OPENING: CONOR MITCHELL, DOB 12th October 1987

THE ORAL HEARINGS IN THE INQUIRY INTO HYPONATRAEMIA-RELATED DEATHS

Chairman: O'Hara J

Banbridge Court House, 16th October 2013

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I. Introduction

1. Conor Mitchell was born on 12th October 1987. Shortly after his birth, he was diagnosed with spastic tetraplegic cerebral palsy. He also had a history of epilepsy.

2. On 8th May 2003 (when Conor was 15), Conor's general practitioner referred him to the Royal Belfast Hospital for Sick Children ('RBHSC') as he had been unwell for about 10 days. However, owing to the proximity of the Craigavon Area Hospital ('CAH') to the family home, his mother decided to bring him to the Accident and Emergency Department ('A&E') of that Hospital instead.

3. At the CAH A&E, he was examined by Dr. Suzie Budd[1] (Staff Grade doctor in A&E) who took blood samples and noted that he was pale, unresponsive and had signs of dehydration. The A&E notes refer to him having a 'dry mouth'. Dr. Budd referred Conor to the Paediatric Team but was advised that, at 15 years old, he was not suitable. He was provided with a bolus of fluids in A&E and admitted on to the Medical Admissions Unit ('MAU') by Staff Nurse Ruth Bullas for the purposes of observation. During his time on that ward, further fluids were prescribed and administered.

4. Conor's condition deteriorated in the course of the afternoon of 8th May 2003 and into the evening. At or about 20:30 hours Conor suffered two episodes of seizure activity in rapid succession and stopped breathing.

5. After Conor was intubated and ventilated, a CT scan was conducted and he was admitted to the Intensive Care Unit ('ICU') of the CAH. On 9th May 2003, Dr. Charles McAllister requested a transfer to the Paediatric Intensive Care Unit ('PICU') of the RBHSC in view of his small size and complex problems. Conor was accepted for transfer by Dr. Anthony Chisakuta, a Consultant Paediatric Anaesthetist who had treated Lucy when she was transferred from the Erne Hospital in April 2000.

6. Conor was examined on admission by Dr. James McKaigue, a Consultant Paediatric Anaesthetist who was aware of the role of hyponatraemia in Adam's death in November 1995, was aware of Claire's death in October 1996 and accepted Lucy for transfer in April 2000. On 12th May 2003 Conor was also examined on the ward by Dr. Robert Taylor, the Consultant Paediatric Anaesthetist who had been responsible for the fluid errors in Adam's case and who had been a member of the Chief Medical Officer's ('CMO') 2001 Working Party for the Guidelines.

[1] See List of Persons for all persons named Ref: 327-003-001.

7. Brain stem tests carried out were shown to be negative and on 12th May 2003, a decision was taken to discontinue treatment. Life was pronounced extinct at 15:45 on that date.

The Opening

8. This Opening will:

   (i) Set out the principal issues in Conor's case in the context of the evidence gathered to date and the revised Terms of Reference and List of Issues; and

   (ii) Identify the main areas which the Legal Team consider requires further investigation through questioning in these Oral Hearings.

9. As with the treatment of the issues in the other cases, the matters to be addressed during the Oral Hearings will essentially concern as yet unresolved differences between:

   (i) Documents and the evidence of a witness;

   (ii) Evidence of witnesses, whether between the accounts given by a witness or between the accounts of different witnesses;

   (iii) Evidence of a witness and the views of an Expert; and

   (iv) Views of the Expert on a particular issue.

II. Evidence Received

10. As has been explained in earlier openings, the Inquiry's search and request for relevant documents started in or about the beginning of 2005 and is ongoing. Such requests are guided by the Inquiry's Advisors and its Experts as well as arising out of documents received and responses to the Inquiry's requests for Witness Statements.

11. For convenience, the sources of the documents and other material received are set out in Appendix I to this Opening.

12. As with the other cases which you have considered, I am conscious that you, Mr. Chairman, will be making findings and recommendations on the basis of all of the evidence received and not just what is heard during the Oral Hearings. You have a complete set of the documentary materials which have been gathered by the Inquiry as part of its investigation in Conor's case. Therefore, I do not propose to recite or summarise the contents of those materials. Rather, I will try to indicate the key elements of the evidence that has been received.

Expert Reports

13. The Inquiry has engaged Dr. Robert Scott-Jupp as an expert to assess the extent to which clinicians and nursing staff at the CAH managed Conor's fluids in a manner which complied with the *'Guidance on the Prevention of Hyponatraemia'*, (hereinafter referred to as the 'Guidelines').

14. Dr. Robert Scott-Jupp is a Consultant Paediatrician at Salisbury District Hospital, England and has previously assisted the Inquiry in relation to clinical issues raised by Raychel's case. He also provided an expert's report in Claire's case. He has provided a preliminary report dated 19th September 2013 and a supplementary report dated 10th October 2013.

III. Schedules Compiled by the Inquiry

15. The Inquiry has received a vast amount of information and in order to assist you and the Interested Parties, the Legal Team has compiled a number of schedules and charts as ancillary documents to distil the salient points.

List of Persons Involved in Conor's Case

16. The Legal Team has compiled a list of those persons involved in the clinical aspects of Conor's care from all the information received by the Inquiry.[2] It explains their position at the time of Conor's admission to CAH and the RBHSC and briefly summarises their role in his treatment and care. It also includes the names of those identified by or on behalf of the CAH who had some responsibility for taking the Guidelines forward in that Hospital.

17. Additionally, the List of Persons identifies those who have made statements and to whom they were provided. Importantly it indicates the witnesses that it is proposed to call to give evidence during the Oral Hearings.

18. As with the other cases, there will be a number of witnesses not required to give evidence at the Oral Hearings so their Witness Statements will be tendered in lieu of oral evidence.

Chronology of Events

19. The Legal Team has prepared a Chronology of Events which, given the more restricted nature of the Inquiry's consideration of Conor's case, will focus on events relevant to the management of his intravenous fluids.

20. This document is compiled almost exclusively from Conor's medical notes and records, but it is supplemented from other sources such as from

[2] See List of Persons Ref: 327-003-001.

Depositions or Witness Statements where this appears to be appropriate and uncontroversial. However, if any particular timing or event is disputed, then it is expected that witnesses giving oral evidence will make their position clear to the Inquiry, either directly or through their legal representatives.

21. The structure of the Chronology is straightforward and follows the pattern already established for the previous cases. The date and time are on the left-hand side, the event is in the middle and the reference for the source of the information is on the right-hand side. The far right columns identify the doctors and nurses that were on duty at the relevant time.

IV. The Inquiry's Terms of Reference

22. The decision to add Conor's case to the Inquiry's work 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 the 'Guidelines' issued by the Department, which was a document designed to ensure that the administration of fluids was safely managed in children's cases.

23. The Chairman reflected upon the issues raised by Conor's case at a Public Hearing which took place on 30th May 2008:

> *"The Inquiry has had great difficulty in deciding whether any of the circumstances relating to Conor's death should be investigated. On balance, I have concluded that it should be insofar as it relates to hyponatraemia, because of my concern that lessons should have been learned generally and from the earlier deaths about fluid management, have not been learned. Furthermore, by the time Conor died the Department of Health in Northern Ireland had introduced guidelines on hyponatraemia. These guidelines appear to have been widely welcomed and praised. A question arises, however, as to the extent to which those guidelines were followed at all, in Conor's case. There is clearly no point in having guidelines if the staff to whom they are directed are not trained in them and do not become familiar with them. The Minister has approved the decision to add the circumstances of Conor's death to the Inquiry."*[3]

24. Subsequently, in February 2010, the Chairman issued a decision on the way in which Conor's case would be investigated by the Inquiry. In it, the Chairman stressed the importance of the effective implementation of the Guidelines:

> *"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.*

[3] Page 5-6 of the transcript of the Public Hearing, 8 May 2008, IHRDNI Website.

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."[4]

25. More recently, Conor's family have made representations to the Inquiry advising that they do not intend to participate in the Inquiry's Oral 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 were appropriate to address.

26. Accordingly, at a hearing on 2nd 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"*

V. Published List of Issues in Conor's Case

27. The following were the original List of Issues published by the Inquiry in connection with Conor's case:

4.1 Investigation into the dissemination, circulation, implementation and enforcement of the Guidelines issued in March 2002:

(1) The actions taken to circulate and disseminate the Guidelines by the DHSSPS, the Hospitals and in particular Craigavon Hospital, the Trusts and Boards.

[4] Ref: 327-004-001

(2) The actions taken to implement the Guidelines and to ensure that they were followed in the treatment of all children, whether on paediatric or adult wards, by the DHSSPS, the Hospitals and in particular Craigavon Hospital, the Trusts and Boards.

(3) Extent to which the guidelines had been both implemented and incorporated into clinical practice for all children, whether on paediatric or adult wards.

4.2 Investigation into the care and treatment that Conor received in 2003 in relation to the management of fluid balance:

(1) What understanding those who cared for and treated Conor had of the fluid management issues raised by his condition.

(2) To what extent fluid management and record keeping was covered in the teaching/training of members of those who treated Conor.

(3) To what extent the care and treatment which Conor received, both in Craigavon Hospital and the RBHSC, was consistent with the then teaching/training on fluid management and record keeping, in particular the Guidelines.

(4) Whether the fact that Conor was admitted to an adult ward at Craigavon Hospital rather than a children's ward was relevant to whether the Guidelines were adhered to.

4.3 Investigation into the education, training and professional development of doctors and nursing staff in Northern Ireland in fluid management and record keeping by the time that Conor was admitted to hospital in 2003:

(1) Extent to which any changes that had occurred had any effect, and if so, what that effect was.

(2) Extent to which any changes resulted from lessons learned from Adam's death in 1995 and the Inquest into his death in 1996, Claire's death in 1996, Lucy Crawford's death in April 2000 and Raychel's death in June 2001 and Inquest into Raychel's death in February 2003.

(3) Extent to which the care and treatment that Conor received was consistent with the then teaching/training on fluid management (in particular hyponatraemia) and record keeping.

(4) How the teaching/training in Northern Ireland at that time compared with the rest of the UK .

4.4 Investigation into the extent to which procedures and practices in Northern Ireland for the reporting and dissemination of information to the DHSSPS and the medical community in general of unexpected deaths in Hospital and the outcome of Coroners' Inquests, had changed by the time that Conor died in 2003:

(1) Whether there were any changes and if so:

(a) Their content

(b) What prompted them

(c) Extent to which they were influenced by the lessons learned from Adam's death and the Inquest into his death in 1996, Claire's death in 1996, Lucy Crawford's death in April 2000 and the death of Raychel and the Inquest into her death in February 2003.

(2) Whether any such changes had any effect, and if so, what that effect was.

(3) Extent to which any deficiencies in the dissemination of information in respect of Adam's death in 1995 and the lessons learned from the Inquest into his death in 1996, Claire's death in 1996, Lucy Crawford's death in April 2000 and the death of Raychel and the Inquest into her death in February 2003, could have played a role in the death of Conor.

(4) How the procedures and practices in Northern Ireland at that time compared with procedures and practices in operation in the rest of the UK.

28. In light of the views expressed by and on behalf of Conor's family and the consideration given to them by the Chairman, it is no longer necessary or appropriate for the Inquiry to carry out its work by reference to all of those issues.

29. As the Chairman has indicated, the Inquiry's work has proceeded by way of an examination of the extent to which those who provided for Conor's care at the CAH complied with the Guidelines published in 2002. Broadly speaking, the issues with which the Inquiry has become concerned with are contained in item 4.2 above.

30. Thus, the focus of the Inquiry's work for the Oral Hearings will be on Conor's need for intravenous fluids and how they were managed in the period between his arrival at A&E and the point at which he suffered a respiratory arrest, taking into account the relevant procedures and arrangements described in the Guidelines. While some attention will be given to the

possible implications of the decision to admit Conor to an adult as opposed to a children's ward, the correctness of that decision will not be one which the Inquiry will attempt to resolve.

31. Accordingly, and unlike the investigations conducted into the cases of Adam, Claire and Raychel, the Inquiry has not investigated any clinical aspect of Conor's case, save for his fluid management. This means that the Inquiry has not explored the concerns that were expressed over the possibility that Conor suffered a series of unrecognised and untreated seizures in the course of the afternoon of 8th May 2003. Nor has the Inquiry examined the treatment Conor received in the ICU at CAH and PICU at RBHSC or pursued any examination of the underlying cause of his death.

32. Consistent with the Inquiry's core interest in assessing the degree of compliance with the Guidelines in Conor's case, attention will also be given during the Oral Hearings to the steps taken at CAH to ensure that those Guidelines became embedded in the practice of the nursing and clinical staff who worked there.

33. This will involve an examination of any measures which may have been taken to inform staff of the content of the Guidelines, and to ensure compliance with them at CAH. Generally speaking, these issues are included at item 4.1 of the list of published issues set out above. The Inquiry has been interested and continues to be interested to clarify whether those who treated Conor in CAH had any knowledge of the Guidelines, and whether the Guidelines were viewed by clinicians and nursing staff as requiring them to change their approach to fluid management in the cases of children and young people.

34. The Oral Hearings in relation to Conor's case will not look beyond how the Guidelines were implemented in CAH. In the next and final segment of the Inquiry's Oral Hearings, which will focus on the work of the Department, there will be an opportunity to explore some of the more general themes included at items 4.1, 4.3 and 4.4 of the published issues set out above. At that time, any failure on the part of CAH to take appropriate steps to ensure that the Guidelines were effectively implemented may be the subject of further comment and an opportunity will be available to determine whether the Department or others can extract any lessons from Craigavon's experience of implementing the Guidelines.

VI. Response to Raychel Ferguson's Death in June 2001

35. On 18th June 2001, Dr. Raymond Fulton, Medical Director at Altnagelvin Area Hospital disclosed the circumstances of Raychel's death to a regular[5] meeting

[5] Ref: 095-011-054

of Medical Directors at Castle Buildings.[6] At the meeting, Dr. Fulton suggested that there should be regional guidance to regulate fluid management in paediatric cases and that he considered that Solution No.18 was hazardous when used in post-operative children.[7]

36. Dr. Henrietta Campbell, the CMO, states that she was informed of Raychel's death by Dr. Ian Carson shortly after the meeting of 18th June 2001. She was also informed of Raychel's death by Dr. Fulton during a telephone conversation on 22nd June 2001.[8] He suggested that she publicise the dangers of hyponatraemia when using low saline solutions in surgical children and reiterated his view that there was a need for regional guidelines.[9]

37. On 26th June 2001, Dr. Robert Taylor was able to advise a meeting of the Sick Child Liaison Group that work was to take place on *"agreed guidelines from the Department of Health on this subject."*[10]

38. Dr. Fulton telephoned Dr. McConnell, Director of Public Health at the WHSSB, to inform him of Raychel's death and forwarded relevant journal articles. Dr. McConnell then raised the matter at the next meeting of the Directors of Public Health on 2nd July 2001 in the presence of both the Chief and Deputy Chief Medical Officers.[11] It was claimed that current evidence showed that certain fluids were being used incorrectly post operatively and agreed that guidelines should be issued to all units.[12]

39. Subsequently, on 5th July 2001, Dr. McConnell wrote to other Directors of Public Health, circulating Dr. Fulton's medical literature and pointing out that hypotonic saline was still in common practice in a number of paediatric units despite there being information around for a few years suggesting doing so presented risks to a small number of children in the acute perioperative period.[13] He suggested that they each check with their respective Boards whether modification might be required.

40. In a conversation between the CMO and Dr. Fulton on 22nd July 2001, the CMO suggested that the Clinical Resource Efficiency Support Team ('CREST') might be involved in the development of regional guidance.

41. That was followed up by an email on 26th July 2001 from Stella Burnside (Chief Executive at Altnagelvin) to the CMO seeking an overview of the

6 Ref: 012-039-179
7 Ref: 095-011-054
8 Ref: 006-002-238
9 Ref: 012-039-180;
10 Ref: WS-008/1 p.15
11 Ref: 075-081-323
12 Ref: 320-080-005
13 Ref: 022-094-303

research evidence and making the point that she regarded the issue to be a regional one.[14]

42. In response to that request about the research, the CMO e-mailed Dr. Carson on 27th July 2001 seeking background material.[15] Dr. Taylor responded with a paper 'Hyponatraemia in Children', which included background material describing the 'problem' as well as providing recommendations and intravenous fluid prescription.[16]

43. Dr. Carson forwarded it on to the CMO on 30th July 2001 describing the problem of dilutional hyponatraemia as being well recognised. He concluded with the suggestion that it might be an appropriate subject for CREST and observed that: *"There is obviously a need to get better agreement between anaesthetists/intensivists and paediatricians"* and that there were nursing issues in relation to blood sampling and volume of blood necessary for regular sodium analysis.[17]

44. As matters developed, the CMO directed her Deputy, Dr. Paul Darragh, to assemble a Working Group to consider hyponatraemia in children and make recommendations on fluid balance in children.[18] These would then be presented to the Specialty Advisory Committees ('SAC') for Surgery, Paediatrics and Anaesthetics.

45. On 14th August 2001, Dr. Darragh met with Dr. Miriam McCarthy, Senior Medical Officer, to inform her of Raychel's death and asked her to convene a Working Group.[19] Dr. Darragh wrote out to several clinicians on 21st August 2001, providing them with Dr. Taylor's background piece and inviting them to a meeting at Castle Buildings:

> *"There is increasing evidence that Acute Hyponatraemia is emerging as a significant problem in sick children receiving IV fluids. As a result we believe we should convene a group to consider how best practice could be brought to bear on the problem and to explore whether further advice needs to be issued by the DHSS&PS at this time to the profession."*[20]

46. Amongst those invited to attend the first meeting were Drs. Crean, Taylor, Loughrey, Marshall and Nesbitt. Their prior knowledge of the deaths of Adam, Claire, Lucy and Raychel is reflected in a schedule.[21] Dr. Darrell Lowry (Consultant Anaesthetist) attended the meeting on behalf of the CAH.

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14 Ref: 022-093-301
15 Ref: WS-330/1, p.10
16 Ref: 043-101-223
17 Ref: 021-056-135
18 Ref: 075-082-329
19 Ref: WS-080/1, p.2
20 Ref: 007-050-099
21 Ref: 328-003-001

47. At a meeting on 3rd September 2001 of the Directors of Public Health, it was reported that Dr. Darragh was setting up a Working Group to consider hyponatraemia and that recommendations on paediatric fluid balance would be made, which would be presented at SAC Surgery, SAC Paediatrics and SAC Anaesthetics.[22]

Meetings of the Working Group

48. The meeting of the Working Group took place on 26th September 2001 and was chaired by Dr. Darragh.[23]

49. The minutes of the meeting show that Dr. Taylor informed those present about the background, the "*incidence of cases seen in RBHSC"* and patients who are particularly at risk of hyponatraemia. He stated that this was "*a problem that has been present for many years*". Dr. Taylor put forward a number of recommendations directed at preventing the occurrence of hyponatraemia.

50. A general discussion followed in which it was highlighted that the current guidelines for paediatric fluid management had been developed almost 50 years previously and were not suitable for post-operative children. It was agreed that a simple new guidance was required and that a small group would undertake the drafting of guidelines.

51. It appears that this sub-group involved Drs. Crean, Jenkins, McAloon and Loughrey. A meeting took place on 10th October 2001 at which the provision of a 'teaching tool' for junior staff was discussed.[24]

Production of the 2002 Guidelines

52. On 1st November 2001, Dr. Darragh chaired a meeting of the SAC Anaesthetics. He advised that a draft paper had been prepared as guidance on preventing the development of hyponatraemia in children and he asked for comments to be sent to Dr. McCarthy.[25]

53. At a meeting of the Directors of Public Health / DHSSPS on 5th November 2001, Dr. McCarthy introduced the draft guidance paper on the 'Prevention of Hyponatraemia in Children receiving Intravenous Fluids'.[26] There was a discussion on the best way to disseminate and it was considered that it would be beneficial if the Guidelines were endorsed by CREST and it was noted that the Guidelines already had the support of SAC Anaesthetics and Paediatrics. The action point recorded in the minutes was that Dr. McCarthy would forward the Guidelines to CREST/Royal College of Paediatricians.

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22 Ref: 320-081-001
23 Ref: 007-048-094
24 Ref: 007-038-072
25 Ref: 075-080-322
26 Ref: 320-082-001

54. The draft Guidelines were discussed at a CREST meeting on 8th November 2001. It was reported that the Department had approached CREST regarding the dissemination and 'kite marking' of the Guidelines, which had been targeted at junior staff and non-specialists with a view to raising awareness.[27] They were also presented and discussed at a meeting on 26th November 2001 of the Paediatric Anaesthetic Group in Northern Ireland, which was attended by Dr. Lowry who was CAH's representative on the Guidelines Working Party.[28] In addition, the Guidelines were presented and discussed at SAC Surgery on 11th December 2001, during which there was a specific request that they should be circulated to A&E Departments.[29]

55. Dr. McCarthy subsequently sought the views and advice of Dr. Edward Sumner on the level of detail to be contained in the Guidelines and on recommendations for specific fluid choices.[30]

56. Dr. Sumner replied on 17th December 2001, providing a specific and detailed opinion.[31]

Publication of the 2002 Guidelines

57. By 25th March 2002 the CMO was in a position to circulate the Guidelines. In her statement to the Inquiry, the CMO has suggested that it was unusual for her office to issue guidance on clinical issues such as this:

> *"There is a distinction to be drawn here between public health or regional policies (which did come under my remit) and clinical guidelines (which generally speaking did not come under my remit – the Hyponatraemia guidelines being a notable exception)."*[32]

58. The publication of the Guidelines followed the deaths of all of the children being investigated by this Inquiry, except Conor Mitchell.

