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# INTRODUCTION

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Preamble

1.1 In June 2001 nine year old Raychel Ferguson was admitted to the Altnagelvin Area Hospital in Derry. She underwent routine surgery but did not recover as expected. She vomited repeatedly and her condition deteriorated. Her parents voiced concern. Within 48 hours of admission Raychel had suffered brain death. Mr and Mrs Ferguson were not satisfied with the explanation they were given for her death.

1.2 In February 2003 the Coroner at Raychel’s inquest found that her death had been caused by hyponatraemia brought about by an intravenous (‘IV’) fluid therapy which had given her inadequate sodium replacement in the context of vomiting and water retention. Reference was also made at the inquest to the death of another child in Northern Ireland from hyponatraemia, that of Adam Strain.

1.3 Mr and Mrs Ferguson were determined to question why their daughter had died. They were not alone. Investigative journalists at Ulster Television (‘UTV’) also questioned her death and broadcast a documentary in February 2003 drawing attention to hyponatraemia and the clinical failings in Raychel’s case.¹

1.4 At the same time, and in response to the inquest, the Chief Officer of the Western Health and Social Services Council (‘WHSSC’) drew the Coroner’s attention to the death in 2000 of a child called Lucy Crawford because her case had similarities to Raychel’s. He asked whether an inquest into Lucy’s death might not have saved Raychel.²

1.5 The UTV team then added Lucy’s case to their investigation and, in October 2004, broadcast a further documentary entitled ‘When Hospitals Kill’ which examined the deaths of Raychel, Adam and Lucy.³ It claimed that all had died from hyponatraemia because all had been given too much of the wrong type of fluid. The programme raised concerns about a failure to learn

¹ UTV ‘Insight’ 27-02-03 ‘Vital Signs’
² 006-012-297
³ UTV ‘Insight’ 21-10-04 ‘When Hospitals Kill’. UTV also treated the issue in ‘The Issue’ 25-03-04.
lessons and the possibility that there had been a deliberate ‘cover-up’. It criticised clinicians, Trusts and the Chief Medical Officer.

1.6 The programme provoked considerable media interest and public disquiet. Concern was widespread and Ms Angela Smith MP, then Minister with responsibility for Health in Northern Ireland, was obliged to take action. In November 2004 she announced that “in pursuance of the powers conferred by Article 54 and Schedule 8 of the Health and Personal Social Services (Northern Ireland) Order 1972, the Department of Health, Social Services and Public Safety hereby appoints Mr John O’Hara QC to hold an Inquiry into the events surrounding and following the deaths of Adam Strain, Lucy Crawford and Raychel Ferguson.”

1.7 The Minister emphasised that it is “of the highest importance that the general public has confidence in the quality and standards of care provided by our health and social services.” The Department of Health, Social Services and Public Safety for Northern Ireland (‘the Department’), recognising that public confidence in the Health Service had been undermined, granted the Inquiry broad terms of reference so as to permit the concerns of families and public alike to be addressed.

1.8 The terms of reference required inquiry into:

(i) The care and treatment of Adam Strain, Lucy Crawford and Raychel Ferguson, with particular reference to the management of fluid balance and the choice and administration of intravenous fluids in each case.

(ii) The actions of the statutory authorities, other organisations and responsible individuals concerned in the procedures, investigations and events which followed the deaths of Adam Strain, Lucy Crawford and Raychel Ferguson.
(iii) The information and explanations given to the respective families and others by the relevant authorities.

Additionally, discretion was granted me to examine and report on any other matter I should think relevant and to make such recommendations to the Department as I should think fit.

1.9 The UTV documentary was also watched by the parents of Claire Roberts who had died in the Royal Belfast Hospital for Sick Children (‘RBHSC’) or (‘the Children’s Hospital’) in 1996. Her death had not been reported to the Coroner and her parents had never really understood why she had died. When Mr and Mrs Roberts watched the programme they immediately recognised similarities with their own daughter’s case and were prompted to ask questions. Subsequent investigation and inquest revealed that hyponatraemia had played a part in her death too. I added Claire’s case to those I had been originally tasked to investigate because hyponatraemia was implicated and she had died in the same hospital as Adam. In addition to my obvious concern about the treatment Claire had received, I was troubled by the failure to report her death to the Coroner in 1996 and about what was revealed at her inquest 10 years later.

