-047]
[73] [088-004-114]
[74] [088-004-113]
[75] [092-019-084]
[76] [087-025-117]
[77] [087-015-082]
[78] [087-025-117]
[79] [087-019-097]
[80] [087-048-187]

Requirements

101. The Inquiry requires your assistance for the purpose of addressing the question of whether, having regard to Conor's condition, weight, age and any other relevant factor, nursing staff and clinicians at the Craigavon Area Hospital managed his intravenous fluid requirements in a manner which complied with the *'Guidance on the Prevention of Hyponatraemia in Children.'*

102. In this regard you are asked to pay specific attention to each of the headline points contained within the Guidance:

    a. Baseline assessment
    b. Fluid Requirements
    c. Choice of Fluid
    d. Monitor
    e. Seek Advice

103. You are asked to consider the content of Conor's Craigavon Hospital notes and records by reference to each of these headline points, and to provide a detailed commentary indicating whether in your view the requirements of the Guidelines have or have not been complied with under each point.

104. You are asked to fully explain and give reasons for the conclusions you reach under each point. You are asked to use the Inquiry document page references when doing so.

105. You will appreciate that the Guidelines emphasise the importance of appropriate and safe fluid prescription, as well as the need for adequate recording and documentation. Therefore, in your report as well as drawing attention to any concerns about fluid type, rate or volume, if appropriate, you also should draw attention to any part of the record keeping which in your view exhibits uncertainty or vagueness in the description of the fluid regime, its calculation and monitoring.

106. For the purposes of advising on these matters you are referred to the following specific documents:

- Conor's Craigavon Hospital case notes: File 88
- Guidance on the Prevention of Hyponatraemia: 007-003-004
- CMO's Letter of 25 March 2002, explaining the Guidance: 007-001-001

107. Within this briefing document, reference has been made to other documents, such as the content of deposition material. This has been included in order to ensure that you are fully briefed as to the background of this case.

108. However, we have not been briefed you with any documents other than those described at paragraph 106. We do not believe that it is necessary for you to consider any other material in order to address the issues set out above. Please do not hesitate to contact the Inquiry Secretary if you are of the view that there are other documents which you believe that you would need to consider in order to fully address the issues raised above.

Documents Supplied to Dr Robert Scott-Jupp in addition to those referred to at Para 106 of Brief.

Reference Number	Document Title	Date
007-073	Letter from Dr C Humphrey Craigavon Area Hospital Trust to Dr H Campbell CMO re guidelines	07-Apr-2004
087-002	Deposition of Joanna Mitchell including letter from Linda Scotson of the Institute for Advanced Neuromotor Rehabilitation	24-May-2004
087-004	Deposition of Judy Mitchell	24-May-2004
087-006	Deposition of Jonathan Mitchell	
087-008	Deposition of Ivor Mitchell	25-May-2004
087-010	Deposition of Damien Mullan	25-May-2004
087-012	Deposition of Ann Henderson	25-May-2004
087-013	Deposition of Brian Herron	25-May-2004
087-015	Deposition of Dr Catherine Elizabeth Quinn	26-May-2004
087-017	Deposition of S/N Ruth Bullas	26-May-2004
087-019	Deposition of S/N F J Lavery	26-May-2004
087-021	Deposition of Sister Irene Brennan	26-May-2004
087-023	Deposition of S/N Barbara Wilkinson	27-May-2001
087-025	Deposition of Dr Andrew Murdock	27-May-2004
087-027	Deposition of Dr Paul Kerr	27-May-2004
087-029	Deposition of Dr Suzie Budd	07-Jun-2004
087-031	Deposition of Dr Janice Bothwell	07-Jun-2004
087-033	Deposition of Dr Elaine Hicks	07-Jun-2004
087-035	Deposition of Dr Marian Williams	08-Jun-2004
087-037	Deposition of Dr Michael B H Smith	08-Jun-2004
087-038	Deposition of Dr E Sumner	08-Jun-2004

Reference Number	Document Title	Date
007-073	Letter from Dr C Humphrey Craigavon Area Hospital Trust to Dr H Campbell CMO re guidelines	07-Apr-2004
087-040	Deposition of Dr Richard Brady	
087-042	Deposition of Dr Ian Rennie	
087-044	Deposition of Charles McAllister	
087-046	Deposition of Dr Paul Rice	
087-047	Deposition of Constable Stephen Wilson	
087-048	Deposition of Dr Jill Totten	23-May-2004
087-050	Deposition of James Patrick McKaigue	
087-055	Autopsy Report of Dr Brian Herron	13-May-2003
087-057	Verdict on Inquest	09-Jun-2004