59. In an explanatory letter issued by Dr. Campbell on 25th March 2002, the Guidelines were brought to the attention of a broad range of clinicians practising in Northern Ireland[33]:-

    (i) the Medical Directors of Acute Trusts

    (ii) Directors of Nursing in Acute Trusts

    (iii) Consultant Paediatricians

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27 Ref: 075-066-213
28 Ref: WS-038/1, p.14
29 Ref: 075-084-341
30 Ref: 012-062-314
31 Ref: 007-016-032
32 WS-075/2, page 5, Q7
33 Ref: 007-001-001

(iv) Consultant Surgeons

(v) Consultant Neurosurgeons

(vi) Consultant Anaesthetists/Intensivists

(vii) Consultants in Plastic Surgery/Burns

(viii) Consultants in A&E Medicine

(ix) Consultant Pathologists.

60. The recipients of the correspondence were told that the Guidelines had been prepared as an A2 sized poster which would be circulated separately. In the 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."*[34]

61. Dr. Campbell's correspondence contained three directions:

(i) Displaying the Guidelines

> *"I ask you to ensure that the posters are prominently displayed in all units that accommodate children."*

(ii) Complementing the Guidelines with Local Protocols

> *"The Guidance is designed to provide general advice and does not specify particular fluid choices. Fluid protocols should be developed locally to complement the Guidance and provide more specific direction to junior staff. This is particularly important in subspecialty areas such as renal medicine, burns unit and neurosurgery."*

(iii) Auditing Adherence to the Guidelines

> *"It will be important to audit compliance with the guidance and locally developed protocols and to learn from clinical experience."*

The Guidelines

62. The A2 sized poster containing the Guidelines can be found at Ref: 007-003-004. The Guidelines were prescriptive in relation to five matters: baseline assessment, fluid requirements, choice of fluid, monitoring and the seeking of advice:

[34] Ref: 007-001-001

Baseline Assessment

Before starting IV fluids the following must be measured and recorded:

- **Weight:** accurately in kg (in a bed bound child use best estimate.) Plot on a centile chart or refer to normal range.
- **U&E: take** serum sodium into consideration.

Fluid Requirements

Fluid needs should be assessed by a doctor competent in determining a child's fluid requirement. Accurate calculation is essential and includes:

Maintenance Fluid

- 100mls/kg for first 10kg body wt, plus
- 50mls/kg for next 10kg, plus
- 20mls/kg for each kg thereafter up to max of 70kg

  [This provides the total 24 hr calculation; divide by 24 to get the mls/hr]

Replacement Fluid

- Must always be considered and prescribed separately
- Must reflect fluid loss in both volume and composition (lab analysis of the sodium content of fluid loss may be helpful)

Choice of Fluid

- **Maintenance fluids** must in all instances be dictated by the anticipated sodium and potassium requirements. The glucose requirements, particularly of very young children, must also be met.
- **Replacement fluids** must reflect fluid lost. In most situations, this implies a minimum sodium content of 130mmol/L.
- In resuscitating a child with clinical signs of shock, if a decision is made to administer a crystalloid, normal (0.9%) saline is an appropriate choice, while awaiting the serum sodium.
- The composition of oral rehydration fluids should also be carefully considered in light of the U&E analysis.

Hyponatraemia may occur in any child receiving IV fluids or oral rehydration. Vigilance is needed for all children receiving fluids.

Monitor

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

- **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.

  Consider using an indwelling heparinised cannula to facilitate repeat U&Es.

  Do not take samples from the same limb as the IV infusion.

  Capillary samples are adequate if venous sampling is not practical.

  Urine osmolarity/sodium: Very useful in hyponatraemia. Compare to plasma osmolarity and consult a senior paediatrician or a chemical pathologist in interpreting results.

Seek Advice

Advice and clinical input should be obtained from a senior member of medical staff, for example a Consultant Paediatrician, Consultant Anaesthetist or Consultant Chemical Pathologist.

- In the event of problems that cannot be resolved locally, help should be sought from consultant paediatricians/anaesthetists at the PICU, RBHSC.

63. In April 2002, the CMO included an article in the 'CMO Update' on the issue of hyponatraemia, which drew attention to the Guidelines and *"which stressed*

the need for rigorous monitoring of fluid balance."[35] The 'CMO Update' was a publication which was used by the CMO as a vehicle for engaging with the medical profession. It was used to *"highlight some news-worthy items of significance to the medical profession."*[36]

64. On 23rd June 2003, 6 weeks after Conor's death, CREST launched Guidance on the Management of Hyponatraemia in the Adult Patient.

VII. Steps Taken to Implement the Guidelines at CAH

65. In 2002, when the Guidelines were published, CAH was managed by the Craigavon Area Hospital Group Trust. It is now managed by the Southern Health and Social Care Trust. The Southern Trust was formed on 1st April 2007 under the Review of Public Administration. The word 'Trust' will be used in the passages that follow in order to refer to both organisations, and the date of the event being referred to should serve to indicate the particular organisation involved.

66. The Trust has been unable to supply the Inquiry with any documentary material which could help it to understand the strategy which was adopted to implement the Guidelines, or which would demonstrate the particular steps that were taken to implement them.

67. In correspondence dated the 11th September 2013, the Directorate of Legal Services on behalf of the Trust has set out the position:

> *"The Southern Health & Social Care Trust, in respect of the legacy Craigavon Area Hospital Group Trust, has been unable to locate any records e.g. correspondence, memos, handbooks or meetings which demonstrate how the regional guidance on Prevention and Management of Hyponatraemia in Children, March 2002, was disseminated / adopted more generally amongst its staff. However, the Trust has instructed the Head of Informatics to further explore the viability of retrieving Legacy Trust electronic correspondence. This exercise has been completed."* [37]

68. More helpfully, the Trust has provided the Inquiry with materials relating to the induction of medical trainees at CAH which certainly indicate that some information and/or teaching was provided in relation to fluid management and hyponatraemia both before and after the Guidelines were published. However, those materials, which will be further examined below, do not expressly refer to the Guidelines.

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35 WS-077/1, page 9, para (v)
36 WS-075/2, page 10, Q20
37 Ref: 329-018-006

69. Accordingly, the Inquiry is entirely dependent upon the information contained in the witness statements of those employed at CAH at the time in order to inform it of what was done, and to enable you, Mr. Chairman, to determine whether what was done was adequate.

70. On 4th March 2004, Dr. Campbell asked the Chief Executives of the Acute/Acute and Community Trusts to provide confirmation that both the children's and adult Guidelines had been incorporated into clinical practice:

> *"When the guidance was issued, Trusts were encouraged to develop local protocols to complement the guidance and to provide specific direction to junior staff. Emphasis was given to the need to ensure implementation of the guidance in clinical practice. It was also noted that the guidance should be supplemented locally in each Trust with more detailed fluid protocols relevant to specific speciality areas…*
>
> *"Following the development of guidelines for fluid replacement in children the Clinical Resource Efficiency Support Team (CREST) drew up guidance on The Management of Hyponatraemia in Adults…The purpose of this letter is to ask you to assure me that both of these guidelines have been incorporated into clinical practice in your Trust and that their implementation has been monitored…"*[38]

71. It would appear that officials at CAH made some effort to gather information so that a response could be forwarded to the CMO. The Inquiry has been provided with a minute of a meeting which took place on 29th March 2004. This records that the Clinical Services Manager (Mrs. E. O'Rourke) asked nursing sisters to check whether the posters dealing with the management of hyponatraemia were on display on each ward and available for both nursing and medical staff to refer to.[39] The minute does not indicate whether Mrs. O'Rourke was provided with an answer, and the Trust has not supplied the Inquiry with a minute of any subsequent meeting dealing with this issue.

72. Mrs. O'Rourke has provided a witness statement to the Inquiry in which she has explained that her only recollection of the Guidelines is based on the minute of the meeting of 29th March 2004.[40] However, she cannot recall who asked her to raise the issue referred to in the minute, and she cannot recall the response which she received. Nor can she remember passing on any response received to any other person.[41]

73. Dr. Caroline Humphrey (Medical Director from 6th May 2003) addressed the issues raised in the CMO's letter on behalf of the CAH. In a letter dated 7th

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38 Ref: 007-067-137
39 Ref: 329-014-122
40 WS-370/1, page 4, Q3(c)
41 WS-370/1, page 4, Q4

April 2004 she described Craigavon's response to the Guidelines for children in the following terms:

> *"The guidance….was taken forward in Craigavon Area Hospital Group Trust by a group of senior clinicians including our Consultant Clinical Biochemist, a consultant representative from Accident & Emergency, two senior paediatricians and a consultant anaesthetist. The guidelines for the prevention and management of hyponatraemia in children 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 management of hyponatraemia in children which has been coordinated through the SAC Paediatrics Committee."*[42]

74. The Inquiry has endeavoured to obtain clarification of the matters raised by Dr. Humphrey in her letter to the CMO, both by gathering witness statements and requesting relevant documentation. The following sections will address in specific terms the findings of those investigations so far.

VIII. Responsibility for Implementing the Guidelines at CAH

75. As Dr. Humphrey told the CMO that a group of five senior clinicians took the Guidelines forward in CAH the Inquiry has been keen to identify the names of those five doctors so that steps could be taken to ask them how they went about their task.

76. This issue was raised by the Inquiry in its correspondence to the legal representatives of the Trust on 4th July 2013.[43] The Inquiry's question was not answered in correspondence received from the Trust's legal representatives eight weeks later on 28th August.[44]

77. However, after further correspondence was issued by the Inquiry dated 4th September[45] the Inquiry was told on 20th September that the Trust had been unable to identify the five senior clinicians referred to in Dr. Humphrey's letter.[46] The Inquiry was also told at that time that the Trust had been unable to speak to Dr. Humphrey because by that stage she had been issued with a witness statement.

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42 Ref: 007-073-145
43 Ref: 329-011-001
44 Ref: 329-014-001
45 Ref: 329-015-001
46 Ref: 329-018-003

78. This reasoning is difficult to comprehend. It has been suggested on behalf of the Trust that in line with the Inquiry's direction that witnesses should not discuss the contents of their witness statements with anyone other than their legal representatives, the Trust did not want to take any steps which might potentially undermine the integrity of Dr. Humphrey's account.[47]

79. However, the Trust was not being asked to discuss Dr. Humphrey's witness statement with her. On the contrary it was being asked to provide a specific and discrete piece of information so that the Inquiry's investigations could be expedited. Plainly, the Trust could straightforwardly have sought Dr. Humphrey's instructions on this issue so that it could respond to the Inquiry's questions. Alternatively, it could have instructed its legal representatives to speak to Dr. Humphrey's on its behalf.

80. Moreover, it is unclear why the Trust was unable to speak to Dr. Humphrey about the contents of her 2004 letter before she was served with a witness statement. The Trust has put forward the following explanation for its approach to this matter, through its legal representatives:

> *"The Trust did not approach Dr. Humphrey on its receipt of the letter of the 4th July as its objective at that point had been to provide the Inquiry with the information it sought regarding the group of clinicians referred to in this communication. The Trust was very much focussed at that time on sourcing the information/documentation sought directly from those individuals who had taken the guidance forward within the Trust."*[48]

81. It is again difficult to follow this explanation. One of the key points raised in the Inquiry's letter of 4th July concerned the identification of the five clinicians who (according to Dr. Humphrey's letter) had taken the Guidelines forward within the Trust. The Inquiry has still not received a direct answer to that question, although in correspondence dated the 11 October 2013 the names of four Clinical Directors (Drs. Lee, Sterling, Bell and Orr) have been provided.[49] It is unclear, therefore, what is meant by the assertion that the Trust, having received the Inquiry's correspondence of the 4 July 2013, was focussed on sourcing relevant material from those individuals who had taken the Guidelines forward.

82. In any event, in the correspondence of 20th September it was explained on behalf of the Trust that in 2002 the Medical Director, Director of Nursing and the Chief Executive,

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47 See email from Directorate of Legal Services to Inquiry dated 15 October 2013
48 Ref: 329-032-001
49 Ref: 329-032a-001

> *"had the key responsibility for dissemination, implementation and monitoring of the guidelines."*[50]

83. These persons have now been identified as Dr. William McCaughey (Medical Director), Ms. Bridie Foy (Director of Nursing as at March 2002), Mr. John Mone (Director of Nursing from 2nd September 2002) and Mr. Templeton (Chief Executive).

84. In her statement for the Inquiry, Dr. Humphrey has explained the context in which she responded to the CMO's letter in 2004. She has stated that the CMO's letter was passed to her by the then Chief Executive (Mr. John Templeton) for a response. She recalls meeting with Dr. McCaughey prior to replying to the CMO's correspondence because he was (she believes) responsible for taking forward the implementation of the Guidelines within the Trust in 2002.[51] In her statement, she does not identify the Chief Executive or the Director of Nursing as having any responsibility for taking forward the implementation of the Guidelines at Craigavon.

85. On the specific issue of identifying the five clinicians who reportedly took the Guidelines forward within CAH, Dr. Humphrey has said that she cannot assist.[52] She has stated that she believes that Dr. Peter Sharpe was the Consultant Clinical Biochemist involved, but she cannot identify the representatives from Accident and Emergency Medicine, Anaesthetics or Paediatrics.

86. Dr. Sharpe has told the Inquiry in clear terms that he had no involvement whatsoever in taking forward the Guidelines as they applied to children.[53] He did carry out work in CAH with regard to implementing the CREST Guidelines (in respect of adults).[54]

The Key Responsibility for Implementing the Guidelines

87. In his witness statement, Dr. McCaughey has accepted that he (along with the Director of Nursing and Chief Executive of the Trust) held the "*key responsibility*" to implement the Guidelines, but he has emphasised "*that the details of implementation were appropriately delegated.*"[55]

88. Dr. McCaughey was asked to outline the steps that he took to ensure that the Guidelines were distributed to or brought to the attention of relevant staff in March 2002. He has answered by explaining the process of delegation:

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50 Ref: 329-018-007
51 WS-354/1, page 5, Q3(a)
52 WS-354/1, page 5-6, Q3(b)
53 WS-359/1, page 7, Q5(e)
54 WS-359/1, page 5, Q4
55 WS-369/1, page 7, Q4(a)

> *"The Guidance was forwarded to Clinical Directors in all specialties. The Clinical Directors were to ensure, within the context of Clinical Risk Management in their specialities, as noted below, that appropriate guidance and training was being given, including display of the posters in appropriate clinical areas. (The Trust has searched for but not found copies of this correspondence)."*[56]

89. Dr. McCaughey has further explained that the development of the Trust's clinical governance arrangements at time had reached the stage where clinical risk management was an integral part of each Directorate's responsibilities. Therefore, he has asserted that it was for each specialty to take the Guidelines forward.[57]

90. Nevertheless, even if the task of implementation was appropriately delegated as Dr. McCaughey contends, the Inquiry remains keen to understand just what was done by those doing the delegating to ensure that the CMO's directions with regard to the Guidelines were being followed through.

91. Dr. McCaughey has provided the following account:

> *"This was carried out at a Directorate /Specialty level, as stated above. Any problems in implementing the Guidance were to be included in feedback through the Clinical Effectiveness Subcommittee or if appropriate to the Medical Executive Committee."*[58]

92. Of course, this hardly answers the question that was posed. It may well be that the responsibility for implementing the Guidelines was delegated to Clinical Directors but as one of the persons holding the "*key responsibility*" it might have been expected that Dr. McCaughey could have provided the Inquiry with a more detailed account of the steps which were taken at Directorate level to disseminate, implement and monitor compliance with the Guidelines.

93. Dr. McCaughey's account provided no substantive detail to demonstrate what was done with the Guidelines after they reached Directorate level in order to comply with the directions set out by the CMO in her letter of 25th March 2002, save that he identified Dr. Martina Hogan (Consultant Paediatrician) as the clinician who would have coordinated the process of implementing the Guidelines within paediatrics.[59]

94. However, it appears that even this information may be incorrect. In correspondence dated 11 October 2013 the Trust has indicated that Dr. Hogan

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56 WS-369/1, page 4, Q3(f)
57 WS-369/1, page 5
58 WS-369/1, page 7, Q4(b)
59 WS-369/1, page 5, Q(ii)

has identified Dr. Barbara Bell (in her role as Head of Paediatrics) who *"initiated dissemination and implementation of Actions arriving from the Guidelines…"*[60] This issue is the subject of further comment below.

95. In this correspondence the Inquiry has also been advised of the identity of the doctors who were Clinical Directors in the areas where Conor was treated, namely A&E and the MAU. Dr. Jeff Lee was Clinical Director in MAU, and Mr. Ivan Sterling was Clinical Director of the Accident and Emergency Department at the time when the Guidelines were published.

96. It is not entirely certain whether either of these doctors was circulated with the Guidelines with a direction to implement them. The Inquiry has been told that Dr. Lee "had no immediate recollection of directions given or his actions regarding the 2002 Guidelines." The implication appears to be that he was at some point aware of the Guidelines and directions in association with them but this is by no means clear. For his part Mr. Sterling "had no specific recall of receiving the Guidelines or directions to implement them."[61]

97. In the absence of a complete answer from Dr. McCaughey, and in the absence of a clear account from Dr. Lee and Mr. Sterling, the question of what was done to disseminate and implement the Guidelines in the areas where Conor was treated, to develop protocols and to monitor compliance with both are issues which will have to be further examined at the Oral Hearings.

98. It is noteworthy however that the nursing staff and clinicians who treated Conor in the Emergency Department and in MAU have all told the Inquiry that they were unaware of the Guidelines in May 2003. This will be further examined below.

99. The impression created by the answers given by Dr. McCaughey is that the Clinical Directors (for the unspecified areas which did receive the Guidelines) were left to their own devices to implement same without instruction, guidance or resources from the Medical Director, the Director of Nursing or the Chief Executive.

100. If this is an unfair description, there will be an opportunity to correct it and provide clarification at the Oral Hearings. In any event, the Inquiry will wish to use the opportunity of the Oral Hearings to identify what steps if any were taken by key personnel such as Dr. McCaughey to ascertain whether the Guidelines were being effectively implemented.

101. Dr. McCaughey does recall seeing the A2 sized poster displayed "*in appropriate clinical areas*" but he cannot recall where exactly they were

60 Ref: 329-032a-001

61 Ref: 329-032a-001 & -002

displayed.[62] He recalls that protocols were developed and introduced but he does not recall the details.[63] The CMO insisted that it was important to audit compliance with the Guidelines and local protocols but apart from indicating that CAH accepted an invitation to participate in a regional audit, Dr. McCaughey does not describe any other actions to ensure adherence to the Guidelines.[64]

102. Miss Bridie Foy was the Deputy Director of Nursing at CAH from June 1992. In February 2001, she was appointed acting Director of Nursing, a position she held until September 2002.[65] She has described the key responsibilities of the role, including the need to provide leadership to nursing staff, to ensure the provision of appropriate training to nursing staff, and to take steps to update her own professional knowledge.[66]

103. Miss Foy appears to accept the Trust's assertion that the Director of Nursing, along with the Medical Director and the Chief Executive of the Trust would have had the "*key responsibility*" to ensure the implementation of the Guidelines.[67]

104. However, while the correspondence from the CMO heralding the publication of the Guidelines was addressed to Directors of Nursing in the Acute Trusts, Miss Foy has no recollection of receiving it. She has no recollection of seeing the Guidelines[68] and it follows, and she accepts, that she cannot recall taking any steps whether individually or as part of a group to take the Guidelines forward in Craigavon.[69]

105. Miss Foy can only speculate that she would have expected the Guidelines to have been disseminated to appropriate nursing officers within the Trust in accordance with the policy of the day.[70] That policy has been described as requiring that where a document is relevant to more than one ward or department it should be discussed and noted at the Director of Nursing / Nursing Officer meetings.[71] The Inquiry has not received any documentation to suggest that this was done in the case of the Guidelines, which were obviously of relevance to more than one ward or department.