1.10 In May 2008, and for private reasons, Mr and Mrs Crawford requested that the Minister withdraw Lucy’s case from the scope of my Inquiry. This request was respected and the terms of reference revised. However, concern was then raised that had the circumstances of Lucy’s death been made known at the time of her death and had appropriate lessons been learnt, then the deficient therapy given Raychel 14 months later might have been avoided and her life spared. Accordingly it was urged upon me that examination of what happened after Lucy’s death was integral to the Inquiry into Raychel’s case and should therefore be pursued.

1.11 I found this persuasive, and having issued a consultation paper on the issue in 2009 and received extensive response, I decided in February 2010 that the terms of reference both permitted and required investigation into what
had transpired after Lucy’s death. Accordingly, I directed that that part of her case be examined by the Inquiry.

1.12 In the course of conducting this Inquiry, 4 other deaths were brought to my attention. I considered them in detail and having satisfied myself that hyponatraemia was not implicated, determined that they required no further investigation. Notwithstanding, it cannot be assumed that there were no other child deaths in Northern Ireland from hospital related hyponatraemia during the period under scrutiny.

1.13 In examining the issues it also became necessary to determine whether the Department’s ‘Guidance on the Prevention of Hyponatraemia in Children,’ issued in 2002, was being followed in Northern Ireland’s hospitals. The death in 2003 of 15 year old Conor Mitchell in Craigavon Area Hospital was not a death from hyponatraemia but it was a case in which concerns were raised about whether the Departmental guidance had been followed properly, or at all. I directed that his case be examined in order to scrutinise an actual implementation of the hyponatraemia guidance and to ascertain whether concrete change in practice had resulted.

1.14 I think it important to acknowledge the role played by informed investigative journalism in revealing the extent of the hospital mismanagement in these sad cases. But for the UTV documentary, the close public scrutiny of this Inquiry would not have happened and Mr and Mrs Roberts might never have learnt what really happened to Claire. Whilst the process of inquiry has been long and costly and the amount of information gathered considerable, it is to be recognised that the essential issues as identified by the initial UTV investigation remain as they were. This Inquiry found a Health Service that had been largely self-regulating and unmonitored. In such circumstances the value of independent and inquiring journalism cannot be overstated.
Process

Inquiry procedures

1.15 Upon appointment I directed the following protocols to govern procedures, namely:

(i) General Procedure.
(ii) Oral Hearing.
(iii) Interested Parties.
(iv) Documents.
(v) Witnesses.
(vi) Experts.
(vii) Costs.
(viii) Disclosure.
(ix) Consultation with, and questioning of, Witnesses.

These protocols were amended from time to time as was necessary and are to be found on the Inquiry website at www.ihrdni.org

Counsel

1.16 Counsel were appointed to assist in identifying and investigating relevant issues, the analysis of evidence and the examination of witnesses at public hearings. Legal advices were sought from counsel and received. These duties were performed with great distinction by counsel to the Inquiry, Ms Monye Anyadike-Danes QC and her juniors, Martin Wolfe QC, Jill Comerton, David John Reid, James Anderson and John Stewart.
Solicitors

1.17 An immense debt of gratitude is owed Anne Dillon, Solicitor to the Inquiry. With patience and expertise she assisted and guided at every turn. She was preceded in this role with no less distinction by Fiona Chamberlain. The Inquiry also received the assistance of Brian McLoughlin, Htaik Win, Brian Cullen, Caroline Martin and Clare McGivern. To them I extend my gratitude.

The Secretariat

1.18 The Secretary to the Inquiry, Mrs Bernie Conlon, together with her deputies Ms Denise Devlin and Miss Leanne Ross rose to the formidable challenge of creating and managing the structures and office of the Inquiry. They were assisted by a dedicated and hard-working team. Their administration was one of great professionalism and the tasks performed by them, with efficiency and good grace, were beyond number. I particularly wish to place on record my admiration for the caring and sensitive support given intuitively by them to many of the witnesses to the Inquiry. Given the stresses and sensitivities involved this cannot have been easy and was of considerable assistance to all.