106. Mr. John Mone was appointed as Director of Nursing and Quality from September 2002, taking over the role from Miss Foy. As with Miss Foy, he has

62 WS-369/1, page 6, Q(i)
63 WS-369/1, page 6, Q(j)
64 WS-369/1, page 6, Q(l)
65 WS-367/1, page 2, Q1
66 WS-367/1, page 2
67 WS-367/1, page 6
68 WS-367/1, page 4, Q3(a)&(b)
69 WS-367/1, page 5, Q3(f)
70 WS-367/1, page 5, Q3(g)
71 WS-367/1, page 5, Q3(e)

told the Inquiry that he does not have any recollection of seeing the 2002 Guidelines or being advised about them after taking up his post in CAH.[72]

107. It is presumably reasonable to assume that the process of disseminating, implementing and monitoring compliance with the Guidelines could not have been completed between March and September 2002 when Mr. Mone took up his post.

108. In his witness statement for the Inquiry, Mr. Mone has indicated that since at least 2003 a number of programmes were developed for the education of nursing staff which included some content relating to the management and recording of intravenous fluids. It is not suggested that the attention of nursing staff was drawn to the Guidelines when they participated in these programmes.

109. Plainly, the role of Director of Nursing is one which is strategically important within the Trust. Both Miss Foy and Mr. Mone occupied that position at the time when steps should have been taken to embed the Guidelines in nursing practice. It is unclear how this could have been done if they were unaware of the Guidelines. The Inquiry will be concerned to explore what procedures were in place in CAH in 2002 to bring vital information such as the Guidelines to the attention of the Director of Nursing, and how the Guidelines could have failed to have reached their desks. This will be an issue which will be further examined at the Oral Hearings.

110. Mr. John Templeton was the Chief Executive of Craigavon Area Hospital Group Trust between 1992 and 2007. He believes that Dr. McCaughey would have brought the Guidelines to his attention.[73] However, he understood that the implementation of the Guidelines was a *"professionally led and managed initiative under the direction of the Chief Medical Officer…"*[74] Accordingly, he appears not to have concerned himself with the detail of implementation, as this was a matter for the professional leads. His recollection is that the Medical Director took action to meet the CMO's directions through the Medical Executive Committee, and that the Director of Nursing acted through the Executive Nursing Group.[75]

111. Mr. Templeton accepts that along with the Medical Director and the Director of Nursing he held a responsibility to ensure that the Guidelines were disseminated, implemented and monitored. However, he adds the following qualification:

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72 WS-375/1, page 5, Q(f)
73 WS-371/1, page 3, Q
74 WS-371/1, page 3, Q2(c)
75 Ref: WS-371/1, page 3, Q2(b)

> *"…the hyponatraemia issue was managed principally by the CMO who corresponded directly with the medical community and Directors of Nursing within Trusts. This being seen as a medical/nursing professional practice matter as it concerned direct clinical treatment and care procedures and their embodiment into the clinical practice of all medical and nursing staff involved in the prescription and administration of fluids to children. To the best of my knowledge, there was no direct communication or instructions to Chief Executives…Notwithstanding this, as Chief Executive I had overall responsibility and accountability for ensuring the safety and quality of services to patients whether receiving specific direction or not in relation to this matter."*[76]

112. Consistent with this approach, and as has been described above, when the CMO did write to the Chief Executives in March 2004 to seek clarification of what had been done to implement the Guidelines, it would appear that Mr. Templeton referred the issue to Dr. Humphrey (then Medical Director) for a response.

113. At the Oral Hearings it will be important to consider whether these arrangements led to a situation in which there may have been inadequate scrutiny of the efforts to implement the Guidelines in Craigavon.

IX. Knowledge of the Guidelines Where Conor Was Treated

114. As appears from the CMO's correspondence of 25th March 2002, it was her expectation that the Guidelines would be displayed in all units which accommodated children.

115. The Inquiry has been unable to establish with any precision from the Trust just where in CAH the Guidelines were actually displayed:

> *"...the Guidance poster was displayed in Craigavon Area Hospital. However, the Trust is unable to provide clarity on the units in which the 2002 Guidance was displayed...*
>
> *"The Southern Health & Social Care Trust, in respect of the legacy Craigavon Area Hospital Group Trust, is unable to locate any correspondence issued in relation to the units in association with the display of the poster...."*[77]

116. Those with the *"key responsibility"* have been unable to assist the Inquiry in this regard either. As noted above, Miss Foy and Mr. Mone have no recollection of seeing the Guidelines, and, while Dr. McCaughey has told the

[76] Ref: WS-371/1, page 6, Q3(a)
[77] Ref: 329-018-007

Inquiry that the Guidelines were displayed in appropriate locations, he cannot say where.

117. As has been explained elsewhere in this document, those who cared for Conor when he was a patient in CAH have accepted that the Guidelines applied to him. He was aged 15 when he was admitted to CAH and so he was to be regarded as a child (or young person) for the purposes of the Guidelines, even if he was admitted to an adult ward.

118. Accordingly, since the CMO's direction to hospitals indicated that the Guidelines should be displayed at all locations which accommodated children, it seems that they ought to have been displayed in A&E and in the MAU.

Emergency Department

119. The Inquiry has asked those who provided care to Conor in A&E and in the MAU to outline and explain their knowledge of the Guidelines.

120. The first clinician to encounter Conor was Dr. Suzie Budd (Staff Grade Doctor, Emergency Department, CAH). She was responsible for prescribing Conor's initial intravenous fluids, and for deciding that he should be admitted for observation and further care.

121. Dr. Budd held a qualification in Advanced Paediatric Life Support at the time of caring for Conor. She continues to hold this certificate.[78] Dr. Budd has explained that in order to obtain this qualification, she undertook a module with face-to-face training in fluid and electrolyte management including hyponatraemia.[79]

122. However, Dr. Budd has told the Inquiry that, as far as she can recall, she did not know about the 2002 Guidelines at the time of treating Conor. Indeed, she states that she does not recall seeing the 2002 Guidelines before receiving a request for a witness statement from the Inquiry in September 2013. She has told the Inquiry that she accepts that the Guidelines were applicable to fluid management in the circumstances of Conor's case.[80]

123. By contrast, Dr. Michael B.H. Smith (Consultant Paediatrician) has stated that he was aware of the Guidelines being displayed in the children's areas of the Emergency Department.[81] Of course, this was in accordance with the CMO's directions. It will be recalled that her letter of 25th March 2002 was directed to Consultants in Accident and Emergency Medicine amongst others.

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78 WS-362/1, page 3, Q1(c)
79 WS-362/1, page 3, Q2(b)
80 WS-352/1, page 12, Q18
81 WS-357/1, page 10, Q9(b).

124. Furthermore, Dr. Humphrey has told the Inquiry that before formulating her response to the CMO's correspondence in 2004 she recalled visiting the A&E Department, the Children's Ward and the MAU. [82] She has said that she did so "*unannounced*" and that she spoke to staff to assure herself that they were aware of the relevant Guidelines. She has stated that she was probably looking to see if the adult Guidelines were displayed in adult areas and children's Guidelines in children's areas. She recalls seeing at least one poster in the resuscitation area of the A&E Department, one on the MAU and one displayed in the Children's ward. However, she cannot say with any certainty, whether the adult or children's Guidelines were available in the A&E Department and MAU.[83] Of course, since children were cared for in each of these areas, the children's Guidelines should have been displayed in order to comply with the CMO's direction.

125. It is no doubt possible for even the most conscientious of clinicians to have failed to notice the Guidelines on display. Since Dr. Budd was not aware of the Guidelines until comparatively recently it seems reasonable to infer that effective steps were not taken to bring them to her attention, even if they were on display. It is fair to point out, however, that Dr. Budd's experience of not knowing about the Guidelines is shared by the medical and nursing staff who cared for Conor in MAU.

126. Certainly, if Dr. Budd had been trained in relation to the application of the Guidelines, or if she had been issued with a personal copy with instructions that she was to study them and implement them she could not have failed to have known of their existence. There is no evidence before the Inquiry that either step was taken.

127. At the Oral Hearings, the Inquiry will examine how those with responsibility within CAH apparently failed to disseminate the Guidelines to Dr. Budd, and perhaps to others working in that area.

Medical Admissions Unit

128. Dr. Budd intended that Conor would be admitted to a paediatric ward. She was of the view that since Conor had the physiological status of an eight year old he would benefit from admission to a paediatric setting.[84] For reasons which will be examined elsewhere in this document, a decision was made that Conor would be admitted to the MAU, the main adult medical ward.

82 WS-354/1, page 8, Q5(d)
83 WS-354/1, page 8, Q5(d)
84 WS-352/1, page 6, Q4(b) & (c)

Medical Staff in MAU

129. Dr. Catherine Elizabeth Quinn was a Medical Senior House Officer on 8th May 2003 and was responsible for clerking in new patients. She clerked in Conor. She has told the Inquiry in her witness statement that she was not aware of the Guidelines before seeing Conor.[85] She has said that she has never received formal training in the application of the Guidelines[86] and she has no recollection of receiving any written information concerning the use of the Guidelines.[87]

130. Dr. Quinn has stated that to the best of her knowledge the poster containing the Guidelines was not displayed in MAU. She has no knowledge of the poster being displayed in any other location.[88]

131. Dr. Andrew Murdock was a Specialist Registrar in Gastroenterology and General Internal Medicine when Conor was treated in MAU on 8th May 2003. He was the Medical Registrar on call that day,[89] when he was asked by Dr. Quinn to come to see Conor.[90] He advised Dr. Quinn on the appropriate approach to managing Conor's intravenous fluid needs.[91]

132. Dr. Murdock has helpfully described in his witness statement for the Inquiry the relevant education and training which he has received as an undergraduate and postgraduate student, and as part of his continuing professional development. It would appear that he has not received any training to address the specific issue of fluid management and the prevention of hyponatraemia in children.[92]

133. This may not be surprising since Dr. Murdock's career has developed in the field of adult medicine and in the particular area of Gastroenterology. His one paediatric clinical attachment was for a three-month period in 1996 before qualifying.[93]

134. However, as will be further described below, it is the case that patients were admitted on to the MAU on the basis of their age (14 years and upwards) and not their size or weight. Dr. Murdock has stated that this was a regional policy applied by all Trusts.[94] Clearly, he was expected to prescribe and

85 WS-356/1, page 9, Q14
86 WS356/1, page 9, Q15
87 WS-356/1, page 9, Q16
88 WS-356/1, page 9, Q17
89 WS-355/1, page 5, Q(e)
90 Ref: 087-025-116
91 Ref: 087-025-117
92 WS-355/1, page 5-6, Q2
93 WS-355/1, page 6, Q2(a)
94 WS-355/1, page 7, Q3(d)

administer fluids for young people without the benefit of specific paediatric training.

135. Interestingly, Dr. Peter Sharpe (Consultant Chemical Pathologist, Southern Health and Social Care Trust) has observed:

> *"When I trained in Chemical Pathology in Belfast, it was considered that fluid management in children was the responsibility of the Paediatricians. I was never asked nor would I have given advice on this matter. I consider fluid management in children to be radically different to that of adults and therefore this should only be administered by those with paediatric expertise and training."*[95]

136. Dr. Murdock has told the Inquiry that it is difficult to remember when any particular guideline was brought to his attention during his medical career. He has no specific recollection of the 2002 Guidelines being brought to his attention.[96] He cannot recall receiving any training in the application of the Guidelines[97] and nor can he recall receiving any written information in relation to the use or application of the guidelines.[98] He has stated that he cannot ever recall seeing the Guidelines displayed in any of the locations which he commonly worked in, including the MAU.[99]

137. Dr. Murdock accepts that the Guidelines were applicable in the circumstances of Conor's case. His answers in his witness statement to questions posed to him by the Inquiry suggest that although he was not familiar with the Guidelines, he is of the view that he implemented each of the steps referred to within the Guidelines when attending with Conor.[100]

138. The extent to which Dr. Murdock did comply with the Guidelines has been analysed elsewhere in this document. It will be noted that Dr. Murdock has admitted that he failed to document the process of managing Conor's intravenous fluid needs adequately.[101] He has apologised for this and attributed his omissions to workload pressures. He has indicated that he has taken steps to improve his record keeping since that time.[102]

139. Dr. Marian Williams was a middle grade/second term SHO in Paediatrics when Conor was treated in MAU on 8th May 2003.[103] She was asked by the

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95 WS-359/1, page 3, Q2(b)
96 WS-355/1, page 14, Q14(c)
97 WS-355/1, page 14, Q.15
98 WS-355/1, page 14, Q16
99 WS-355/1, page 15, Q17(b)
100 WS-355/1, page 15, Q19(a)-(e)
101 WS-355/1, page 15, Q19(f)
102 WS-355/1, page 16, Q20(2)
103 WS-358/1, page 3, Q1(c)

medical team who were looking after Conor in MAU to provide advice in relation to his condition.[104]

140. Dr. Williams is now a Consultant Paediatrician. She cannot now recall whether the CMO's Guidelines were ever brought to her attention when she was working as a Paediatric SHO in CAH.[105] She has stated that she was made aware of the Guidelines, and, indeed, she has received training in the use and application of them, but she is unable to assist the Inquiry in relation to who provided the training and when it was provided.

141. Dr. Williams has stated that she was made aware of the Guidelines using formal and informal methods, including during hospital induction programmes and other teaching sessions.[106] She may have received written information in relation to the use or application of the Guidelines but she cannot specifically recall.[107] She has described the learning which emerged from such training in the following terms:

> *"I was made aware that 0.18% Saline was no longer recommended as maintenance fluid in paediatrics. The importance of correct assessment, prescription and monitoring of fluids was also highlighted. I was also made aware of high risk groups of children, when it may be more appropriate to restrict fluids."*[108]

142. Dr. Williams has expressed the view that the Guidelines would have been applicable to Conor's case because he was under 16 years of age.[109] However, she cannot recall whether the Guidelines were displayed in the MAU where Conor was treated or in any other particular area of the Hospital where she worked.[110]

Nursing Staff in MAU

143. Sister Irene Elizabeth Brennan (nee Dickey) has described herself as the senior nurse on the MAU ward on the afternoon of 8th May 2003.[111] She was the equivalent of a Clinical Sister Band 6. She had no experience or qualifications in the field of paediatric nursing.[112] She was responsible for reconnecting Conor's IV line after the venflon had extravasated on the afternoon of 8th May.

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104 WS-358/1, page 4, Q3(d)
105 WS-358/1, page 5, Q5
106 WS-358/1, page 6, Q6
107 WS-358/1, page 6-7, Q7(a)
108 WS-358/1, page 6, Q6(d)
109 WS-358/1, page 7, Q9
110 WS-358/1, page 7, Q8
111 Ref: 087-020-100
112 WS-353/1, page 3, at (c)

144. Sister Brennan has told the Inquiry that she also accepts that the Guidelines were applicable to the circumstances of Conor's case.[113] However, she admits that the Guidelines were not applied to his case because the nurses in MAU were unaware of their existence.[114] She has stated that the 2002 Guidelines were simply never brought to her attention,[115] or that of other nursing staff in MAU. The A2 sized poster containing the Guidelines was not displayed in MAU.[116]

145. Sister Brennan has stated that it was not until 2009 that she attended training in relation to fluid management for children and young people. At this training, which was delivered in the form of a 2-hour lecture, she has stated that she learned about the importance of baseline assessment, fluid requirement, choice of fluid, monitoring of input and intake and when to seek advice.[117] She has provided a copy of the notes which accompanied that lecture.

146. The notes provided by Sister Brennan indicate that information was given to her about fluid management requirements in light of the National Patient Safety Alert, and the Guidelines which were subsequently issued by the Chief Medical Officer in 2007 (the 'Paediatric Parenteral Fluid Therapy (1 month to 16 years) Initial management guideline' hereinafter the '2007 Guidelines').[118]

147. As appears from the analysis set out elsewhere in this document, in 2009 the Trust adopted a policy which provided for compulsory training for those nursing and medical staff whose work involved either prescribing or managing intravenous fluids for children or young persons.

148. Staff Nurse Francis John Lavery was on duty on the afternoon of 8th May 2003, when Conor was admitted to MAU. At that time he was a Grade E. Apart from a short placement during his nursing training, he has no other experience or qualifications in the field of paediatric nursing.[119]

149. Staff Nurse Lavery has stated that he received basic fluid management training as a student nurse, but that he does not recall receiving specific training in relation to fluid management of paediatrics or in the prevention of hyponatraemia post registration.[120]

150. In 2009, Staff Nurse Lavery attended training provided by the Practice Development Facilitator which took the form of a power point presentation

113 WS-353/1, page 13, Q21
114 WS-353/1, page 13/4, Q22
115 WS-353/1, page 12, Q16
116 WS-353/1, page 13, Q20
117 WS-353/1, page 12, Q18
118 WS-353/1, page 20
119 WS-351/1, page 3, at (c)
120 WS-351/1, page 6, Q(f)

and which drew his attention to what must have been the Guidelines published by the DHSS&PSNI in 2007. This would appear to be the same training which Sister Brennan has described.[121] Staff Nurse Lavery has explained that he gained the following knowledge from this training:

> *"The importance of baseline assessment, weight, observations of skin elasticity, lethargy, responsiveness, condition of the mouth and tongue and if eyes are sunken, importance of recording fluid intake and output, choice of intravenous fluids, monitoring, documentation and seeking advice."*[122]

151. As with each of the other clinicians and nursing staff who provided care for Conor before his acute deterioration, Staff Nurse Lavery agrees that the 2002 Guidelines were applicable to Conor's case.[123] However, he is quite clear that the 2002 Guidelines were not brought to his attention at any time before Conor's admission[124] and he has stated that he believes that the Guidelines were not displayed in the MAU.[125]

152. Sister Lorna Cullen was the Ward Sister/Manager in the MAU in May 2003. She has stated that she had no involvement in any aspect of Conor's care.[126] Nevertheless, it was her role to *"manage and co-ordinate the care of patients by a multi-disciplinary team, ensuring they were cared for in a professional manner within a safe environment…"*[127] Presumably, in this leadership role she ought to have been advised of the publication of the Guidelines and the need to ensure their application in practice.

153. However, Sister Cullen has also told the Inquiry that the 2002 Guidelines were not brought to her attention.[128] It was only in 2009, after the publication of the national patient safety alert that guidance on hyponatraemia was brought to her attention. Since then she has undertaken training on two occasions, at which she learned of the importance of adhering to the DHSSPS Paediatric Parenteral Fluid Therapy Guidance (2007).[129]

154. The evidence so far received by the Inquiry, would tend to suggest that in breach of the CMO's directions the Guidelines were not disseminated to or applied in some units which cared for children and young people such as MAU, and possibly the Emergency Department also. At the Oral Hearings it will be important to determine whether this assessment is accurate and if so, to examine how this omission could have occurred.

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121 WS-351/1, page 10, Q10(b)
122 WS-351/1, page 11, Q11(d)
123 WS-351/1, page 12, Q14
124 WS-351/1, page 10, Q10
125 WS-351/1, page 12, Q13
126 WS-374/1, page 4, Q3
127 WS-374/1, page 3, Q1(e)
128 WS-374/1, page 6, Q12
129 WS-374/1, page 6, Q14(b)&(d)

155. It is clear that those responsible for managing the Hospital must have been aware that children as young as 14 would be treated in MAU, and would require safe management of their intravenous fluid needs. Yet it appears that, at the time of Conor's treatment, even the most basic aspect of the CMO's direction – the displaying of a poster – appears not to have been complied with.

156. Moreover, it seems probable that medical and nursing staff working on that ward were not even told about the Guidelines, let alone provided with training in the management of intravenous fluids for children and young people. This position has changed only slowly and only after the publication of the second generation of Guidelines in 2007.

X. Knowledge of the Guidelines in the Paediatric Department

157. Had Conor been admitted to the Paediatric Ward as Dr. Budd had intended, it would appear that he may have encountered nursing and medical staff familiar with the Guidelines.

158. Dr. Smith has told the Inquiry that the Guidelines were displayed in the Paediatric Ward in several locations.[130]

159. It was noted above that Dr. McCaughey identified Dr. Hogan as the clinician who, in the Paediatric Department, was responsible for implementing the Guidelines there.[131]

160. It is not entirely clear that she recognises herself in that description. Indeed in recent correspondence it is said that she believes that Dr. Bell was responsible for implementation.[132] Dr. Hogan worked as a Consultant Paediatrician in CAH in March 2002, and Lead Clinician in Paediatrics from May 2003. She has explained that the Guidelines were brought to her attention in 2002 by the Lead Consultant at the time.[133] She has helpfully indicated the nature of the work which she and others undertook to implement the Guidelines in Paediatrics:

> *"I remember discussion of the posters and the content at consultant meeting and junior doctor meeting and reviewing the posters with staff nurses and doctors…As a consultant I was involved in implementing the recommendations, discussing with junior doctors the changes in fluid management."*[134]

130 WS-357/1, page 10, Q9(b)
131 WS-369/1, page 5, Q3(ii)
132 Ref: 329-032a-001
133 WS-368/1, page 3, Q3(b)
134 WS-368/1, page 4, Q3(c)

161. Dr. Hogan states that she was trained in relation to the use or application of the Guidelines. It would appear that the training was informal in nature, involving discussion with consultant colleagues and junior medical staff.[135] On some unspecified date, she undertook the "BMJ online module." Presumably, this is a reference to the BMJ e-learning module, 'Reducing the Risk of Hyponatraemia When Administering IV Fluids to Children'. As will be explained in greater detail below, it is now a requirement for all clinicians at CAH who engage in paediatric fluid management, to undertake this module.

162. Dr. Barbara Ann Bell was appointed as a Consultant Paediatrician at CAH on 1st April 1989. She continues to occupy that role. She has told the Inquiry that she received a copy of the Guidelines and that she took steps to ensure that all paediatric trainees and consultants understood them and followed them.[136] She has stated that she ensured that the Guidelines were clearly visible in all relevant clinical areas in both the neonatal and general paediatric ward.[137] In addition, steps were taken through the Clinical Services Manager to ensure that "Solution No. 18" was removed from all Paediatric areas.[138]

163. In recent correspondence Dr. Bell has been described as the Clinical Director of Paediatrics at the time the Guidelines were published. She has provided instructions to the DLS that *"the Guidelines were disseminated through the usual standard process in place at the time."*[139] The Inquiry cannot presume to know what this means since "the usual standard process" has never been described for the Inquiry, and no document has been produced to illustrate how that process worked in practice.

164. Dr. Bell has stated that the posters were displayed so that all doctors and nurses could refer to them. Dr. Bell has also stated that she asked that the Guidelines *"be incorporated into educational talks by consultants and senior trainees to ensure that all medical staff were aware of the Guidelines."* Furthermore, the lead trainee in paediatrics was reportedly tasked with the responsibility of ensuring that all trainees were aware of the Guidelines. It has not been made clear how this was done.

Other Areas of the Hospital

165. Dr. Lowry has told the Inquiry that he remembers that the poster containing the Guidelines was displayed in the main theatres, theatre recovery and within the Day Surgery Unit.[140]

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135 WS-368/1, page 5, Q6
136 WS-364/1, page 3, Q3(a)
137 WS-364/1, page 4, Q3(c)(i)
138 WS-364/1, page 4, Q3(c)(ii)
139 Ref: 329-032a-002
140 WS-350/2, page 5, Q3(b)

166. However, attempts to contact the then Clinical Director of Anaesthetics (Dr. Ian Orr) to ascertain the steps that were taken to implement the Guidelines in that Department have so far proven unsuccessful.[141]

XI. Protocols

167. As has been described above, the CMO expected the Trusts to develop fluid protocols to complement the Guidelines in order to provide more specific direction to junior staff. She referred in particular to the importance of such protocols in subspecialty areas such as in renal, burns and neurosurgical units.

168. Dr. Humphrey told the CMO that detailed fluid protocols were available to medical staff. However, in her witness statement Dr. Humphrey has told the Inquiry that she has no specific recollection of the protocols to which she was referring.[142] Moreover, the Trust when pressed to identify and provide these protocols told the Inquiry that it *"cannot identify the detailed fluid protocols which Dr. Humphrey referred to..."*[143]

169. Similarly, Dr. McCaughey has told the Inquiry that he was aware that protocols were developed but he has no recollection of the details.[144]

Protocol in Paediatrics and Anaesthesia

170. More helpfully, the Trust has provided the Inquiry with documentation showing that a protocol for managing intravenous fluids in children had been developed by Dr. Smith and Dr. D. Lowry for use in paediatrics and anaesthetics, even before the CMO's Guidelines were published.[145]

171. In a letter dated 28th August 2013, the Inquiry was initially told that three senior clinicians were involved in developing this protocol. The Inquiry was told that they worked as an informal group. This informal group was inaccurately identified as comprising Dr. Smith, Dr. Lowry as well as a Dr. Peter Sharpe (Consultant Biochemist).

172. The Directorate of Legal Services on behalf of the Trust subsequently indicated that Dr. Sharpe had no involvement in the development of this guidance, [146] a point which was reiterated in the witness statement of Dr.

141 Ref: 329-032a-002
142 WS-354/1, page 11, Q8(a)
143 Ref: 329-018-006
144 WS-369/1, page 6, Q3(j)
145 Ref: 329-014-004
146 Ref: 329-018-002

Sharpe.[147] The Inquiry has sought an explanation from DLS for this inaccuracy but to date no explanation has been given.[148]

173. The confusion does not end there. In another recent development the Inquiry has been provided with an email dated 13 September 2001 whereby Dr. Smith circulated a draft copy of a guideline of IV fluid replacement. In the email Dr. Smith acknowledges the involvement of Dr. Sharpe and others:

> *"Please find attached a draft guideline of IV fluid replacement. I have consulted with Bob Taylor who was writing one at the same time so we blended ours. I have also met with Darryl Lowry and Peter Sharpe and this is the result…"*[149]

174. It has been reported to the Inquiry that Dr. Sharpe has no recollection of being involved with the drafting of the Guideline *"but accepts that he may have been informally consulted as a matter of courtesy given his Lead Clinician in Clinical Biochemistry."*[150](emphasis added)

175. It is obvious from the email issued by Dr. Smith that Dr. Sharpe had some involvement in the development of the guideline at Craigavon, whether he chooses to describe his involvement as formal or informal. It is clear that he met with Dr. Smith to discuss the guideline before it was circulated and that he was then sent a copy of the guideline in draft.

176. In his witness statement, Dr. Lowry has explained the background to the production of the protocol in 2001. He had been telephoned by Dr. Geoff Nesbitt at Altnagelvin Hospital to be told about the circumstances of Raychel Ferguson's death.[151] He was subsequently invited to attend the meeting in relation to acute hyponatraemia in children which was convened by Dr. Paul Darragh at Castle Buildings on 26th September 2001.[152] It would seem those developments prompted Dr. Lowry's interest in the area of intravenous fluid management. At or about that time, he met informally with Dr. Smith and together they developed the protocol.[153]

177. The Inquiry has been advised that the protocol was formulated by Dr. Lowry and Dr. Smith at Craigavon in or about mid-September 2001, 6 months before the CMO published the Department's Guidelines.[154] Dr. Lowry has explained the thinking behind the initiative:

147 WS-359/1, page 4, Q3
148 Ref: 329-023-004
149 Ref: 329-038-002
150 Ref: 329-038-001
151 WS-350/1, page 4, Q3(e)
152 WS-350/1, page 4, Q3(c). See also the record of that meeting at Ref: 007-048-094
153 WS-350/1, page 5, Q3(j)
154 Ref: 329-014-006

> *"I was a member of the September 2001 working group on hyponatraemia in children and so was aware of the potential problem in our hospital as well as across the Province. As Lead Consultant Paediatric Anaesthetist in Craigavon, I felt it was my role to take this forward and development (sic) guidelines in conjunction with a Consultant Paediatrician (Dr. Smith). I had worked in RBHSC before taking up my Consultant post in Craigavon and was aware of the Arieff paper. After Dr. Nesbitt telephoned me describing the death of his patient in Altnagelvin I felt it important to develop guidelines to prevent the same event occurring in Craigavon."*[155]

178. The Trust has indicated that Dr. Lowry and Dr. Smith disseminated the protocol within their own specialties of anaesthetics and paediatrics. Its purpose was to provide guidance on the management of IV fluids.[156]

179. In some respects the protocol developed by Dr. Lowry and Dr. Smith is similar in content to the document produced by Dr. Taylor *'Hyponatraemia in Children'*[157] for the CMO and provided to Dr. Darragh.[158] The document subsequently found its way to other clinicians, for example, to Dr. Ashgar at the Erne Hospital[159] and Dr. Jenkins at the Antrim Hospital.[160]

180. Dr. Smith has explained that he and Dr. Lowry obtained the document from Dr. Taylor and material received from the Trust indicates that he received it in August 2001[161] and that they incorporated it into their own guideline or protocol.[162] The Inquiry has been told by the DLS on behalf of the Trust that Dr. Taylor's document was included in induction packs for trainee anaesthetists in Craigavon.[163]

181. Dr. Lowry has explained that as a result of his involvement in the Northern Ireland working group on hyponatraemia in children he took the view that it was necessary to *"stress the importance of the potential for hyponatraemia in these patients and to educate our trainees in order to prevent any further deaths, either in Craigavon or elsewhere."*[164] Hence the decision to draft the protocol.

182. Dr. Smith has explained the thinking in the following terms:

> *"We were not asked to develop guidance. This initiative arose from a mutual desire to improve the use of IVFs in hospitalised children. We received some written material from Dr. Bob Taylor (Consultant Paediatric Intensive Care)*

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155 WS-350/2, page 3, Q1(d)
156 Ref: 329-018-003
157 Ref: 043-101-223 & Ref: 329-014-057
158 Ref: Transcript of the Oral Hearings, 18th September 2013, p.77
159 Ref: 043-101-223
160 Ref: 329-014-057
161 Ref: 329-014-006
162 WS-357/2, page 2, Q1
163 Ref: 329-014-003
164 WS-350/2, page 7, Q4(d)

> *which we incorporated into our own guideline. Other material obtained was from previous training in our specialties. The purpose of this guidance was to inform the training doctors in our respective specialties of paediatrics and anaesthetics. This was distributed to our trainees and incorporated into induction sessions."*[165]

183. Dr. Smith has further explained that since he and Dr. Lowry had read about instances in which intravenous fluids in hospitalised children had been managed incorrectly both in the United Kingdom and internationally, they "sought to standardise prescribing according to best practice."[166] They completed their work following a review of the literature and after a discussion with colleagues.

Content of the Protocol

184. The protocol contains an explanation of how hyponatraemia can develop in a child post-operatively, and goes on to set out a number of recommendations to ensure safe fluid management practice. In common with the Guidelines which were to be published by the Department, the protocol developed at Craigavon emphasised the need to calculate maintenance fluids separately from "replacement" fluids.

185. The protocol also contains a table describing the particular approaches to be adopted in respect of maintenance fluids, replacement fluids and ongoing losses. Particular types of solution were identified, depending on the type of regime required. It was emphasised that maintenance fluids should contain at least 0.45%NaCl in 2.5% Glucose, and concerns about the use of Solution No. 18 were highlighted.[167]

186. Clearly, it is to the credit of Drs. Smith and Lowry that they proactively addressed the issue of intravenous fluid management in children's cases and worked to provide a useful and detailed protocol in advance of the publication of the Guidelines.

187. However, it is unclear what happened to the protocol when the Guidelines were published. It has been explained on behalf of the Trust that the protocol was used until the CMO published her Guidelines.[168] By contrast, in his witness statement to the Inquiry Dr. Smith stated that the protocol which he had developed with Dr. Lowry *"complemented the Guidance received by providing more specific advice"*, [169] which is what the CMO intended.

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165 WS-357/2, page 2, Q1
166 WS-357/2, page 3
167 Ref: 329-014-004
168 Ref: 329-018-003
169 WS-357/2, page 5, Q3(b)

188. The Inquiry has sought clarification from the Trust in relation to whether the protocol was withdrawn upon the publication of the Guidelines or whether it was used to supplement the Guidelines as Dr. Smith has suggested.

189. Furthermore, at the Oral Hearings it will be necessary to clarify whether any steps were taken at Craigavon to develop other specific protocols as suggested by Dr. Humphrey in her correspondence to the CMO.

XII. Audits

Regional Audit

190. As described above, when issuing the Guidelines in 2002, the CMO emphasised to the Trusts that it would be important to audit compliance with the Guidelines and any locally developed protocols.

191. In her correspondence to the CMO dated 7th April 2004, Dr. Humphrey was only able to refer to the Trust's participation in a regional audit as evidence that the Trust had been monitoring adherence to the Guidelines. In her witness statement to the Inquiry, Dr. Humphrey has not referred to any other audit which might have monitored compliance with the Guidelines. She has not herself claimed to have introduced any measures to audit compliance with the Guidelines after she took up the Medical Director's post in May 2003.

192. The CMO's correspondence to the Trust in 2004 offered an opportunity for a stock taking exercise to be conducted. Clearly, if the experiences of the nursing staff and clinicians who cared for Conor were typical, there was a large group of staff working in CAH at that time with no knowledge of the Guidelines, two years after they were published. Dr. Humphrey appears not to have been aware of that, even though she visited the Emergency Department, the Children's Ward and MAU and spoke to staff.

193. At the Oral Hearings, it will be important to explore with Dr. Humphrey whether she arrived at an accurate impression of the extent to which the Guidelines were being applied in Craigavon by 2004.

194. Dr. McCaughey has given the same answer as Dr. Humphrey, that the regional audit was the tool used to monitor compliance with the Guidelines.[170] Likewise when asked about the performance of audits in CAH in order to monitor compliance with the Guidelines, Dr. Smith has only referred to the regional audit.[171]

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170 WS-369/1, page 6, Q3(l)
171 WS-357/2, page 5, Q3(d)

195. By contrast, within the Daisy Hill Hospital from August 2003 an audit of hyponatraemia was undertaken. The preliminary results of that audit were shared at an area Paediatric audit meeting in January 2005. [172] The audit was still in progress.

Findings of the Regional Audit

196. The background to the regional audit referred to by Dr. Humphrey has been described by Dr. Henrietta Campbell. She has explained that the audit was proposed at the SAC Paediatrics meeting on 10th September 2002.[173] The audit was co-ordinated for the region by Dr. Jarlath McAloon (Consultant Paediatrician) and his colleague Dr. R. Kottyal (Senior House Officer). The results of the audit were written up and published in the Ulster Medical Journal.[174]

197. The audit was conducted in eight acute paediatric inpatient units in Northern Ireland on the same day in May 2003, just over 12 months after the introduction of the Guidelines. In their article McAloon and Kottyal reported that since *"the recruitable numbers available to satisfy the strict inclusion criteria were small an identical exercise was repeated on two further days, one in June 2003 and one in January 2004."*[175]

198. CAH was one of the centres where the audit was conducted. In his witness statement to the Inquiry, Dr. Smith has explained that he co-ordinated the audit at CAH.[176] The Trust has been asked to provide the Inquiry with a copy of the audit report and/or returns which were made in respect of the audit which took place at Craigavon for the purposes of the regional exercise.[177] However, the Inquiry has been advised that the Trust has not retained copies of the audit report or returns, and that it was not practice at that time to retain such documentation in respect of audits conducted through external committees.[178]

199. Likewise, Dr. McAloon has been approached and asked to provide copies of the audit data submitted by each of the eight centres (including CAH), and any other information supplied by those centres.[179] Dr. McAloon has answered by indicating that he shredded the original data sheets after his paper on the subject was published in the Ulster Medical Journal. He had not

172 Ref: 329-020a-148
173 WS-075/1, page 10
174 Ulster Med J 2005; 74(2) 93-97 – see Ref: 329-014-123
175 329-014-124
176 WS-357/2, page 5, Q3(d)
177 Ref: 329-011-003
178 Ref: 329-014-002
179 Ref: 329-025-001

made copies. No additional information was submitted with the data sheets.[180]

200. Dr. McAloon has explained that the data submitted to him by the eight centres was collated and reported as a group result. That is, individual outcomes for each separate Trust were not produced. As appears from the paper published in the Ulster Medical Journal, all units contributed at least one patient to a sample comprising thirty-eight eligible children. The authors indicated that standard achievement rate for maintenance fluid calculation was high (at 82%) but they also referred to evidence of some *"potentially significant variation from advised practice,"* with six cases involving a calculation outside of the Guidelines, three of which were described as *"inappropriate."*[181]

201. The authors were satisfied that an appropriate fluid choice had been made in all cases. They were also satisfied that the weight of patients was being measured or estimated in all cases. However, they highlighted problems in recording the prescription. In particular, while the Guidelines refer to the importance of separately prescribing for maintenance and replacement fluids (in order to avoid the risk of excess fluid administration) this was not done in 70% of the relevant situations identified by the audit.

202. The audit also highlighted significant departure from the direction contained in the Guidelines which emphasised the importance of reassessment of hydration and fluid balance every 12 hours. The authors reported that this was only recorded in a minority of the cases being scrutinised, and that in four cases urea and electrolytes were not checked during 24 hours of IV therapy. Overall, the authors judged that the audit revealed that *"implementation of the Regional guidance has so far been incomplete."*

203. The Inquiry has not been told that the results of the audit led to any scrutiny of practices at CAH or elsewhere. The publication of the audits findings could presumably have provided another opportunity for an assessment of fluid management practice in the Hospital. At the Oral Hearings it will be relevant to determine whether this opportunity was grasped at CAH.

Local/CAH Audits

204. It may be reasonable to suggest that when the CMO informed the Trust's of the importance of monitoring compliance with the Guidelines, she probably did not expect them to limit their activity to participation in a regional audit.

205. However, when asked whether other audits of compliance had been conducted in Northern Ireland by the DHSS&PSNI or at any hospital unit

[180] Ref: 329-026-001
[181] Ref: 329-014-126

before he carried out his work, Dr. McAloon indicated that he was unaware of any other audit.[182]

206. Nevertheless, in recent correspondence the Trust has advised the Inquiry that a number of initiatives were undertaken at CAH the objective of which was

"to ensure compliance with the 2002 guidelines /IV fluids."[183]

207. It is not entirely clear whether any of the four initiatives identified by the Trust actually served this purpose. Certainly, it seems difficult to conclude on the basis of the evidence so far presented to the Inquiry that any of these initiatives were designed specifically to test compliance with the Guidelines, although in some cases the initiative may have achieved this result indirectly. At the Oral Hearings, it will be necessary to examine further whether the initiatives identified by the Trust actually fulfilled the objective which the Trust has described.

208. The first initiative to which the Inquiry has been referred is clinical incident reporting in Paediatrics, which was co-ordinated by Dr. Hogan. This has been described as,

> *"A multi-disciplinary Paediatric Clinical Incidents Group reviewed all new paediatric clinical incidents. In 2003, the format of this meeting was further developed to include discussion on a wider clinical and social care governance agenda. This wider agenda included clinical effectiveness guideline updates. Feedback on clinical incidents within paediatrics continued to be discussed at these meetings."*[184]

209. In her witness statement, Dr. Hogan has confirmed that she established a Paediatric Clinical Governance group sometime in 2003. However, she has told the Inquiry that she did not participate in any monitoring of the implementation of the Guidelines, although she was aware of on-going audits. She has not explained the nature of the ongoing audits, or provided any detail in relation to them.[185]

210. It may be that the Paediatric Clinical Incidents Group (or the Paediatric Clinical Governance Group) examined fluid management in specific clinical incidents referred to it, but Dr. Hogan's account does not suggest that the Group was directly concerned with monitoring compliance with the Guidelines in particular or fluid management in general.

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182 Ref: 329-026-001
183 Ref: 329-018-010 & 329-020-001
184 Ref: 329-018-010
185 WS-368/1, page 4, Q3(c)(iii)

211. The Trust has referred to two further initiatives which were co-ordinated by Drs. Davis and Bell: *Stabilisation and Transfer of Critically Ill Children Telelink Audit* (Bell and Davis) and *Transfer Audit* (Bell).[186] The Trust has commented that,

> *"This project covered all aspects of the stabilisation and transfer of critically ill children, including fluid and airway management where appropriate."*[187]

212. However, Dr. Bell has explained the purpose of the first of these audits ('Stabilisation and Transfer') in the following terms:

> *"The aims of the audit were to discuss the stabilisation, transfer and subsequent management of critically ill children transferred from our hospitals to PICU."*[188]

213. Dr. Bell is quite clear that it was *"not the main focus of the audit"* to ascertain whether clinicians and nursing staff working in Paediatrics were complying with the Guidelines.[189] Indeed, it would appear that compliance with the Guidelines was not specifically or directly examined at all. When asked whether any steps were taken during the audit to ascertain whether the Guidelines were complied with, Dr. Davis answered, *"Not that I recall."*[190]

214. Rather, as Dr. Bell has explained, intravenous fluid administration would have been discussed where it was appropriate to do so in any particular case. Dr. Bell has indicated that in the cases which they looked at, *"fluid administration was deemed appropriate"*.

215. When asked about the second related audit described as 'Transfer Audit' Dr. Bell has clarified that this did not look at the Guidelines at all. She describes this audit as a *"numerical quantitative audit rather than a qualitative audit."*[191]

216. In her witness statement, Dr. Bell has also indicated that with particular regard to the Guidelines, she ensured that they were audited and the results brought to the Paediatric Departmental meeting.[192] She has provided no further detail with regard to this process or the outcomes which it produced. Her description of a specific audit focussing on the Guidelines has not otherwise been identified for the Inquiry by the Trust, although Dr. Hogan has indicated that she was aware of ongoing audits, as noted above. Further steps have been taken by the Inquiry to investigate the nature of this audit referred to by Dr. Bell and the results which it produced.