Conflict of Interests

1.19 All who worked for the Inquiry were required to and did sign a ‘Declaration of Interests’ for the purposes of confirming the credentials of independence underpinning the Inquiry.

Documentation

1.20 The Inquiry, having been established pursuant to the Health and Personal Social Services (Northern Ireland) Order 1972, enjoyed broad powers to compel the production of documents.

1.21 A very considerable volume of documentary evidence was received and collated. Documents were filed in an electronic management system, with
each page given a 9 figure identifying number, comprising a file number (first 3 figures), the document number (second 3 figures) and page number (final 3 figures). These are available on the website. Irrelevant and protected information was redacted. Documents and materials which were subject to legal privilege or which failed to satisfy the tests of relevance or fairness were excluded from consideration and do not appear on the Inquiry website.

1.22 In order to marshal and present aspects of the very extensive information gathered, a number of tables, schedules, charts and chronologies was compiled for summary and reference. These too may be found on the website.

1.23 The Inquiry website is the archive for documents released by the Inquiry. It includes transcripts of public hearings, openings, witness statements, exhibits, expert reports, medical notes and records, charts, schedules, briefing papers, memoranda and other relevant materials. This record amounts to more than 113,000 pages and 12,650 documents. All documents comprising the Inquiry record will be deposited with the Public Record Office for Northern Ireland and access to the website will be maintained within the Record Office web archive. Accordingly, it is unnecessary to append specific documents to this Report.

**Expert witnesses, advisors and peer reviewers**

1.24 Respected specialists were retained by the Inquiry to advice and report on relevant aspects of clinical care as well as hospital management and governance. Many of these experts gave evidence at the public hearings. Their invaluable contribution is gratefully acknowledged. In addition, a number of expert background briefing papers were commissioned advising on matters ranging from fluid management training for nurses (1975-2009)
to post-mortem practice, coronial process and statistics. They are to be found on the Inquiry website.\textsuperscript{6}

1.25 I wish to acknowledge the guidance of the team of expert advisors who assisted the work of the Inquiry. To Dr Harvey Marcovitch in paediatrics, the late Dr Peter Booker in paediatric anaesthetics, Ms Carol Williams in nursing and Ms Mary Whitty and Mr Grenville Kershaw in health service governance and management, I owe a debt of gratitude. Independent of the Health Service in Northern Ireland the advisors submitted their assessment of matters to be considered at the public hearings. Their reports are to be found on the Inquiry website.

1.26 The work of the advisors was in turn 'peer reviewed' by leading international experts Dr Desmond Bohn (paediatric anaesthesia) and Dr Sharon Kinney (paediatric intensive care nursing). Their signal contribution is to be recognised.

1.27 Additionally, I received expert assistance in finalising my draft recommendations from Professor Gabriel Scally (Professor of Public Health and Planning and one time Regional Director of Public Health, NHS England 1996 – 2012) and Dr Tracey Cooper (Chief Executive for Public Health, Wales and former Chief Executive of the Health Information and Quality Authority, Ireland). They advised as to whether my draft recommendations were realistic and achievable and, where appropriate, suggested refinement.

**Witnesses and Interested Parties**

1.28 In accord with convention, the Inquiry sought and received an undertaking from the Director of the Public Prosecution Service that the evidence of witnesses would not be used in criminal proceedings against them.\textsuperscript{7} This was done to encourage co-operation.

\textsuperscript{6} \url{http://www.ihrdni.org/background_papers.htm}
\textsuperscript{7} 370-048-001
1.29 Evidence was sought initially from potential witnesses by way of detailed questionnaires known as witness statement requests. Supplementary witness statements were then sought to clarify and particularise. The Inquiry received 538 individual witness statements but some were to prove of lesser importance than others and not all witnesses were asked to give oral testimony. A list of all who provided evidence to the Inquiry may be found at Appendices 4 and 5.