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186 Ref: 329-018-010
187 Ref: 329-018-010
188 WS-364/1, page 4, Q4(b)
189 WS-364/1, page 5, Q4(e)(i)
190 WS-366/1, page 5, Q4(e)
191 WS-364/1, page 6, Q5(b)&(d)
192 WS-364/1, page 4, Q3(c)(iv)

217. The fourth initiative which the Trust has identified as a device to ensure compliance with the 2002 Guidelines was an audit of resuscitation led by Dr. A. Chillingworth. Dr. Chillingworth has explained that she designed this audit with Dr. Jonathan Davis.[193] The purpose of the audit was to establish the incidence and outcomes of paediatric resuscitation in CAH. When asked specifically whether the audit was used to ascertain whether clinicians and nursing staff complied with the Guidelines, she answered clearly that it was not:

> *"[This] included a review of all paediatric resuscitations between April-July 2005. The audit included the use of IV fluids."*[194]
>
> *"The Advanced Paediatric Life Support Guidelines (current version in 2005) were used as the standards in the audit. We did not compare data directly with the Chief Medical Officer's Guidance on the Prevention of Hyponatraemia in Children."*[195](emphasis added)

218. The Inquiry has been advised by the Trust that the audit demonstrated that in all cases examined the clinical features of shock were documented, and that normal saline was used in an appropriate volume.[196]

219. When asked specifically about the issue of audit, Dr. Lowry has explained to the Inquiry that he cannot recall whether an audit was carried out to monitor compliance with the Guidelines. However, he has stated that fluid balance charts were regularly the subject of audit. He has provided the Inquiry with the minutes of a morbidity/mortality and audit meeting from 14th December 2001, before the publication of the Guidelines, at which the results of a pilot project were discussed. [197]

220. The function of the pilot project was to establish if fluid charts were fully completed and calculated accurately. It is unclear whether this study took place in paediatrics or in adult medicine. The two clinicians referred to (Mr. Mackle and Mr. Hewitt) work in General Surgery.

221. The outcome of the pilot was that none of the five charts piloted met all of the criteria. It is unclear whether further steps were taken on an ongoing basis to check completion of fluid balance sheets, amongst either children or adult patients. The Inquiry has not been provided with any material to indicate that it was.

193 WS-365/1, page 5, Q4(a)
194 Ref: 329-018-010
195 WS-365/1, page 5, Q4(e)
196 Ref: 329-018-010
197 WS-350/2, page 5, Q3(d)

222. Accordingly, it may be reasonable to conclude that following the publication of the 2002 Guidelines, the only audit which was undertaken in order to specifically assess compliance with the Guidelines, or more broadly, to examine the completion of fluid balance charts, was the regional audit conducted by Dr. McAloon. As will be described elsewhere in this document, since the publication of the 2007 Guidelines the Trust has engaged in a thorough and ongoing audit of compliance.

XIII. Teaching/Induction

Before the Guidelines were Published

223. The documentation provided to the Inquiry on behalf of the Southern Trust indicates that the principles and techniques associated with safe fluid management were included as part of the training for some members of staff even before it became a matter of wider concern in mid-2001.

224. Dr. Lowry has explained that he gave regular lectures to theatre and recovery nursing staff on paediatric anaesthesia (including fluid management).[198] In particular, the Inquiry has been referred to a power-point presentation developed by Dr. Lowry *("Paediatric Anaesthesia")* in November 2000 and which was delivered in the form of a presentation to theatre and recovery nurses and anaesthetic trainees over a number of years.[199]

225. Within this document information is provided with regard to the appropriate fluid solutions to use when delivering a bolus of IV fluids,[200] a formula is given for calculating maintenance IV fluids,[201] and particular advice is given with regard to the use of crystalloids.[202]

226. In that latter section of the document, the point is made that Solution No. 18 is appropriate for maintenance only. Plainly, that advice was to change by the time that Drs. Smith and Lowry had developed their protocol in late 2001. The document also refers to the risk that hyponatraemia might develop as a result of the syndrome of inappropriate anti diuretic hormone is also highlighted: *"beware hyponatraemia due to stress response."*

Following Publication of the Guidelines

227. As noted above, the Inquiry has been told by the Trust that it has been unable to locate any records (whether correspondence, memos, handbooks etc) to

198 WS-350/2, page 4, Q2(c)
199 Ref:329-014-007
200 Ref: 329-014-015
201 Ref: 329-014-016
202 Ref: 329-014-017

demonstrate how the Guidelines were taken forward.[203] Moreover, no witness has told the Inquiry that the Guidelines were formally launched to the staff, or that any particular statement was made to the staff about their applicability and importance.

228. Nevertheless, after the publication of the Guidelines in March 2002 it would appear that a number of steps were taken to publicise the dangers of hyponatraemia, and to emphasise the principles of safe fluid practice. The Inquiry has been unable to confirm whether this work was carried out with particular reference to the Guidelines since the documentation provided to the Inquiry on these subjects is general in nature and does not refer specifically to the Guidelines as such.

229. The following is an extract taken from the orientation manual for Craigavon's Department of Anaesthesia (August 2002):

> *"The myth that children should only be given No. 18 solution is exactly that – a myth. Under no circumstances give a child hypotonic fluids (e.g. No. 18 solution, half-normal saline or 5% dextrose) perioperatively in theatre, post-op on the wards or in A&E for resuscitation….If you give hypotonic fluids to these children their plasma sodium can fall to dangerous levels leading to nausea, drowsiness, fitting and even death. This is not a theoretical risk – a child recently died after an appendicectomy in a local hospital because they were given No. 18 solution postoperatively. Please use Hartmann's solution or Normal Saline…."*[204]

230. It would appear that this guidance was written by Dr. Lowry who has explained to the Inquiry how he wrote a chapter for the induction manual for trainee anaesthetists, and supplemented this with handouts which were included in their induction pack.[205]

231. Such advice appears to have been supplemented for anaesthetic trainees by the inclusion in the Friday seminar programme of topics such as electrolytes/blood components.[206]

232. Given the prominent role played by Dr. Lowry in publicising the importance of careful fluid management, and the risk of hyponatraemia, it is perhaps surprising that he has been unable to recall any steps taken by him (whether individually or as part of a group) to implement the Guidelines after they were published in March 2002.[207] He believes that in his role as Consultant Anaesthetist that he would have received the correspondence issued by the

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203 Ref: 329-018-005
204 Ref: 329-014-061
205 WS-350/1, page 5, Q3(k)
206 Ref: 329-014-063
207 WS-350/2, page 5, Q3(e)

CMO on 25th March 2002[208] which introduced the Guidelines, but he has no particular recollection of this.

233. By contrast, Dr. Smith recalls receiving an email and a letter containing an A4 sized version of the poster containing the Guidelines, although he does not recall who sent him these.[209] He did not receive any training in relation to the Guidelines and nor was he provided with any documentation addressing the use or application of the Guidelines.[210]

234. Nevertheless, Dr. Smith recalls that alongside Dr. Lowry he took steps to advance the implementation of the Guidelines in Craigavon:

> *"I combined this Guidance with our paediatric protocol on IVF use and trained our junior doctors at each induction in August and February each year. Posters of the Guidance were placed in the treatment rooms and resuscitation areas of the paediatric ward and children's area of the Emergency Department. I was assisted by Dr. Lowry from Anaesthetics. I also provided training sessions for the anaesthetic trainees. My training sessions were reported to the Postgraduate Supervisor for the Paediatric trainees."*[211]

235. The Inquiry has been advised that relevant information and guidance was also developed for medical trainees at CAH. The Inquiry has been provided with the programme of tutorials which were provided to medical senior house officers from 2001-2007.[212] In each year for which records have been provided medical SHO's appear to have received a tutorial on the subject of hyponatraemia, delivered by Dr. Peter Sharpe.

236. It seems probable that Dr. Sharpe's input must have been restricted to the management of adults with hyponatraemia. He has advised the Inquiry that he is considered to be an expert in the field of adult fluid management, whereas he does not provide advice on paediatric fluid management or hyponatraemia.[213]

237. The Inquiry has also been provided with a power point presentation (dated 2003) which deals with the topic of hyponatraemia. The cover sheet has been annotated with a note indicating that the presentation has been used as part of the medical induction programme at Craigavon from 2003 onwards.[214] The presentation specifically focuses on hyponatraemia in the adult patient, and it provides guidance on appropriate investigations, diagnosis and management.

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208 WS-350/2, page 5, Q3(a)
209 WS-357/1, page 9, Q6
210 WS-357/1, page 9-10, Q7&8
211 WS-357/2, page 5, Q3(e)
212 Ref: 329-014-065 – 329-014-070
213 WS-359/1, page 4
214 Ref: 329-014-071

238. The Drugs and Therapeutics Committee at Craigavon also developed a power point presentation (dated 2004) which is described as "*The Good Prescribing Guide*".[215] The Inquiry has been advised that this was delivered as part of the generic induction programmes. The document provides general advice in relation to the principles of good prescribing, including how to make appropriate records.

239. In 2003, a PowerPoint presentation was developed in relation to IV fluid and electrolyte management.[216] The Inquiry has been told that this formed part of the pre-registration house officer induction programme.[217] The presentation is a detailed overview of various fluid related issues including clinical assessment, the use of intravenous fluids and particular fluid and electrolyte issues including hyponatraemia. It is noted within the document that children are at increased risk of hyponatraemia.[218]

240. The Inquiry has also been provided with the pre-registration house officer programme sheets for the years 2003, 2005 and 2006. Reference is made on that programme in August 2003 to "IV Fluids and Electrolytes" although the time allotted for that topic was apparently only 15 minutes.[219] In subsequent years (e.g. 2005), the topic was described as "Intravenous Fluid Management" and 1 hour was allocated to it.[220]

241. Hyponatraemia was covered as a specific topic during the generic induction programme for junior medical staff in 2005[221] and 2006[222], but the time spent on the issue again appears to have been limited.

XIV. New Members of Staff

242. It may be of assistance in charting the impact made by the publication of the Guidelines, to consider the reported experiences of a new member of staff taking up a post in CAH after the introduction of the Guidelines.

243. Dr. Jonathan Davis started working as a Senior House Officer in Paediatrics in August 2004.[223] He has explained that he cannot recall ever receiving training

215 Ref: 329-014-080
216 Ref: 329-014-084 - the Inquiry has been provided with a second such presentation which is slightly different in content: 329-014-098
217 Ref: 329-014-003
218 Ref: 329-014-093
219 Ref: 329-014-011
220 Ref: 329-014-113
221 Ref: 329-014-118
222 Ref: 329-014-120
223 WS-366/1, page 2, Q1(b)

in the use or application of the Guidelines, or any written information on the subject.[224]

244. However, he has stated "*the administration of fluids was included in the on-going education programme" at CAH,* and that "*an emphasis [was] always placed on correct fluid administration and observation both clinically and biochemically."*[225]

245. While it is probable that trainees and new members of staff who attended the induction programmes after March 2002 were receiving up to date information about the principles of safe fluid practice, it is less clear whether they were being referred directly to the Guidelines.

246. It may be the case that safe fluid management practice for children in general was the subject of greater scrutiny in the Paediatric Department as compared to other units in the Hospital which might have cared for children and young people.

247. It is unclear to the Inquiry whether established clinicians were being directed to update their knowledge of safe fluid management, let alone being referred to the Guidelines. These are issues which may be further explored at the Oral Hearings.

XV. Conor's Attendance at the CAH

Background

248. 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-*

[224] WS-366/1, page 6, Q5&6
[225] WS-366/1, page 4, Q3

*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."*[226]

** In fact Conor was found to weigh 22 kg on admission to CAH.

249. 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 8th May 2003, his general practitioner decided that it would be prudent to refer him to hospital.

250. A deposition provided by Ms. Mitchell at the time of the Coroner's Inquest helpfully summarises the events which occurred prior to Conor's admission to the CAH[227] :-

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

(ii) 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.

(iii) 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.

(iv) On 2 May, Conor was examined by Dr. Doyle (General Practitioner) of Moore's 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.

(v) 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.

226 Ref: 087-002-014
227 Ref: 087-002-015 - 018

(vi) 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.

(vii) 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.

(viii) 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.

(ix) 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.

(x) On 8 May, Conor appeared lethargic and unwell. At 10:00, Dr. Doyle made a house call and examined Conor. She advised that Conor should be brought to hospital for blood tests and observation.

251. Dr. Doyle prepared a referral letter indicating *"Referral to RBHSC,"* indicating that she assumed that Conor would be brought to the RBHSC.."[228] 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 CAH

252. Conor was brought to the A&E Department of the CAH where he was seen at 10:51. 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.[229]

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228 Ref: 088-002-022

229 Ref: 087-002-031

253. 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.

254. As appears from the records of the Emergency Department, Conor was seen by Dr. Suzie Budd (Staff Grade Doctor in A&E) and by Staff Nurse Carragher.[230]

255. The Inquiry's understanding of the events which took place in the Emergency Department is assisted by the depositions taken from Dr. Budd[231] and Ms. Mitchell[232] at the Coroner's Inquest into Conor's death.

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

257. 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.[233] Dr. Budd has said that the results demonstrated that Conor was not hypoglycaemic and that there was no acidosis.[234]

258. In her deposition, Dr. Budd has stated that paracetamol was given and that she recommended intravenous antibiotics. However, she has stated that she could not obtain consent from Conor's family to administer the antibiotics. Subsequently, when Conor was admitted on to the ward, antibiotics were accepted and administered.

259. Whilst in the 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.

260. 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

230 Ref: 088-002-020 & -021
231 Ref: 087-029-133
232 Ref: 087-002-013
233 Ref: 088-002-023
234 Ref: 087-029-133

cannula but might be an atypical seizure activity.[235] Ms. Mitchell has stated that what she saw was "*a completely untypical seizure…*"[236]

261. 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.[237]

Fluid Management in the Emergency Department

262. The fluids which were ordered by the medical staff in the Emergency Department and later in MAU are documented on a prescription chart at Ref: 088-004-064.

263. On this document, it can be seen that 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 to be given at 11:20 and 110 ml to be given at 11:45.

264. The intake/output chart can be found at Ref: 088-004-063. As with the document at Ref: 088-004-064 there is a reference to 110 ml of Hartmann's being erected at 11:20 and again at 11:45. However, on this document 110mls was written for a third time in the "volume erected" column, alongside 12 mid-day. It is unclear why this was done. The "volume in" column records two entries each of 110ml.

265. The intake/output chart is also supposed to record episodes of output whether in the form of urine, faeces or vomit. No details relating to Conor's output have been recorded, whether during his time in the Emergency Department or later.

266. As noted above, Dr. Budd has stated that she was unfamiliar with the Guidelines until recently. However, having been referred to the stepped approach described in the Guidelines – baseline assessment, fluid requirements, choice of fluid and monitor – she has asserted that she did apply the principles of those Guidelines in her management of Conor's fluids.

267. Under "baseline assessment", Dr. Budd has explained that she took a history, performed an examination, obtained Conor's weight and took blood tests including urea and electrolytes and an emergency venous gas.[238]

268. The venous gas sample taken shortly after Conor's arrival at the Emergency Department demonstrated a serum sodium of 135.7 mmol/L.[239] The

235 Ref: 087-027-127
236 Ref: 087-002-019
237 Ref: 087-027-128
238 WS-352/1, page 12
239 Ref: 088-004-036

preliminary biochemistry results are timed at 12:09, that is, after the initial administration of intravenous fluids. It is unclear whether this is the time of the result or whether it is the time that the sample was taken. At that time Conor's serum sodium measured 138.0 mmol/L[240]

269. Dr. Budd has gone on to describe Conor's fluid requirements. She regarded him as a patient who needed emergency management of shock.[241] She has explained her approach:

> *"After reading the GP referral letter, the nursing triage sheet, taking a history from his family and performing an examination, I concluded that Conor needed a fluid bolus on the basis of his clinical condition. I was concerned with his apparent rapid deterioration in the level of consciousness (as per his family) given his history of vomiting and poor oral intake. I was concerned that this was indicative of developing shock."*[242]

270. Dr. Budd has said that her approach was informed by the APLS Guidelines:

> *"...APLS Guidelines suggested fluid of 20 mls/kg should be rapidly given in cases of shock. I prescribed Conor a 10mls/kg bolus (220 mls) to be given (2 x 110 mls) via Burette (not a syringed push) to allow for closer monitoring, taking into consideration his cerebral compromise and cardiovascular status..."*[243]

271. Under "choice of fluid" Dr. Budd has said that she selected Hartmann's because of its isotonic properties. She has told the Inquiry that this was a fluid recommended by APLS as appropriate in a resuscitation situation.[244] She administered the fluid as a bolus (delivering the fluid over half an hour) because her objective was to *"prevent Conor's further deterioration to uncompensated shock."*[245]

272. Dr. Budd has assisted the Inquiry by clarifying the entries made on the prescription sheet and the intake/output chart. She made the first entry on the prescription sheet, indicating 220mls of Hartmann's to be given over half an hour. She did not make the entry in the "nurses' signatures" column. She failed to sign the prescription in the "prescribers" column and she has acknowledged this omission.[246]

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240 Ref: 088-002-023
241 WS-352/1, page 12
242 WS-352/1, page 7, Q5(a)
243 WS-352/1, page 7, Q5(b)
244 WS-352/1, page 7, Q5(e)
245 WS-352/1, page 7, Q5(g)
246 WS-352/1, page 9, Q8(b)

Concerns about Fluid Management in the Emergency Department

273. In her evidence to the Inquest, Ms. Mitchell expressed the view that when Conor was being cared for in the Emergency Department *"Conor received approximately 440ml of IV rehydration fluids in one hour."* She also told the Coroner that Conor's grandmother thought that she observed his face looking *"swollen and puffy"*.[247]

274. In her evidence to the Inquest Conor's grandmother Ms. Judy Mitchell stated that Conor received three syringes of fluid when he was treated in the Emergency Department, each of 110ml.[248]

275. This was similar to the account given to the Coroner by Dr. Catherine Quinn (who prescribed fluids for Conor when he was later admitted to MAU). At that time she recalled that Conor received "*three syringes of fluid in A&E.*"[249] However, in the statement which she provided to the Inquiry, Dr. Quinn has corrected her earlier account and stated that two syringes were given.[250]

276. In his statement to the Inquiry, Dr. Murdock has suggested that Conor may have received a 400ml bolus in the Emergency Department.[251]

277. Dr. Budd has addressed the uncertainty about volume, and the question of whether the fluids given had any impact on Conor's appearance.

278. Firstly, she is clear in her view that she prescribed 220mls only, and that this is what he received over a period of about 40 minutes.[252]

279. When referred to the third entry of 110mls on "volume erected" column of the intake/output chart, Dr. Budd told the Inquiry that she did not make this entry. On one view the fact that someone chose to write in a third entry of 110mls of Hartmann's might suggest that a total of 330mls had been infused, but Dr. Budd is adamant that this is not what was given and it was certainly not what she prescribed. She has properly referred to the fact that the total amount of Hartmann's showing within the "volume in" column at Ref: 088-004-063 of the intake/output chart would seem to support her position that only 220mls which she says she was administered.[253]

280. Secondly, Dr. Budd has said that she certainly did not observe Conor's face looking swollen or puffy, and nor was this drawn to her attention.[254]

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247 Ref: 087-002-018
248 Ref: 087-004-044
249 Ref: 087-015-044
250 WS-356/1, page 5, Q5
251 WS-355/1, page 8, Q4(c)
252 WS-352/1, page 10, Q13(a)&(b)
253 WS-352/1, page 9, Q9(a)
254 WS-352/1, page 10, Q13(c)

Likewise, Dr. Quinn who clerked Conor into MAU shortly after he left the Emergency Department did not observe any abnormality.[255]

Concerns Identified by Dr. Robert Scott-Jupp

281. In his preliminary report, Dr. Scott-Jupp examined the management of Conor's intravenous fluids in the Emergency Department under each of the headings set out in the Guidelines.

282. With regard to baseline assessment, Dr. Scott-Jupp was satisfied that the requirements of the Guidelines were complied with. He noted that Conor's weight was recorded, although he was uncertain whether Conor was actually weighed or whether an estimate had been taken.[256]

283. He also noted that Conor's urea and electrolytes were measured. He thought that it was unlikely that those results were known about at the time when the fluid resuscitation was started. However, he observed that staff also took an arterial gas sample at 10:59 and although such tests can be unreliable as regards sodium he considered that staff may have thought those results to be sufficient to plan for fluid resuscitation.[257]

284. Dr. Scott-Jupp next considered the issues arising under the 'fluid requirements' section of the Guidelines. He identified a number of concerns.