1.30 I designated family members and key witnesses ‘interested parties’ in accordance with protocol. Doctors, nurses, managers and healthcare professionals were named in this way together with the Department, HSC Trusts and others. Interested parties became entitled to legal representation at the public hearing, were allowed to make submissions, suggest lines of questioning and on occasion to question witnesses. A full list of those accorded interested party status is provided at Appendix 6

List of Issues

1.31 These reflected the terms of reference as revised and the evidence as received. They were subject to comment and suggestion from interested parties and are to be found on the Inquiry website.

Background

Hyponatraemia

1.32 The shared fate of Adam, Claire, Lucy and Raychel was to suffer hyponatraemia, a condition in which the concentration of sodium in the blood falls below safe levels. It can result from excessive sodium losses, caused for example by vomiting, or can arise in a number of different ways. One variant is dilutional hyponatraemia in which excess fluid in the system reduces sodium levels by dilution. The less sodium in the excess fluid, the greater the dilution. Excess fluid can be introduced by excessive intravenous infusion or can result from excess water retention, or a combination of both.
Children can react to illness or surgical stress with a recognised Syndrome of Inappropriate Anti-Diuretic Hormone secretion (‘SIADH’) which inhibits urine production and causes water retention. The resultant increase in the amount of water in the blood leads to dilution of its sodium concentration. This can become problematic if the sodium level is already low. Thus, for example, if sodium rich fluids lost through vomiting are replaced by sodium light fluids (such as an intravenous low saline solution) in the presence of anti-diuretic hormone activity, the inevitable result will be a lowering by dilution of already lowered sodium levels and ultimately a dilutional hyponatraemia. If left untreated, the fall in the sodium concentration will induce cerebral oedema causing raised intracranial pressure, respiratory arrest, coma and potential brain-stem death. The symptoms of hyponatraemia are often lethargy, headaches, nausea and vomiting. The severity of the symptoms relates to the rate at which the sodium level falls. A diagnosis is made easily by assessing the serum sodium levels. Accordingly, safe IV fluid management of a child with sodium losses cannot be assured without testing the sodium levels and understanding the fluid balance. Because such a patient is the subject of active fluid therapy, dilutional hyponatraemia should not happen in a hospital. It is a preventable hospital illness.

Solution No. 18

In each of the cases examined in this Report (excepting only Conor) the patient was given intravenous infusion of a fluid known as Solution No.18, so called because it contains only 0.18% sodium chloride. This is deemed a low saline or hypotonic solution because it contains only about 1/5 of the sodium and chloride found in blood. Because it is so low in sodium it cannot replace sodium lost through vomiting or diarrhoea and can, if administered excessively or too quickly, create a dilutional effect on sodium levels resulting in hyponatraemia. It is not dangerous of itself, but can become so if given inappropriately in the presence of established sodium losses or SIADH.
1.35 The risks of using low sodium solutions such as Solution No.18 and the dangers of dilutional hyponatraemia were understood from the early 1990s. In a leading paper published in the British Medical Journal (‘BMJ’) in 1992, Professors Arieff, Ayus and Fraser concluded that “symptomatic hyponatraemia can best be prevented by not infusing hypotonic fluids to hospitalised children unless there is a clear cut indication for their use.”

Notwithstanding and despite similar subsequent warnings in the medical literature, it is clear that even at the time of Raychel’s death, Solution No.18 remained the standard IV solution for general use with children.

1.36 In consequence of Raychel’s death, Dr Henrietta Campbell, the Chief Medical Officer (‘CMO’), directed that the Department issue Guidance on the Prevention of Hyponatraemia in Children. This was published in March 2002 specifically warning that “hyponatraemia may occur in any child receiving any IV fluids... vigilance is needed for all children receiving fluids.” It gave clear advice for the regular monitoring of fluid balance, the regular evaluation of sodium levels and the accurate calculation of IV fluid requirements. Fluids were specifically to be prescribed as maintenance fluids to meet anticipated fluid requirements or as replacement fluids to replace fluids and sodium actually lost. This was a most valuable guideline and the first of its kind in the UK. The work of providing guidance was thereafter undertaken by the National Patient Safety Agency (‘NPSA’). By 2010 the Regulation and Quality Improvement Authority (‘RQIA’) was able to report that Solution No.18 had been removed from all clinical areas where children might receive treatment.
**The Children**

*Adam Strain*

1.37 Adam was born on 4th August 1991 and died on 28th November 1995 at the RBHSC having undergone renal transplant surgery. He was born with kidney abnormality and, having suffered multiple problems, was placed on the transplant register and admitted for kidney transplant on 26th November 1995. He did not survive surgery. As with the other cases being examined he received intravenous infusion of Solution No.18. His death was scrutinised at inquest and found to have been caused by cerebral oedema brought about by the acute onset of hyponatraemia suffered in consequence of an excess administration of fluids containing only very small amounts of sodium. There may also have been other factors combining with this underlying cause. The consultant anaesthetist responsible for the management of Adam’s fluids refused to accept that Adam had suffered dilutional hyponatraemia.15

1.38 In the course of Adam’s inquest, draft ‘Recommendations for the Prevention and Management of Hyponatraemia arising during Paediatric Surgery’16 were submitted by the RBHSC paediatric anaesthetists in order to reassure the Coroner as to the future management of such cases. These recommendations specifically referenced Professor Arieff’s paper on hyponatraemia and indicated that all anaesthetic staff would be made aware of the complications of hyponatraemia. The recommendations were not however circulated, and the opportunity to familiarise clinicians in the RBHSC and elsewhere with the risk to children of dilutional hyponatraemia in the context of IV infusion of hypotonic solution was lost.

*Claire Roberts*

1.39 Four months after the inquest into Adam’s death Claire Roberts was also admitted to the RBHSC. She was nine years old and had a past history of

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15 093-038-238
16 060-018-036
convulsions in early childhood. On 21st October 1996 she was referred by her GP to the RBHSC with symptoms of vomiting, malaise and drowsiness. In light of her medical history it was thought that she could be suffering seizures. She was admitted and placed on an IV infusion of Solution No.18. Her blood tests revealed slightly lower than normal sodium levels but her sodium was not then reassessed over the next 24 hours despite the fact that she was receiving a continuous infusion of Solution No.18. Her condition did not improve, her consciousness reduced and the doctors did not know what was wrong with her. No further tests were performed. She was then given too much of an anti-convulsant medication, her levels of consciousness declined further and early in the morning of 23rd October she suffered respiratory arrest and was transferred to the Paediatric Intensive Care Unit (‘PICU’) where she died. Her death was not reported to the Coroner and only a partial autopsy was performed. A death certificate was issued citing cerebral oedema and status epilepticus as the cause of her death. Mr and Mrs Roberts were led to believe that Claire may have suffered encephalitis.

Eight years later, having watched the UTV programme about the deaths of Adam, Lucy and Raychel and recognising similarities with Claire’s case, Mr and Mrs Roberts contacted the RBHSC. They queried the management of her fluids and asked whether hyponatraemia might not have played a part in her death. Only then was the Coroner notified. He conducted an inquest in May 2006 and found that hyponatraemia due to SIADH had contributed to the cerebral oedema which caused her death. He also found an indeterminate contribution from meningo-encephalitis and status epilepticus.

Lucy Crawford

Lucy was born on 5th November 1998 and admitted to the Erne Hospital on 12th April 2000 with a history of drowsiness and vomiting. The vomiting may have caused dehydration and she was assessed an appropriate candidate for IV fluid replacement. Blood tests revealed normal sodium levels and an
IV infusion of Solution No.18 was commenced. However, she was given an excessive volume of Solution No.18 at an excessive rate. In the early hours of 13\textsuperscript{th} April she suffered a seizure. Her serum sodium levels had fallen significantly since admission. She was transferred to PICU in the RBHSC where she was pronounced dead the following day. Her death was not formally notified to the Coroner. A hospital post-mortem was performed and a death certificate issued citing cerebral oedema due to dehydration and gastroenteritis as the cause of death. Lucy’s parents were concerned with the treatment she had received at the Erne Hospital and did not feel that the cause of her death had been adequately explained to them.