285. Firstly, he noted that Conor was not seen by a Paediatrician for the purposes of assessing his fluid needs, yet the Guidelines emphasised the importance of obtaining input from a doctor competent in determining a child's fluid requirement. Dr. Scott Jupp has expressed the opinion that none of the doctors who saw Conor in the Emergency Department or MAU *"are likely to have had the necessary skills, particularly in assessing a disabled child."*[258]

286. The Trust has rejected that criticism by stating that if a Paediatrician was required the service would not be deliverable:

> *"The strategic context issue is that if all children presenting to DGH Emergency Departments were required to be assessed by a paediatrician this could have a significant implication for most non specialist general hospitals within the region as there would be insufficient paediatric medical workforce to deliver this…"*[259]

255 WS-356/1, page 8
256 Ref: 260-002-012
257 Ref: 260-002-012
258 Ref: 260-002-013
259 Ref: 329-033-005

287. In his supplementary report, Dr. Scott-Jupp has accepted that he had earlier underestimated Dr. Budd's degree of experience and specialty. Nevertheless, he is of the view that the Trust's response to his broader concern is overstated:

> *"…I maintain that neither the ED (emergency department) staff, nor the adult medical doctors who subsequently saw him, were best placed to manage his fluids after the immediate resuscitation."*[260]

288. In terms of Conor's actual fluid requirements when he was seen in the Emergency Department, Dr. Scott Jupp considers that the quantity prescribed (10 ml/kg) was appropriate for his weight, on the assumption that resuscitation fluids were required.[261] However, he has expressed the view that the fluids were given rather more slowly than would be typical for a resuscitation fluid so that in essence they were *"given as a replacement fluid not a resuscitation fluid."*[262]He has said that *"there is confusion between resuscitation and replacement fluid."*[263]

289. Having considered the witness statement of Dr. Budd, Dr. Scott-Jupp has reiterated his position:

> *"She also justifies taking 40 minutes to deliver this bolus although she intended to give it over 30 minutes. In my view this is longer than the time normally taken to deliver a resuscitation fluid bolus in paediatric practice in 2003, which would be over 10-15 minutes. However, it was not unacceptably long."*[264]

290. Dr. Scott-Jupp has expressed some mild concerns about what he views as non-compliance with the 'choice of fluid' provisions of the Guidelines. Applying the Guidelines he is of the view that normal saline should have been administered if Conor was considered to be in shock:

> *"Regarding resuscitation fluid, they chose to use Hartmann's rather than normal saline and therefore in this respect they did not comply with the guidelines. However, as Conor was not in clinical shock, this stipulation in the Guideline was not applicable. The 'resuscitation' fluid given was effectively replacement fluid."*[265]

291. As noted above, Dr. Budd explained in her statement that she selected Hartmann's because of its isotonic properties. She is supported in her approach by the Trust who have responded to Dr. Scott-Jupp's concern in the following terms:

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260 Ref: 260-004-006, Comment 6.
261 Ref: 260-002-013
262 Ref: 260-002-013
263 Ref: 260-002-015
264 Ref: 260-004-002
265 Ref: 260-002-016

> *"In the covering letter from the CMO [25 March 2002 – Ref: 007-001-001] that accompanied the 2002 Guidelines the following it (sic) is stated in paragraph 5:*
>
> *'The Guidance is designed to provide general advice* ***and does not specify particular fluid choices"***
>
> *"The accompanying guideline states 'When resuscitating a child with clinical signs of shock, if a decision is made to administer a crystalloid, normal 0.9% saline is an appropriate choice while awaiting the serum sodium."*
>
> *"Thus, by inference and explicitly, Hartmanns would also have been an appropriate choice as the guidance did not specify a particular crystalloid."*[266] *(emphasis as per original)*

292. Dr. Scott-Jupp accepts that there is space for flexibility in the Guideline in this respect. However, he has stated:

> *"…I was interpreting the wording of the guideline literally (ie. Part 3 under 'Choice of Fluid'). I fully accept that Hartmann's is an entirely acceptable fluid to use in this circumstances. However, strictly speaking although using Hartmann's was an appropriate action, the guideline was not complied with in this respect…"*[267]

293. Dr. Scott-Jupp has also reflected his concerns in respect of the application of the 'monitor' provisions of the Guidelines:

> *"Conor's clinical state, particularly his degree of dehydration was not well monitored. In the initial Emergency Department assessment, he was said to be dehydrated on examination but the physical signs of this are not described (088-002-020). Subsequently on his admission to the MAU, he was said to be 'dry' but again the signs are not listed (088-004-045). His pulse and blood pressure were normal so he was not in a hypovolaemic shock as a result of dehydration. No attempt was made to quantify his urine output prior to his arrival at hospital was made."*[268]

294. Dr. Budd told the Inquest into Conor's death that she considered him to be 5% dehydrated, that is, mildly dehydrated.[269] In her witness statement for the Inquiry, she has explained how she reached that view, although she accepts that some of the factors that she took into account such as capillary refill time and her assessment of skin turgor were not recorded in Conor's notes.[270]

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266 Ref: 329-033-004
267 Ref: 260-004-006, Comment 4
268 Ref: 260-002-017
269 Ref: 087-029-135
270 WS-352/1, page 5, Q3(a)

295. Dr. Scott-Jupp considers that to make a full and proper assessment of a child's hydration status the following should be examined and documented:

> *"…urine output, urine concentration either observed or measured, vital signs, presence or absence of sunken eyes, dry tongue, loss of skin turgor. Also the patient's conscious level and responsiveness is important, although in Conor this would have been difficult for a doctor unfamiliar with him to assess. None of these were recorded apart from a mention of him being 'drowsy' on admission."*[271]

296. Dr. Budd assessed some of these factors, but clearly not all of them. Dr. Scott-Jupp opines the monitoring of Conor's clinical state did not comply with the Guidelines. In particular, he has stated that *"the failure to make a more accurate assessment of his state of hydration could have led to either excessive or inadequate fluid replacement, or to replacement with fluid that contained an inappropriate electrolyte content."*[272]

Referral to Paediatrics

297. 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*."[273] 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.[274]

298. Dr. Michael Smith has described the policy which would have underpinned the decision to admit Conor to an adult ward:

> *"The hospital followed the Northern Ireland guideline at the time for ward admissions in which the upper age limit was the day before the 14th birthday. This was the policy for all general paediatric wards at the time. The only exceptions to this rule were patients around this age with chronic illnesses who were regularly under the care of a paediatrician and in the process of transitioning to adult care"*[275]

299. In her witness statement Dr. Budd has expanded on this issue:

> *"I considered that given that he had the physiological status of an 8 year old, he would benefit from care under the specialist paediatric team. I intended him to be admitted there...*

271 Ref: 260-002-017
272 Ref: 260-002-018
273 Ref: 088-002-020
274 Ref: 087-029-134
275 WS-357/1, page 4, Q3(a)

> *"I bleeped the Admissions SHO on the Paediatric Ward and spoke to him or her on the telephone. After initial refusal, I requested the SHO to discuss the case further with a senior colleague. I believe that my request for Conor's admission was discussed with the Paediatric Consultant. As a result I was told Conor could not go to the Paediatric Ward as he was over 13 years old and was not under continuing care of one of the Paediatric Consultants..."*[276]

300. Dr. Quinn (who clerked Conor into the MAU) recalls that she was aware of this debate. She has explained that because Conor was older than 14 years and not under the care of a Paediatrician as an outpatient, she initially thought the decision to admit him to an adult ward was reasonable. However, that was before she attended with Conor and before she realised that he had the body habitus of an eight year old.

301. Dr. Andrew Murdock (who also saw Conor in MAU) cannot remember discussing the question of the appropriateness of Conor's admission to an adult ward. However, he recalls that having examined Conor and advised on his fluids, he directed Dr. Quinn to contact the paediatric team to discuss the suitability of that fluid prescription.[277] Dr. Murdock noted his directions at the time: *"D/W Paeds re rate."*[278]

302. Dr. Scott-Jupp is firmly of the view that Conor ought to have been admitted and managed in a paediatric setting. In his preliminary report he has explained in detail the kinds of benefits which might have accrued had he been treated on a Paediatric Ward:

    (i) Greater attention might have been given to early diagnosis of a urinary tract infection

    (ii) A different antibiotic requiring less volume of fluid is likely to have been prescribed

    (iii) It is likely that he would have been treated throughout with Normal Saline, both for immediate resuscitation and maintenance

    (iv) When the cannula extravascited (as described below), it is likely to have been re-sited more quickly

    (v) Conor's seizures might have been noted and addressed sooner by paediatric nursing and medical staff

    (vi) There might have been better support for Conor's family

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276 WS-352/1, page 6, Q4
277 WS-355/1, page 8, Q3(g)
278 Ref: 088-004-045

303. Since it has emerged that none of the clinicians caring for Conor had any familiarity with the Guidelines, and whereas the evidence gathered by the Inquiry suggests that amongst the Paediatric staff particular attention had been given to careful fluid management after the publication of the Guidelines, it is also possible that Conor's fluids would have been managed with those Guidelines in mind, had he been treated in a Paediatric setting.

304. The Trust has taken issue with Dr. Scott-Jupp on the question of the appropriateness of his admission to an adult ward. The Trust contends that in 2003 and indeed currently, *"[it is not] unusual to have 14 years as a cut-off point for choosing between an adult and children's ward."*[279] It refers to a number of RQIA documents to support its point. The Trust has also advanced the proposition that upper limit for referral to RBHSC was 13 years chronological age and not physiological age at that time.[280]

305. Having considered the Trust's position Dr. Scott-Jupp continues to hold the view that Conor was inappropriately admitted to an adult ward. In his supplementary report he has said:

> *"…I still find it surprising that more flexibility was not shown. In this particular situation, where it should have been obvious to all concerned that this was a very immature, child-like 15 year old, I would have expected greater flexibility both at Craigavon and in Belfast. I do not believe that age cut-offs should have been so rigidly applied."*[281]

306. Plainly, the General Practitioner thought that it ought to have been possible to admit Conor into a Paediatric Ward, hence his original referral to RBHSC. Dr. Budd was also of the view that a Paediatric admission as most appropriate.

307. Moreover, despite what has been suggested by the Trust (that it would not have been possible to transfer Conor to PICU) in fact what transpired was that flexibility was shown in Belfast. Having been assured of Conor's physical immaturity the RBHSC decided that they could offer him a bed in the Paediatric Intensive Care Unit.[282]

308. The Trust has explained to the Inquiry that under a strategy called "Changing for Children" it is taking steps to engage with its commissioning body to secure funding to increase the age limits on its Paediatric Wards.[283]

309. Dr. Scott-Jupp is unimpressed with the pace of progress in Northern Ireland compared with Great Britain. He has explained that very few Paediatric Units

279 Ref: 329-033-006
280 Ref: 329-033-006
281 Ref: 260-004-007, Comment 7
282 Ref: 088-004-073
283 Ref: 329-033-008

in district general hospitals in England in 2003 had an age 14 as a cut-off. He has stated that most applied the age of 16 as a cut off, and a similar approach was adopted in most PICUs and specialist children's hospitals.[284]

310. Given the expertise to be found in Paediatric Wards in relation to important clinical issues such as fluid management in children, Dr. Scott-Jupp's observations are obviously pertinent to the Inquiry's considerations.

Staff Nurse Ruth Bullas

311. Sister Irene Brennan (nee Dickey) explained to the Coroner in her deposition that she was the senior nurse on the ward on the afternoon of 8th May 2003.[285] However, in her witness statement for the Inquiry, Sister Brennan has stated that Sister Lorna Cullen was the most senior nurse on duty on the Ward on the 8 May.[286]

312. Sister Cullen has explained the allocation of responsibility on MAU:

> *"Each wing of MAU is divided into two teams. There is a nurse in charge on each wing who allocates nursing staff to work in each team and this is done at the beginning of each shift. The nurse in charge on both wings liaise with me on a regular basis to update me on the status of each patient."*[287]

313. She maintains that it was Sister Brennan's responsibility to supervise the nursing care afforded to Conor because she was in charge of the front wing of MAU.[288]

314. Consistent with this, Sister Brennan appears to have allocated Staff Nurse Bullas to the care of Conor. Staff Nurse Bullas admitted Conor to the MAU where he was accommodated in a side room within the ward. This was an adult ward.

315. Staff Nurse Bullas made a note which she timed at 13:30 relating to Conor's history and presentation at the time of admission.[289] It is recorded that Conor was observed to be having spasms "*several times*" and that he had been seen by the senior house officer.

316. Ms. Mitchell has alleged that Conor was in fact suffering seizures throughout the afternoon of 8th May and that her concerns about this were not appropriately addressed. In this regard she registered a complaint to the Nursing and Midwifery Council ('NMC') against Staff Nurse Bullas in which

284 Ref: 260-004-007, Comment 7
285 Ref: 087-021-101
286 WS-353/1, page 9, Q6
287 WS-374/1, page 4, Q1(f)
288 WS-374/1, page 5, Q6
289 Ref: 088-004-091

she alleged, inter alia, that Staff Nurse Bullas failed to document her complaints about seizures, failed to escalate them to a senior member of staff. In a hearing which took place in the absence of Staff Nurse Bullas this complaint was upheld, and the NMC found that her fitness to practice was impaired. The NMC decided that the appropriate sanction was to remove her from the nursing register.

317. The Inquiry understands that Staff Nurse Bullas is now living overseas. It has taken steps to notify her of these Oral Hearings. She has been asked to contact the Inquiry and has recently done so.

Conor's Admission to the MAU

318. The senior house officer in MAU was Dr. Catherine Quinn (Medical SHO). She made a note of her attendance with Conor[290] and she also provided a deposition to the Coroner.[291]

319. 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. This issue is explored in the passage below.

320. 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 which was delivered intravenously in 200ml of fluid. Dr. Scott-Jupp has expressed concerns about the use of this anti-biotic. He is commented that it was an unusual choice in a paediatric setting.[292] He has noted that its use contributed to Conor's fluid load since it was delivered intravenously in 200ml of fluid.

321. Dr. Quinn asked the Medical Registrar to see Conor. 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[293]. He also made a note of his attendance with Conor.[294]

322. 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

290 Ref: 088-004-037 & 038
291 Ref: 087-015-081
292 Ref: 260-004-005
293 Ref: 087-025-116
294 Ref: 088-004-045

Conor to continue with the course of antibiotics which had been started by Dr. Quinn and he directed Dr. Quinn in relation to the prescription of intravenous fluids. The management of Conor's intravenous fluids in MAU is examined in the section below.

323. Ms. Mitchell was dissatisfied with the care afforded to Conor in MAU on the afternoon of 8th May. She was concerned that he was deteriorating.

324. At or around 18:30 Conor was again seen by Dr. Murdock. Concern had been expressed by Ms. Mitchell about a rash on Conor's abdomen. The nursing notes also refer to episodes of spasm. Dr. Murdock found no abnormalities on the abdomen.[295] After concluding his examination, he reported Conor's history to Dr. David McEneaney (Consultant Cardiologist) with a view to determining whether a transfer to the RBHSC was indicated, as this had been requested by Ms. Mitchell.[296] Dr. McEneaney expressed himself satisfied with Conor's current management but it was agreed that Conor should be seen by a member of the Paediatric team.

325. 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.[297]

Conor's Condition Deteriorates

326. 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.[298] 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.[299]

327. Dr. Murdock was present at the time of the second seizure. Dr. Michael Smith 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[300], and he has also addressed those events in his deposition where he has stated[301] :-

295 Ref: 088-004-046
296 Ref: 087-002-020
297 Ref: 088-004-047
298 Ref: 087-035-166
299 Ref: 087-035-164
300 Ref: 088-004-119
301 Ref: 087-025-119

> *"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 intravenous Acyclovir was given with the dosage being calculated from the British National Formula."*[302]

328. The anaesthetist who attended Conor was Dr. Aoibhin Hutchinson (Specialist Registrar Anaesthesia) who provided an account of her involvement in a statement dated 28th October 2003.[303]

329. 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*."[304] In his opinion, there were appearances which were suggestive of subarachnoid blood. Dr. Rice has also provided an account of his involvement in his deposition to the Coroner.[305]

330. The scan was sent electronically to the Neurosurgical 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.[306]

331. 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."*[307] 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.[308]

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302 Ref: 087-025-119
303 Ref: 087-054-197
304 Ref: 088-004-050. The typed version of the report appears at Ref: 088-004-131
305 Ref: 087-046-185
306 Ref: 088-004-055
307 Ref: 088-004-049
308 Ref: 088-004-052 & 053

Fluid Management in MAU

332. As noted above, the fluids which were ordered by the medical staff prior to Conor's collapse in CAH are recorded at Ref: 088-004-064.

333. On this 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. The records themselves do not help the reader to understand how much, if any, of this fluid prescription was administered. The nurses signature in the right hand column would appear to be that of Staff Nurse Wilkinson.

334. Dr. Quinn has explained her initial prescribing for Conor was based on an assumption that an adult regime might be appropriate:

> *"My fluid plan was recorded on the fluid prescription chart (088-004-064). My first fluid prescription (3 litre normal saline over 24 hours, or 125ml/hr) was based on a usual fluid regime for an adult patient. I did not make any additional calculations. This fluid prescription was not appropriate for Conor's size. This was highlighted by Dr. Murdock during his review and I subsequently changed the prescription to a reduced volume and infusion rate on his advice, as shown on the fluid prescription chart (088-004-064)."*[309]

335. Dr. Murdock has confirmed that he had asked Dr. Quinn to reduce the volume of fluid to be given to Conor and the rate of infusion, because of his low weight and size for his age.[310]

336. Dr. Quinn has stated that none of the original (deleted) prescription was actually infused before the prescription was changed. She is supported in that view by Dr. Murdock.[311] However, this position may not be consistent with the fact that the 1 litre bag was signed for.[312] Furthermore, Staff Nurse Bullas has said that at 1.30pm Conor was receiving intravenous fluids.[313] It is unclear whether this fluid was administered as per the original deleted prescription, or pursuant to the new prescription. What is clear is that the intake/output chart fails to document the fluids given to Conor in MAU until an entry at 4.10pm.[314]

337. The further prescription 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" has been written.". This would appear to convey the direction that 250 ml of normal saline was to be infused over the first 4 hours, followed by 250

309 WS-356/1, page 5-6, Q6
310 WS-355/1, page 8
311 WS-355/1, page 11, Q6
312 Ref: 088-004-064
313 Ref: 087-017-093
314 Ref: 088-004-063

ml over the next 6 hours, and then 250 ml to be given over the next 8 hours. Dr. Quinn appears to have signed as the prescriber. The nursing signatures alongside the entry at "4.10pm" are those of Sister Brennan and Staff Nurse Wilkinson.

338. Dr. Quinn has sought to explain the thinking behind the use of the intravenous fluid regime:

> *"The aim of the IV fluid was to continue fluid replacement and maintain hydration. I was concerned Conor was dehydrated in view of the history of vomiting, poor intake, dehydration noted on examination in A&E and blood urea level at the upper limit of normal (087-015-082)."*[315]

339. The suggestion that the regime adopted was intended to serve the dual purpose of maintenance and replacement is somewhat confusing, and not consistent with the quantity of fluid that was prescribed. Dr. Murdock provides a clearer description of the approach :

> *"I have not documented my reasoning at the time. My recollection is that I wanted to cautious with fluid volume and rate.*
>
> *"Reviewing the case Conor's maintenance fluid volume would have been approximately 1500mls calculated in accordance with the 2002 Guidelines. Upon examination I found Conor to be dehydrated. The fluid deficit would have been approximately 600mls. Conor had already received approximately 400mls bolus and 200mls antibiotic fluid totalling approximately 600mls. A total volume of 750 mls was a reduction in the maintenance fluid to reduce the chance of fluid overload. This volume was below the 2002 guideline limits and would have allowed for further fluid as per intravenous antibiotics and for any oral intake that may have been possible as the patient improved."*[316]

340. Dr. Murdock has added that his thinking was *"to rehydrate slowly and safely avoiding large boluses with opportunity for reassessment/adjustment…"*[317]

341. Dr. Murdock's reference to a 400ml bolus having been administered in the Emergency Department is not supported by the documentation, and is contrary to the account given by Dr. Budd.

342. Dr. Murdock has stated that he asked Dr. Quinn to discuss the fluid prescription with the paediatric registrar in order to obtain confirmation that it was reasonable.[318] He has referred to the relevant entry which he made in Conor's case notes*: "D/W PAEDS RE RATE".*[319]He has recalled that he spoke

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315 Ref: WS-356/1, page 5
316 WS-355/1, page 9, Q4(i)
317 WS-355/1, page 10, Q4(j)
318 WS-355/1, page 10, Q4(k)
319 Ref: 088-004-045

to Dr. Quinn later that afternoon and was reassured that the Paediatricians were happy with the prescription.[320] He did not make a note to that effect. Dr. Quinn has stated that she cannot remember discussing this with the Paediatric team. [321]

343. Dr. Quinn has stated that she did not apply the Guidelines in Conor's case since she was unaware of them. Her answer suggests that she thought the Guidelines were only applicable to the Paediatric setting: "*I did not apply the Guidance as, having never worked in paediatrics, I was not aware of it*." [322]

344. Dr. Murdock cannot remember seeing the Guidelines, and has no recollection of ever receiving training in relation to its application.[323] However, he has asserted that the fluids prescribed for Conor in MAU were appropriate and within the principles set by the Guidelines (although he accepts that the documentation of Conor's fluid regime was deficient):

> *"I assessed Conor, prescribed an acceptable fluid at a rate within 2002 guidelines, sought senior guidance and monitored Conor but unfortunately my documentation in the medical notes should give a fuller account of the process I followed."*[324]

345. The intake/output chart for the period after Conor's admission to MAU can again be found at Ref: 088-004-063. This chart indicates that the venflon became extravasated at 14:00, and that fluids were not then reconnected until 4.10pm. Before then, 200ml of the antibiotic Ciproxin had been administered.