The Erne hospital conducted a review of her case and sought the opinion of Dr Murray Quinn, Consultant Paediatrician of the Altnagelvin Area Hospital. He concluded that the cause of Lucy’s seizure and cerebral oedema could not be determined with confidence but that her fluid therapy had been acceptable. There the matter would have rested but for the concern of Mr Stanley Millar, Chief Officer of the WHSSC, who referred her death to the Coroner. The subsequent verdict at inquest was that Lucy’s death was caused by cerebral oedema due to acute dilutional hyponatraemia in the context of gastroenteritis. In terms, the Coroner found that the cerebral oedema had not been due to dehydration but rather to excessive rehydration with Solution No.18. Revised terms of reference restricted the Inquiry to an investigation of what had happened after Lucy’s death and specifically to the failure to correctly identify the cause of her death.

\textit{Raychel Ferguson}

Raychel was born on 4\textsuperscript{th} February 1992 and enjoyed a childhood of excellent health. She was admitted to Altnagelvin Area Hospital on the evening of 7\textsuperscript{th} June 2001 with pain on urination, stomach ache and nausea. She underwent an uneventful appendectomy that night. On admission her sodium levels had been normal and she was placed on an IV infusion of

\textsuperscript{17} 325-002-011
Solution No.18 which was re-commenced after surgery. The rate of fluid administration was marginally more than it should have been. Raychel vomited repeatedly over the course of the following day and her parents expressed concern. Notwithstanding that her condition deteriorated, her sodium levels were not reassessed, her fluid balance was not monitored and her IV infusion continued until she suffered a collapse in the early hours of 9th June. Her sodium levels were then found to be exceptionally low. She had acute hyponatraemia and was transferred to PICU at RBHSC where she was pronounced dead the next day. Raychel’s parents did not feel they were given a satisfactory explanation. Her death was notified to the Coroner who found at inquest that she had died from cerebral oedema caused by hyponatraemia which had been caused in turn by a combination of inadequate electrolyte replacement in the face of severe post-operative vomiting and water retention resulting from anti-diuretic hormone activity.

1.44 After Raychel’s death Altnagelvin reviewed her case and having identified shortcomings in clinical care, set about addressing them. It also took steps to draw the risks attaching to the infusion of Solution No.18 and hyponatraemia to the attention of the CMO and a wider medical audience. This prompted the Department to prepare its Guidance for the Prevention of Hyponatraemia in Children.

Conor Mitchell

1.45 Conor was born on 12th October 1987 with spastic tetraplegia, cerebral palsy and mild epilepsy. He was admitted onto an adult medical ward at the Craigavon Area Hospital (‘CAH’) on 8th May 2003 with a history of vomiting and malaise. He was given IV fluids but unlike the other children, received an isotonic solution rather than Solution No.18. Nonetheless, his condition deteriorated and his family expressed concern. He suffered two seizures in the evening and was transferred to PICU at the RBHSC the following day. He was pronounced dead on 12th May. His family were concerned about the care he had received. The Coroner commissioned expert opinion and conducted an inquest but the precise cause of Conor’s
death remained unclear. There was cerebral oedema but no obvious cause. Notwithstanding that the Coroner considered the fluid management to have been acceptable, concerns were raised about whether the Department’s hyponatraemia guidance had been followed properly, or at all, and whether the fluid therapy administered was appropriate.

1.46 It was a matter of particular interest to this Inquiry to determine whether the guidance introduced in consequence of Raychel’s death was being followed. Accordingly, I directed investigation into the way in which the guidance had been issued by the Department and the means by which it had been implemented and enforced. Conor’s case was selected for scrutiny so as to permit inquiry into how the hyponatraemia guidance had been introduced at CAH, whether Conor’s treatment had been informed by it and whether any changes to practice or procedure had resulted. The terms of reference were accordingly amended so as to permit inquiry into “the circumstances of the death of Conor Mitchell in the context of the guidelines on fluid management in children.”

**The Department**

1.47 One of the fundamental questions for this Inquiry was whether lessons could and should have been learned from the ‘adverse incidents’ described. Whilst clinicians and hospitals were obliged to investigate such incidents it was also necessary to consider whether responsibility for collecting information about such matters extended to the Department. It was necessary to understand the Departmental procedures for assuring delivery of safe healthcare and the extent to which information about healthcare problems, and specifically the deaths of Adam, Claire, Lucy and Raychel, became known to the statutory authorities, and what was done in response.

1.48 Having so closely examined all that had gone wrong it became equally necessary to determine whether it had been put right and to assess what the relevant statutory bodies had done to remedy matters in the years
following the period under review. I was interested to know, for example, if updated systems could be bypassed in a culture which concealed error.

1.49 Accordingly, and when examining the present Health Service and in exploring what might be achieved for the future, I considered that a different approach to information gathering was required of the Inquiry. In order that views could be more readily aired and ideas for improvement exchanged, I directed a forum for opinion and discussion with representatives from the Department, the Belfast Health & Social Care Trust (‘BHSCT’), the Health and Social Care Board (‘HSCB’), Action against Medical Accidents (‘AvMA’), the Patient and Client Council (‘PCC’), Regulation and Quality Improvement Authority (‘RQIA’) and others. Participants were not subject to criticism and it was hoped debate would emerge from the evidence already received, the agenda for discussion and my own questions. Parties were asked for up-to-date information and position papers about the current processes for ensuring the provision of satisfactory healthcare. In particular, submissions were invited in respect of my more significant concerns including the handling of complaints, the notification and investigation of Serious Adverse Incidents (‘SAIs’), the involvement of families and the introduction of a legally enforceable duty of candour. The responses and position papers received were circulated amongst the interested parties and are to be found on the Inquiry website.¹⁸

1.50 Identification of relevant lessons for the future is necessarily dependent upon an understanding of the systems as they are today. The Inquiry has sought relevant up-to-date information and has attempted to note the changes which have occurred in the years since the deaths examined. Given the pace of reform and procedural change in the years since, this has been no easy task. This Report is not to be understood as intending a comprehensive and up-to-the-minute account of the current position.

¹⁸ [http://www.ihrdni.org/supp-eviden-additional-papers.htm](http://www.ihrdni.org/supp-eviden-additional-papers.htm)
Hearings

1.51 The public hearings were conducted over the course of 148 days at The Courthouse, Banbridge, County Down, from February 2012 to November 2013. In all, 179 witnesses gave evidence. Full transcripts of the hearings extending to over 32,000 pages may be found on the website, together with the written closing submissions of 37 of the interested parties.

1.52 In relation to all the cases under consideration (excepting Lucy) evidence was heard and examined in respect of both clinical and governance issues. Hearings were conducted on that basis and in that order. There was occasional and inevitable overlap between clinical and governance evidence. Senior Counsel to the Inquiry opened each stage with a full background statement identifying the facts and issues as then understood. These openings are to be found on the website. It was not the function of counsel to advance any particular case but to test the evidence and assist the process of the Inquiry.

1.53 All hearings were conducted openly and in public, save for one issue considered in private session in accordance with the requirements of the European Convention on Human Rights and two separate and specific orders of the High Court.19 This was done in an attempt to identify the possible whereabouts of the consultant responsible for Claire’s care while protecting the privacy of other patients then receiving treatment within the RHBSC.

1.54 All witnesses were advised as to the general subject matter of questioning in advance. They were questioned by Inquiry counsel. On occasion I permitted the legal representatives of interested parties to pose questions when there was a reasonable basis so to do.

1.55 Salmon letters20 were sent in confidence to those witnesses thought most likely to be criticised, so as to place them on notice. This is done in the

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interests of fairness. I directed such letters be sent to a number of individuals and organisations in accordance with the procedure for hearings.

1.56 Those who assisted the Inquiry and re-lived their experiences in public, did so with dignity and patience. The Inquiry is indebted to them for their invaluable assistance. In particular and in this regard I acknowledge the courage of family members and pay tribute to them.