346. The intake/output chart does not provide any detail or description of what fluid was reconnected at 4.10pm: the reader of the document cannot say what type of fluid was reconnected or the volume that was reconnected. The only fluid mentioned by name on this document is the Hartmann's Solution which was infused in the Emergency Department.

347. Sister Brennan was responsible for making that entry. When asked to explain what the entry means she has simply said that it shows that intravenous fluids were recommenced at that time.[325]

348. It took over two hours for fluids to be reconnected after the venflon tissued. 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

320 WS-355/1, page 10, Q4(k)
321 WS-356/1, page 8, Q11
322 Ws-356/1, page 10, Q19
323 WS-355/1, page 14
324 WS-355/1, page 15, Q19(e)
325 WS-353/1, page 10

the family, Dr. Nicholson was contacted and, at 16:00, Dr. Totten attended to reconnect the fluids.[326]

349. Dr. Scott-Jupp has commented on this delay:

> *"In my view this delay was not particularly significant…Conor had already received at least 400-500 ml of IV fluid, which given that he was clearly not in a state of hypovolaemic shock, was a sufficient volume for initial fluid treatment. Thus although the delay in re-siting the cannula was not best practice, and would have been distressing for his family, I do not believe that this of itself contributed to his deterioration and death."*[327]

350. There is entry in the intake/output chart at 5.00pm indicating that 250 ml was the "volume in". It is unclear to what this refers. On one view, this was the amount infused between 4.10pm and 5.00pm, but that would be an exceedingly fast rate since the prescription was for 250ml to be given over 4 hours. Perhaps, the reference to "250" signifies that a new 250ml bag of fluids had been erected. The position remains unexplained.

351. It would appear that fluids were not checked at either 6.00pm or 7.00pm. There is then a further entry timed at 7.40pm which states, *"250 ml normal saline erected to run for 6."*[328] This is consistent with the prescription signed off by Dr. Quinn which provided for a second 250ml bag to be given over 6 hours, after the first 250ml bag had been given.

352. The intake/output chart is completely silent on the question of output. The reader of this chart can only interpret it as suggesting that Conor produced no output whatsoever having received at least 220ml of Hartmann's, Ciproxin in 200ml of fluid, and at least 250ml of Normal Saline. Plainly, that cannot be correct.

353. Indeed, Ms. Mitchell gave evidence to the Inquest that, when Conor was brought up to MAU, the urine bag which had been fitted in the Emergency Unit was overflowing.[329] A further bag was fitted.

354. Sister Brennan has also noted that oral input has not been recorded.[330] It may also be suggested (subject to clarification of the '250' entry) that intravenous input was not recorded during Conor's time in MAU.

355. Sister Brennan has accepted that it was part of her responsibility as Clinical Sister to supervise practice.[331] It appears that Sister Brennan would have had

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326 Ref: 088-004-091
327 Ref: 260-002-007
328 Ref: 088-004-063
329 Ref: 087-002-020
330 Ws—353/1, page 10, Q9
331 WS-353/1, page 8, Q6(b)

an opportunity to observe that Conor's intake/output chart was not being adequately completed since she had cause to make an entry in the chart at or about 4.10pm.

356. Sister Brennan has told the Inquiry that she "*did not observe that Conor's intake and output had not been recorded.*"[332] She is unable to assist the Inquiry in its concern to understand why there was no record made of Conor's fluid output. She concedes that there certainly was fluid output because the nursing notes show that urine samples were obtained for analysis in both the Emergency Department and MAU.

357. In her deposition to the Coroner, Staff Nurse Bullas acknowledged that there was no record of fluid output and conceded that this ought to have been done.[333]

358. Staff Nurse Lavery has explained in his Inquiry statement that responsibility for making a record of Conor's fluid output rested with the nurse who was allocated to his care, or any member of the nursing team who provided care for Conor and who was aware of him passing urine, faeces or vomit. He was not aware of any such output during the period that he was with Conor.[334]

Concerns about Fluid Management in MAU by Dr. Scott Jupp

359. Dr. Scott-Jupp has also examined the management of Conor's fluids in MAU by reference to the Guidelines.

360. Firstly, he accepts that the baseline assessment was properly conducted in MAU. Dr. Quinn and Dr. Murdock would have been aware of Conor's weight because it had been recorded on the chart (at Ref: 088-004-064). They would also have been in a position to note the urea and electrolyte results, and these were written into the MAU admission note at Ref: 088-004-038.

361. Secondly, under 'fluid requirements' Dr. Scott Jupp reiterates the point that an adult medical SHO and registrar were unlikely to have the skills to assess a disabled child.[335] It was perhaps in recognition of a deficit in his skills or experience that Dr. Murdock directed Dr. Quinn to obtain confirmation from the Paediatric team that his fluid prescription was reasonable, although there is some uncertainty in relation to whether his direction was complied with.

362. Turning to Dr. Quinn's initial prescription, Dr. Scott-Jupp has characterised this as "*clearly inappropriate*."[336] This appears to be recognised and accepted by Dr. Quinn, although it is less clear why she thought it appropriate to

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332 WS-353/1, page 11, Q11
333 Ref: 087-017-093
334 WS-351/1, page 10, Q8&9
335 Ref: 260-002-012
336 Ref: 260-002-013

formulate such a prescription in the first place. This may reflect her relative inexperience and her lack of exposure to paediatrics, and perhaps points up the danger referred of admitting and treating patients on the basis of their age rather than their physical composition.

363. In his preliminary report, Dr. Scott-Jupp has set out the appropriate calculation for a maintenance regime by applying the formula set out in the Guidelines to Conor's case. Over 24 hours, the calculation would lead to a total of 1540ml or 63ml/hr. He has characterised the prescription formulated for Conor following Dr. Murdock's intervention as *"actually quite a restricted quanity of fluid."*[337]

364. Dr. Scott-Jupp has expressed concern about the absence of documentation to explain how the prescription was arrived at:

> *"…it appears that the formula given in the guidelines was not used to calculate his maintenance fluids. There is no documentation in the case records of how these quantities and rate were arrived at. In paediatric practice it would be usual to record how a rehydration regime was calculated."*[338]

365. In his supplementary report, Dr. Scott Jupp has considered the witness statement of Dr. Murdock and opined that he has given "*acceptable reasons*" for the quantity and rate which was prescribed.[339] However, he remains concerned that there is a failure to distinguish clearly between maintenance and replacement fluids.

366. This is a theme which Dr. Scott-Jupp first developed in his preliminary report where he expressed a concern that there was a failure to adequately address the issue of replacement fluid. He has commented that *"it was impossible to prescribe an appropriate quantity of replacement fluid without any quantification of his output."*[340] He has noted that there was no estimate of fluid output, and no calculation of estimated replacement requirement.[341] He has gone on to describe the importance of properly investigating the need for replacement fluids:

> *"The need for replacement fluids should have been assessed before the initial infusion was started, and then again at intervals during the day, by clinically assessing his state of hydration and his urine output."*[342]

367. The inadequacy of the documentation of Conor's fluid regime has also attracted Dr. Scott-Jupp's attention. He has criticised the failure to record any

337 Ref: 260-002-013
338 Ref: 260-002-013
339 Ref: 260-004-002
340 Ref: 260-002-014
341 Ref: 260-002-015
342 Ref: 260-002-014

output, and he has identified an "uncertainty" in terms of the volume of fluid actually received by Conor between 11.20am and 7.40pm.[343]

368. The Trust has responded to Dr. Scott-Jupp's report where he has criticised the absence of recording of fluid output.[344] In his supplementary report, Dr. Scott Jupp has emphasised that he accepts that the absence of vomiting is not something would need to be recorded. However, he has explained that his central point was that urine output was not recorded.[345] Plainly, the failure to record urine output betrays the fact that there was no action taken to assess fluid balance.

369. Dr. Scott-Jupp is satisfied with the type of fluid that was infused in MAU. However, he has expressed himself dissatisfied with the compliance with the monitoring requirements stipulated in the Guidelines. He notes that the failure to adequately document the physical signs of dehydration in the Emergency Department, was an error that was repeated in MAU.

370. In his note, Dr. Murdock recorded that Conor was "*dry*" on examination[346] but Dr. Scott Jupp observes that the signs are not listed.[347] He goes on to highlight the fact that no urine specimen was taken for osmolarity or biochemical analysis, and an assessment of urine concentration was not performed. He emphasises that more specific biochemical analysis would have helped to clarify the degree of dehydration and whether there was an ongoing need for fluid replacement.[348]

371. Moreover, Dr. Scott-Jupp is critical of the failure to ensure that Conor was reviewed by a more senior member of staff. He has suggested that this would have been important for a number of reasons, including in relation to Conor's fluid management and for the purposes of determining whether there was seizure activity.[349]

372. The Trust has responded to this by expressing some surprise that Dr. Scott-Jupp should make reference to the issue of the seizures:

> *"On the general issue of seizure activity, the Trust notes that the Inquiry instructed Dr. Scott Jupp to pay specific attention to the following points contained within the fluid management guidance….[Accordingly] the Trust would query whether the inclusion of Dr. Scott-Jupp's comments in relation to seizure activity is in any way relevant to the terms of reference of the Inquiry."*

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343 Ref: 260-002-014
344 Ref: 329-033-008
345 Ref: 260-004-008
346 Ref: 088-004-044
347 Ref: 260-002-017
348 Ref: 260-002-018
349 Ref: 260-002-018

373. It is apposite to set out Dr. Scott-Jupp's response in full because it helpfully places the significance of any inappropriate fluid management in context:

> *"I accept that my comments on [seizures] were not strictly within the brief, which was to look at the intravenous fluid management. However, I was also asked to give my views on the sequence of events that led to Conor's death, and on whether fluid management may have contributed to it. As I made clear, I do not consider that inappropriate fluid management was a contribution to his death. It therefore behoves me to give an opinion as to what may have been the actual cause of his death. As I stated clearly in my report, I consider that continuing undiagnosed seizure activity is highly likely to have been a major cause as was indicated in the coroner's view. In my view, this was a much more significant failing in his care than any issues relating to the fluid management."*[350]

Conor Admitted to Intensive Care Unit of CAH

374. When Conor was transferred to the ICU at 22:00, he was placed under the care of Dr. McCaughey (Consultant Anaesthetist).[351] 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.[352]

375. 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 9th May 2003. He received a handover report from Dr. McCaughey who advised him that Conor was comatose following an apparent respiratory arrest the night before.[353] There had been no change in his condition overnight.

376. 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[354] save that Dr. McAllister could elicit flexion to supra-orbital stimulation.[355]

377. Dr. Richard Brady was the SHO 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.[356] The responses to the test were minimal. The notes record that, "*All appearances are that this unfortunate young fellow is brain stem dead.*"[357]

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350 Ref: 260-004-005
351 Dr. McCaughey was at this date no longer the Medical Director. Dr. Humphrey had taken up this role two days earlier.
352 Ref: 088-004-052
353 Ref: 087-044-182
354 Ref: 088-004-055
355 Ref: 087-044-182
356 Ref: 087-040-178
357 Ref: 088-004-056

378. Following discussions with Conor's family, a decision was made to request a transfer to the PICU of the RBHSC.

379. 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.[358] She examined Conor and found that he had the body habitus of an 8-9 year old.[359]

380. Dr. McDonald spoke to Dr. Chisakuta (Consultant Paediatric Anaesthetist at the PICU)[360] and explained her findings following which a transfer to the RBHSC was agreed.[361] Dr. McAllister prepared a letter of transfer addressed to Dr. Chisakuta.[362]

381. 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.[363]

382. Conor was catheterised in preparation for transfer.[364] The notes record that there had been difficulties in a previous attempt at catheterisation: "*No output recordings due to difficult catheterisation last night.*"[365] The reason for the transfer was written up in the following terms: "*In view of weight and complex problems → transfer to RBHSC.*"[366]

383. A new intake/output chart was commenced when Conor was admitted to the ICU.[367] While it appears from this chart that an effort was made to record output, we know that Conor was not catheterised and therefore no precise measurement of output could be recorded.

Conor Admitted to the PICU of the RBHSC

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

385. By 12th 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.*"[368]

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358 Ref: 087-053-195
359 Ref: 088-004-057
360 Ref: 088-004-033 & 034
361 Ref: 088-004-058
362 Ref: 088-004-033 & 034
363 Ref: 092-001-001
364 Ref: 088-004-058
365 Ref: 088-004-056
366 Ref: 088-004-059
367 Ref: 088-003-026 and continued at Ref: 088-003-030
368 Ref: 092-017-057

386. 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 12th May 2003.

XVI. Post-Mortem

387. Dr. Janice Bothwell (Consultant Paediatrician, RBHSC) reported Conor's death to the Coroner's Office. She was concerned about the absence of an explanation for Conor's brainstem dysfunction secondary to a probable hypoxic ischaemic event. She also noted that the family had concerns about the care provided in CAH.[369]

388. Dr. Bothwell submitted an autopsy request form. In that section of the form dealing with the history of Conor's illness, she recorded that while in CAH Conor appeared to be rehydrated. She queried the rate at which rehydration was achieved. She proceeded to list Conor's clinical problems in order of importance for the purposes of enabling the pathologist to produce a more relevant report:

> "*Brainstem dysfunction with cerebral oedema. Cause of cerebral oedema related to (1) Viral illness; (2) Over-rehydration/inappro fluid management; (3) status epilepticus → causing hypoxia.*"[370] (emphasis added)

389. The autopsy report can be found at Ref: 087-055-205. Dr. Brian Herron (Consultant Pathologist, Department of Neuropathology) provided a detailed commentary of his findings commencing at Ref: 087-055-201. In order to assist with his analysis, Dr. Herron (through the Coroner's Office) commissioned a report from Dr. Edward Sumner.[371]

390. At post mortem, Dr. Herron found evidence of oedema and pneumonia on both lungs. Histologically there was evidence of patchy bronchopneumonia but no evidence of aspiration.[372]

391. Dr. Herron summarised the brain pathology in the following terms:

> "*He had a history of cerebral palsy and epilepsy. His brain showed bilateral porencephalic cysts. In addition there were acute changes to his brain with coning of cerebellar tonsils, cerebral oedema, cerebral perfusion failure, global tissue necrosis with an early inflammatory response. There was haemorrhage into the brain which may be secondary to reperfusion following a respiratory or cardiac arrest due to leakage of damage (sic) vessels.*"[373]

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369 Ref: 087-031-140
370 Ref: 087-137c-454&455
371 Ref: 087-056-213
372 Ref: 087-055-208
373 Ref: 087-055-212

392. In his analysis, Dr. Herron indicated that he could be confident that the ultimate cause of death was cerebral oedema.[374] However, as he said at the Inquest, Dr. Herron remained unsure of the underlying cause of the cerebral oedema.

393. Dr. Herron relied heavily on the input of Dr. Sumner and quoted extensively from Dr. Sumner's report in his own commentary.[375] Dr. Sumner summarised his views in the following way:

> *"I think it is regrettable that Conor was not nursed in a paediatric environment as he was small for his age, weighing only 22kg.*
>
> *It is impossible for me to be dogmatic about the cause of the acute brain swelling that occurred on 8 May 2003.*
>
> *The total volume of intravenous fluids given was not excessive and the type of fluid was appropriate, but was the initial rate of administration too great for Conor? There was no pulmonary oedema, but his face did become puffy. We may never know exactly what sparked off the seizure activity and whether this prolonged, untreated fitting caused the brain swelling, leading to coning.*
>
> *The major hypernatraemia occurred after brainstem death and, in my view probably had no part in the causation of the initial brain swelling."*[376]

394. Dr. Herron has opined that the seizures experienced by Conor during his admission to CAH *"may be important in his ultimate death."* However, he has said that he would defer to the opinion of a Consultant Neurologist or a Paediatric Neurologist in order to determine the nature, cause and outcome of the seizures.[377]

XVII. Coroner's Inquest

395. 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.[378]

396. In the narrative verdict at the Inquest into Conor's death, Mr. Leckey described Conor's fluid management at CAH as *"acceptable."*

374 Ref: 087-055-204
375 Ref: 087-055-202 – Ref: 087-055-204
376 Ref: 087-056-220
377 Ref: 087-055-204
378 Ref: 087-057-221

397. At the Inquest, Dr. Elaine Hicks (Consultant Neurologist) expressed the view that "*fluid management is very difficult in a case such as this and may lead the brain of someone such as Conor to respond in an abnormal way.*"[379]

398. In her deposition, Dr. Bothwell expressed the view that "*the fluid management [of Conor] at Craigavon was appropriate,*"[380] notwithstanding the description which she had included in the autopsy request form referred to above.

399. At the Inquest a number of witnesses were asked to give consideration to the high serum sodium levels experienced by Conor on the day after his collapse. There appears to have been a consensus that Conor experienced hypernatraemia as a consequence of his brainstem malfunction and not as a consequence of the fluids that he was given.[381]

Views Expressed By Dr. E. Sumner

400. In his evidence to the Coroner, Dr. Sumner described fluid management in Conor's case as "*acceptable*" although in need of "*fine tuning*."[382]

401. Nevertheless, he did advance some criticisms of fluid management when he appeared before the Coroner[383], just as he did in his report prepared for the Coroner dated November 2003. In his report Dr. Sumner paid particular attention to Ms. Mitchell's assertion, contained in her deposition,[384] that while he was being treated in A&E, Conor received 440 ml of IV rehydration fluids in one hour. Ms. Mitchell had also explained how Conor's grandmother had noted that his face had "*looked swollen and puffy*" in the context of fluids having been administered during his time in the Emergency Department.[385]

402. Of course, if Conor did receive 440 ml in an hour that would have been twice as much as Dr. Budd maintains was administered. As has been described above, Dr. Budd is very clear that Conor did not receive 440ml. Dr. Sumner analysed this issue and concluded:

> *"It is not clear how much intravenous fluid was actually given. If 440 ml had been given over the first hour, this amounts to 20 ml per kg and though this is a large fluid bolus, it is not excessive for a mildly dehydrated child with normal cardiovascular and renal systems. There followed several hours with no fluids. However, there is evidence that Conor's face became puffy which does imply some acute fluid overload."*[386]

379 Ref: 087-033-155
380 Ref: 087-031-140
381 See the views of Dr. Bothwell Ref: 087-031-140 and Dr. Sumner Ref: 087-038-173
382 Ref: 087-038-173
383 Ref: 087-056-218
384 Ref: 087-002-018
385 Ref: 087-002-018
386 Ref: 087-056-218

403. It would appear that neither medical nor nursing staff were aware of the puffiness noted by Conor's grandmother.

404. In an unusual turn of events, and notwithstanding the evidence which he had given to the Inquest which was broadly uncritical of Conor's fluid management, Dr. Sumner subsequently wrote to Dr. John Jenkins (Consultant Paediatrician, Department of Child Health), Mr. Leckey (Coroner), and Dr. Campbell (CMO) to express misgivings about the approach that had been adopted to fluids. In this correspondence, he expressed his disquiet about fluid management in Conor's case which he described as "*suboptimal.*"[387] He particularised his concerns as follows:

> *"…in the case of Conor who was primarily admitted for the treatment of dehydration, there was no written formal examination for this, such as skin turgor, capillary refill, though they did note his mouth was dry.*
>
> *"There was no calculation of the degree of dehydration nor the fluid deficit and no calculation of the maintenance fluids for a 22kg child. You will see from the enclosed copy of the fluid charts that the first prescription is not even signed. In my opinion, the initial rate of infusion was unnecessarily high. Small fluid deficits can be made good over a few hours. There was a lapse in infusion for some hours and then 250ml saline were ordered to run over four hours and then a further 250ml over six hours. The basis of these amounts makes no sense to me at all. There was no note of volumes of urine passed, even though it was collected and I could not even find a basic TPR chart."*[388]

405. Dr. Sumner went on to say that it was his impression "*that the basics of fluid management are neither well understood, nor properly carried out.*"[389]

406. Dr. Jenkins spoke to Dr. Campbell before replying to Dr. Sumner's correspondence. In his reply, he noted the steps that had been taken in Northern Ireland to improve the practice of fluid management, including the regional audit of the implementation of the Guidelines. He recognised, however, that further work needed to be undertaken to bring further improvement to this area.[390]

407. Some of the work that has been undertaken to secure that improvement is described in the final section of this document.

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387 Ref: 087-062i-247
388 Ref: 087-062i-247
389 Ref: 087-062i-248
390 Ref: 087-062H-242

XVIII. Serious Adverse Incident Procedure

408. In 2003, CAH had a procedure for adverse incident reporting. Within this procedure an adverse incident was defined in the following terms:

> *"...any unexpected or unplanned incident that has a short or long term detrimental effect on patients, staff or others, which results in material loss or damage, loss of opportunity or damage to reputation. This definition includes 'near miss' reporting."*[391]

409. The procedure prescribed that where the incident was "patient related" a comprehensive entry was to be made in the patient's medical record.[392]

410. In a schedule to the procedure, a list of clinically related adverse incidents which should be reported are described. They include unexpected death as a result of treatment/procedure; any incident which may lead to serious clinical or non-clinical consequences/outcomes; where a complaint or claim may arise from treatment of actions; any other category which gives cause for concern.[393] The policy envisaged that moderate or major adverse incidents would be reported through to the Health Board.[394]

411. The Inquiry has been advised that the death of Conor was not reported as a serious adverse incident.[395] It is not entirely clear why it was not so reported since the death of Conor was undoubtedly unexpected (having been admitted for a suspected urinary tract infection), concerns had been expressed by his family regarding his care and where there was a lack of diagnosis for his cerebral oedema.

412. The Inquiry has been provided with correspondence between Dr. Humphrey and Dr. AM Telford (Director of Public Health, Southern Health and Social Services Board). Dr. Humphrey explained the decision not to treat the case as a serious adverse incident on the basis that fluid management issues were not implicated in the cause of death.[396] The correspondence did not consider whether there were other aspects of the case which might have led to the death being treated as an adverse incident.

413. Ms. Mitchell engaged in regular correspondence with the Trust's Chief Executive (Mr. Templeton) particularly after the Inquest into Conor's death in 2004 and into 2005.[397] She described Conor's treatment in the CAH as "*slipshod and unsatisfactory*." In her correspondence, she referred to her

391 Ref: 329-022-003
392 Ref: 329-022-003, at paragraph 3.6
393 Ref: 329-022-011 & -012
394 Ref: 329-022-013
395 Ref: 329-022-001
396 Ref: 329-022-017
397 See correspondence from Ref: 329-022-021 through to -033 of that sequence

concerns about the fluid administration in Conor's case.[398] Mr. Templeton in his replies on behalf of the Trust insisted that *"all of the staff involved in Conor's care have acted properly in their clinical activities..."*[399]

414. After Conor's case was added to the work of this Inquiry, and following Dr. Humphrey's correspondence to Dr. AM Telford, the Trust was told that the case *"can now be considered a serious adverse incident as defined in Circular HSS (PPM) 06/04."*[400]

XIX. Developments at CAH Following Conor's Death

415. The Guidelines which were applicable at the time when Conor was cared for in CAH remained in place until 2007. However, on 27th April 2007 the CMO, Chief Pharmaceutical Officer and Chief Nursing Officer issued Circular HSC (SQS) 20/2007 which addressed the NPSA Patient Safety Alert 22 – *Reducing the Risk of Hyponatraemia When Administering Infusions to Children.*[401] Subsequently, in September 2007 the DHSS&PSNI issued the Paediatric Parenteral Fluid Therapy Guidelines.

416. The efforts made to respond to NPSA Safety Alert 22, and the Paediatric Parenteral Fluid Therapy Guidelines (2007) appear to have been planned, focussed and ongoing at the CAH.

417. The approach taken at the Southern Trust (i.e. Craigavon Hospital and Daisyhill Hospital) has been described in correspondence in the following terms:[402]

(i) The RQIA undertook an Independent Review in relation to NPSA Alert 22 (2008)

(ii) An Action Plan was presented to the Trust's Board in relation to the Trust's position in response to the RQIA Independent Review (September 2009)

(iii) The Paediatric Team developed guidelines for fluid management in paediatric patients

(iv) The Trust established an Implementation Working Group under the chairmanship of the Medical Director

(v) A high level overview was undertaken to identify actions required

398 See for example at Ref: 329-022-022 and Ref: 329-022-030
399 Ref: 329-022-028
400 Ref: 329-022-018
401 Ref: 303-028-367
402 Ref: 329-020a-001

(vi) A Paediatric Intravenous Infusion Policy was developed and implemented

(vii) A training programme was formulated for nursing staff

(viii) The BMJ e-learning module was made mandatory for medical staff

(ix) Guidance on admission of persons aged 14-18 was issued

(x) Compliance audit instituted

418. Some of these matters will now be examined in greater detail.

14-16 Year Old Age Group

419. In the initial stages of grappling with the 2007 Guidelines, particular attention was paid to risks associated with the care of those in the 14-16 year old age group. At a "Hyponatraemia Meeting" held on 17th January 2008, the group discussed the processes to reach the 14-16 year old age group of patients who may not be on the paediatric wards. It was agreed to disseminate Guidelines and information to the Associate Medical Directors and Clinical Directors of Medicine and Surgery to alert them to the Guidelines. It was agreed to alert Obstetrics and Gynaecology. It was also agreed to make copies of the fluid prescription chart available on the wards.[403] There was discussion in relation to the most appropriate means of educating and advising nursing staff on adult wards in relation to the use of prescription charts.

420. On 20th February 2008, Dr. B. Aljarad (Associate Medical Director, Children and Young Peoples Services) addressed correspondence to a number of clinicians in the following terms:

> *"As you will, on occasions, be involved in looking after children in the age group 14-16 years, I would like to ask for your co-operation in implementing the following Recommendations:-*
>
> - *Please ensure that the Poster for Paediatric Parenteral Fluid Therapy is on display in Medical and Surgical Units, Theatres, Emergency Medicine and Gynaecological Wards. I would suggest an E3 laminated poster would be appropriate. I'm happy to supply the posters if required. I am aware that some of the CREST Guidelines posters are still in place, however, the new Guidelines produced by the Department of Health should replace/be added as they are more detailed and more recent.*

[403] Ref: 329-020a-019

- *As a new group of Doctors have just started in February, I would ask you to bring these Guidelines to their attention, along with existing members of the Team.*

- *Please advise your team if they need more help with implementing these Guidelines or any advice in prescribing IV fluids for children, to seek help from the Paediatric Team in Craigavon or Daisy Hill Hospital*

- *An audit is to be undertaken on the Implementation of these Guidelines, and we would aim to capture data of all cases with iatrogenic Hyponatraemia. Therefore, I will urge you to encourage your staff to report cases of iatrogenic Hyponatraemia by filling in a Clinical Incident form. I am in discussion with the appropriate staff members to see how we can undertake this audit in the future."*[404]

421. As part of the arrangements to ensure compliance with NPSA Patient Safety Alert 22 Trust's were expected to complete an audit checklist. This was complied with by the Southern Trust on 30th October 2007[405], and again at the end of March 2008.[406]

422. By the 30th October 2007 the Trust was able to report that the following recommended actions had been addressed:

(i) Solution No. 18 had been removed from stock and general use in areas that treat children in both Craigavon Hospital and Daisy Hill Hospital (and other sites e.g. St. Lukes and Lurgan Hospitals)

(ii) Alternative infusion fluids required to be used as part of the Hyponatraemia Algorithm stocked in Craigavon and Daisy Hill Hospitals

(iii) A new fluid balance and prescription sheet was being considered for use

Paediatric Intravenous Infusion Policy

423. On the 8th October 2009, the Southern Trust adopted the 'Paediatric Intravenous Infusion Policy.'[407] The policy was reviewed in July 2013. The purpose of the policy is described in the following terms:

> *"To ensure that all registered nurses, midwives and medical practitioners are aware of their responsibilities and apply the recommended clinical procedures*

404 Ref: 329-020a-024
405 Ref: 329-020a-042
406 Ref: 329-020a-038
407 Ref: 329-020a-117

in relation to the prescription, administration, monitoring and review of intravenous fluids, including hypotonic infusions, as set out in the National Patient Safety Agency (NPSA) Patient Safety Alert 22 and the DHSSPS Parenteral Fluid Therapy Guidance 2007."

424. The policy is an extensive document. It incorporates a medical procedure detailing the roles and responsibilities in relation to prescription, monitoring and reviewing of intravenous infusions for children and young people;[408] a nursing and midwifery procedure for the administration of intravenous fluids; and a procedure to monitor paediatric hospital acquired hyponatraemia.[409] The responsibilities of the Chief Executive and the Trust's various Directors are also described.[410]

425. The procedure applicable to nurses and midwifes contains the following key features:

(i) Before administering any prescribed intravenous fluid nursing and midwifery staff must consult the prescription chart to ascertain various facts including the child's name, type of fluid, weight of child, that the fluid calculation chart has been completed by the prescriber, the amount and time frame for administration, date and time due, route of administration and validity of the prescription

(ii) Nursing and midwifery staff should not commence any intravenous fluids if they are not satisfied that the prescription of these fluids is in accordance with the 'Paediatric Parenteral Fluid Therapy Guidelines' (2007)

(iii) The nurse/midwife responsible for the care of the child should take various steps including to document on the fluid balance chart and nursing care plan that the infusion has commenced; check the infusion and cannula site hourly and document; record the cumulative total of fluid administered over 24 hours; complete the Early Warning Score in use and report any changes in the child's condition; ensure medical reassessment takes place when required; ensure issues relating to the intravenous infusion are discussed at all shift changes

Incident Trigger List

426. The policy also contains an incident trigger list,[411] and the associated incident reporting mechanism[412]. If a doctor, nurse or pharmacist recognises a 'trigger'

408 Ref: 329-020a-125
409 Ref: 329-020a-133
410 Ref: 329-020a-121
411 Ref: 329-020a-145
412 Ref: 329-020a-146

they are required to complete an incident report form. The procedure identifies the types of clinical incidents which should be reported:

(i) The use of any IV fluid for bolus, deficit or maintenance other than outlined in the DHSSPS (Sept 2007) Paediatric Parenteral Fluid Therapy Guidelines

(ii) Any episode of hospital acquired hyponatraemia in children receiving IV fluids (i.e. sodium level dropping below 135 mmol/L

(iii) Failure to record a serum sodium less than 135 mmol/L or failure to document the action taken

(iv) Electrolytes not being checked a minimum of 24 hourly in any child or young person receiving IV fluids

(v) Failure to record the calculations for fluid requirements on the fluid balance sheet

(vi) Signs and symptoms of hypovolaemia or fluid overload while on IV fluids

Mandatory Training

427. The policy emphasises to medical staff and nursing staff that they must be properly trained for the task of managing intravenous fluids to children and young people, and the consequences of failing to undertake training:

> *"3.0 Policy Statement*
>
> *The Trust is committed to providing safe, high quality care to all patients, including children and young people admitted to its acute facilities. The Trust will ensure that registered nurses, midwives and medical practitioners are supported in delivering safe and effective care to children and young people through the implementation and recommendations as set out in the NPSA/2007/22 alert and the DHSSPS Parenteral Fluid Therapy Guidance, September 2007.*
>
> *The Trust will support registered nurses, midwives and medical practitioners by:-*
>
> - *Providing access to evidence-based practice relating to intravenous infusion therapy*
> - *Providing necessary training and updates to ensure all staff are appropriately trained in undertaking this clinical procedure*

- *Clarifying the roles and responsibilities of those involved in the prescription, administration, monitoring and review of intravenous infusions to children and young people*

- *Setting in place clinical governance arrangements to provide assurance on safe, high quality practice*

In addition the Trust will put in place a 'Desist Notice' process whereby registered nurses, midwives or medical practitioners who have not undertaken appropriate training to undertake this clinical procedure, will be prohibited from prescribing, administering, reviewing and monitoring intravenous fluids to children and young people."[413]

428. The Inquiry has been told that a significant training programme on hyponatraemia has been implemented for nursing staff: training is required as part of induction and staff are required to complete a refresher course every two years. Moreover, staff are required to complete a competency framework within 12 weeks of attending the training.[414] The Inquiry has been provided with copies of the Competency Framework (associated with the administration etc of fluids to children)[415] as well as an outline of the training provided to nurses by the Clinical Education Centre in relation to intravenous fluid management in children.[416]

429. Medical staff are also required to participate in training in association with the prescription of intravenous fluids to children and young persons. The Inquiry has been provided with a detailed account of the training requirements for three categories of medical staff: rotational doctors in training, permanent medical staff, and locum medical staff.[417] The Inquiry has also received comprehensive documentation which demonstrates

430. The Inquiry has been advised that rotational doctors in training are required by the Southern Trust to complete the BMJ e-learning module, 'Reducing the Risk of Hyponatraemia When Administering IV Fluids to Children.'[418] Having completed the learning module relating to hyponatraemia (as well as other required training in relation to other clinical matters) trainees are required to sign a declaration of compliance.[419] The Trust has developed a database which allows it to identify those rotational doctors who have not submitted a declaration or whose competency in an area has expired.[420] The Inquiry has been advised that the BMJ learning module relating to

413 Ref: 329-020a-120
414 Ref: 329-020a-006
415 Ref: 329-020a-173
416 Ref: 329-020a-177
417 Ref: 329-020a-006, -007, -008, -009
418 Ref: 329-020a-007
419 Ref: 329-020a-179
420 Ref: 329-020a-007, and see associated documentation at Ref: 329-020a-184

hyponatraemia is expected to be completed before a trainee commences at the Trust.[421]

431. In an apparent effort to help to inform and educate trainees the Southern Trust has developed a website resource which provides internal e-learning learning as well as directions to external e-learning resources.[422]

432. The Southern Trust's mandatory induction programme for junior doctors includes sections on fluid balance chart implementation as well as hyponatraemia.[423] These are short sessions which are presumably designed to refer attendees to the applicable policies and guidelines. The Inquiry has been advised that attendance at bi-annual face-to-face induction is mandatory for all new starts. The face-to-face programme is delivered by a Consultant Paediatrician. The Inquiry is further advised that in August 2013 the programme addressed the roll out of the regional fluid balance charts.[424] The Inquiry has been informed that those participating in paediatric specialty inductions also receive education in intravenous fluid management.[425]

433. As is the case with rotational doctors in training, permanent members of the medical staff in the Southern Trust are required to complete the BMJ e-learning module in relation to hyponatraemia.[426] Those who do not have *"relevant direct patient contact"* may be excused the training.[427] The requirement is described as being *"once off"* so that there is no apparent obligation to repeat the training or to participate in refresher training. However, there is a process of annual appraisal and the Inquiry has been advised that appraisers are expected to use this opportunity *"to stimulate discussion on training attainment/requirements."*[428] Permanent members of staff are expected to maintain a training passport,[429] and the Trust's Medical Director's office maintains a database which holds records of doctors training.[430]

434. It would appear that the Southern Trust has endeavoured to ensure that permanent members of its medical staff are kept apprised of developments in the field of intravenous fluid management. The Inquiry has been advised that the roll out of the new regional fluid prescription and balance chart was the subject of presentations at Trust Morbidity and Mortality Meetings,[431]

421 Ref: 329-020a-007, point 4
422 Ref: 329-020a-188
423 Ref: 329-020a-196
424 Ref: 329-020a-007
425 Ref: 329-020a-008, point 7
426 Ref: 329-020a-208
427 Ref: 329-020a-208
428 Ref: 329-020a-008
429 Ref: 329-020a-212
430 Ref: 329-020a-008, point 2
431 Ref: 329-020a-008

although it is unclear which staff attended such meetings, and whether attendees had any role in disseminating the information received at those meetings. The Inquiry has been provided with the materials which were used to assist with the roll out of the new chart. A "roll out" document has been developed for paediatric[432] as well as adult patients.[433]

435. The Inquiry has been advised that locum medical staff are not exempt from the requirement to undertake the BMJ e-learning module in relation to hyponatraemia.[434] The Southern Trust has implemented a medical locum pre-employment checklist which details this module as a mandatory training requirement.[435] The Inquiry has been informed that compliance with this requirement is checked prior to commencement of employment.

Audit of Compliance

436. As part of the clinical governance procedures referred to in the policy, the Southern Trust has taken steps to audit compliance with the 2007 Guidelines. The Inquiry has been advised that a number of audits have been undertaken to assess compliance with the 2007 Guidelines. A description of those audits has been set out in tabular form at 329-020a-004 and -005.

437. What appears to be the principal audit used by the Trust to monitor compliance with the Guidelines is described as the *Audit of Hyponatraemia.* All doctors involved in the prescribing, monitoring and reviewing of paediatric IV infusions are expected to facilitate and participate in this audit.[436] A similar commitment is expected of nursing and midwifery staff involved in the administration of intravenous fluids to children and young people.[437]

438. The Inquiry has been provided with the results of the Audit of Hyponatraemia for the age group 1 month to one day before sixteenth birthday. The procedure governing this audit is described in detail at Ref: 329-020a-134 to -140.

439. The audit has been conducted in each year since 2010 and is ongoing. Data is gathered from within the paediatric unit and in all areas where 14-16 year olds are managed in acute inpatient wards. The results appear to show reasonably high compliance with a range of fluid management requirements, although compliance has clearly been incomplete in a number of cases.[438]

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[432] Ref: 329-020a-220
[433] Ref: 329-020a-265
[434] Ref: 329-020a-009
[435] Ref: 329-020a-314
[436] Ref: 329-020a-122
[437] Ref: 329-020a-123
[438] Ref: 329-020a-161 & -162

440. The audit for each year in which it was conducted ultimately seeks to address the question of whether there were any concerns regarding fluid management. In 2010, concerns were noted in 6 cases out of the 71 audited (7%). Those concerns included cases where the fluid balance chart was undated (3), where the fluid balance chart was not filed in the patient's notes (1), where no nursing documentation was recorded (1) and where no weight, calculation or nursing documentation was recorded (1).

441. The greatest number of concerns were found during the audit conducted in 2012, when issues were noted in 10% of cases audited (9). In that year, 8 patients were identified as having received more than the maximum mls/hr. The audit reported that none of the patients came to any harm, although the cases were reported and investigated through the incident management systems. There was 1 case where weight and U&E had not been recorded and where a calculation had not been documented.

442. In 2011, concerns about fluid management were only noted in 4% of cases, and, so far, no concerns have been noted in the 41 cases audited to August 2013.

Steps Taken as a Result of Audit

443. The Inquiry has been advised that audit results are shared with the multi-disciplinary team. Moreover, hyponatraemia appears as a standing item at clinical governance meetings in order to promote discussion and shared learning among the multi-disciplinary team.[439] The Inquiry has been advised that the process of auditing compliance with the 2007 Guidelines has led to the following changes in practice and procedure:[440]

(i) Revising the fluid balance chart within SHSCT to assist in improving documentation by incorporating the fluid calculation sheet so as to produce a single document

(ii) Developing and implementing a guideline for perioperative fluid management in children

(iii) Reviewing the paediatric intravenous infusion policy

(iv) Implementing the agreed regional fluid prescription chart

444. The *guidelines for perioperative fluid management in children* which have been developed by the Trust are described as a local guideline. They appear to have been formulated in April 2013 "*to provide guidance and reduce the risk of harm associated with intravenous fluid administration to the paediatric patient in the*

439 Ref: 329-020a-008, points 8 and 9
440 Ref: 329-020a-006

perioperative phase."[441] They provide a detailed description of the fluid management issues relevant to rehydration/replacement, the administration of maintenance fluid and the fluids to be used in a theatre environment. The guidelines also address the issue of documentation.

441 Ref: 329-020a-163

Appendix I – Evidence Received By the Inquiry

445. Requests for information and evidence were sent out to a number of bodies in relation to Conor's case:

(i) Department of Health, Social Services and Public Safety

(ii) Craigavon Area Group Hospitals HSS Trust (and its successor the Southern Health & Social Care Trust)

(iii) Belfast Health and Social Care Trust

(iv) HM Coroner for Greater Belfast

(v) Police Service of Northern Ireland ("PSNI")

(vi) Nursing & Midwifery Council ("NMC")

Documents and Other Material

446. The call for documents has been ongoing since the establishment of the Inquiry and it is continuing. The search for relevant documents has and is being informed by guidance from the Inquiry's Advisors, from its Experts and from the responses to requests for witness statements.

447. The material received to date in relation to Conor's case includes:

(i) Documents held by the Coroner (Depositions from the Inquest into Conor's death and a Report commissioned by the Coroner)[442]

(ii) Medical Notes and Records in respect of the care and treatment of Conor Mitchell at the Craigavon Area Hospital[443] and the RBHSC.[444]

(iii) Documents from the investigations of the Police Service of Northern Ireland ("PSNI")

(iv) Correspondence from the Directorate of Legal Service ("DLS") providing responses to the Inquiry's requests for information[445]

442 Ref: File 087
443 Ref: File 088
444 Ref: File 092
445 Ref: File 329

Publications

448. The Legal Team has added to its bibliography any publications referred to by its Advisors, Experts and Witnesses. It is available on the Inquiry website and is updated as further authorities are cited.

Expert Report

449. This is referred to in detail above in Section II of the Opening.

Witness Statements

450. The Legal Team requested and received a large number of witness statements and supplemental witness statements from persons involved in Conor's case. The Legal Team has been informed in that task by:

(i) The Inquiry's Advisors

(ii) Conor's medical notes, records and other contemporaneous material

(iii) Previous statements made, whether through Depositions to the Coroner or witness statements to the Inquiry

(iv) Statements from others and in some cases the evidence of others during the Oral Hearings

(v) Subsequent documents received from the DLS and a variety of other sources

(vi) Reports from the Inquiry's Expert[446]

451. The Legal Team has compiled a list of all those involved in Conor's case from all of the information received by the Inquiry.[447] It explains their position then and now, briefly summarises their role in Conor's case, and whether they have provided a statement and, if so, for whom. Importantly, it also indicates the witnesses that it is proposed to call to give evidence during the Oral Hearing.

446 Ref: 260-002 & Ref: 260-004
447 Ref: 327-003