1.57 The Inquiry also heard from a wide range of clinicians, healthcare professionals and independent expert witnesses. The experience of giving evidence in public was no doubt stressful for many and the Inquiry is grateful.

Evidence

1.58 The Public Inquiry process is investigative and inquisitorial and seeks to determine what has happened in order to better identify what may be learned. Accordingly, I have found myself in a very different position to a judge sitting in a court of law. In identifying what has gone wrong I have inevitably criticised some individuals and organisations, but my findings are not binding and are not determinative of liability.

1.59 This has not been an investigation into allegations of criminal wrongdoing. It has been an investigation into deficiencies in clinical performance and shortcomings in governance control and response. Accordingly, I did not think it correct to adopt the criminal standard of proof when making a finding of fact. I considered the civil standard of proof found on the balance of probabilities to be appropriate. Were it otherwise, my findings would be limited in number by the more onerous criminal burden of proof and would suffer a consequent reduction in scope to identify lessons. The drawing of lessons is the most important task of this Inquiry.

1.60 In applying the balance of probabilities as the standard of proof, I have borne in mind the concepts of ‘common sense’ and ‘inherent improbability’
when reaching a finding of fact. In addition and for the avoidance of doubt, where I permit myself comment expressing suspicion or concern, it is because I think it relevant. It is not a finding of fact. I have striven at all times to be fair.

1.61 I have, of course, assessed the acts and omissions of all involved against contemporaneous expectations and standards and not against those of today. Where there was no consensus as to those standards I have taken that into account. I have not assumed that a written record is proof of its content any more than I have assumed that the absence of record means that something did not happen.

1.62 Passage of time and memory degraded some of the evidence. Given the absence of full investigation at the time of the deaths and the time since lapsed, this was a relevant consideration. Nonetheless, I was surprised at how little some witnesses found themselves able to recall.

1.63 I am conscious that the individuals who are criticised were not able to defend themselves as they might in adversarial proceedings and were circumscribed in their right to make representations. I am also aware that individuals who are criticised may attract adverse publicity affecting both reputation and career. Therefore where critical comment is made of an individual, it must be assessed in the context of the limitations of the process.

**Costs**

1.64 Inquiry costs are as set out at Appendix 10.

**Report**

1.65 This Report deals in turn with the deaths of Adam and Claire, the events that post-dated Lucy’s death, Raychel’s case and the fluid management and organisational issues presented by Conor’s treatment.
1.66 The role and involvement of the Department in these specific cases and in general is dealt with in a separate chapter as is my assessment of the progress and current involvement of the Department and Health Service.

1.67 In general, and unless otherwise stated, I have accepted the evidence as recited. Whilst I have had regard to all the evidence and to the submissions made, I have not referenced it all in the Report or made fully reasoned decisions for each and every issue of fact because to do so would unduly extend the Report. Footnoted references are given for fact or quotation or otherwise to explain. Where significant dispute has arisen as to fact, I have given a fuller reasoning for my conclusion. It is important when considering my treatment of the facts as well as my comments, criticisms and conclusions, to read them in context, just as the Report itself must be read in its entirety.

1.68 The Report does in large measure deal with all those issues appearing in the list of issues. However, some matters once thought germane, were found on examination to have less relevance to the overall view, in which circumstances they do not always find detailed reference in the Report. It has been inevitable that some material and evidence will be referred to in more than one chapter. Whilst repetition has been kept to a minimum, in some contexts it has been permitted in aid of clarity.

1.69 I acknowledge the assistance of counsel to the Inquiry in the assessment of the evidence and its significance. However, the conclusions of the Report are mine and mine alone.

**Recommendations**

1.70 I set out my recommendations to strengthen and improve practice and systems in the hope that the failings found, cannot easily be repeated. The recommendations are presented in Chapter 9 of this Report. It is for the Department of Health to take them forward. Many will doubtless require significant detailed consideration to enable implementation. I expect the Department to indicate not only which of my recommendations it accepts
but also to make clear how and when implementation is to be achieved. Further and subsequent reports should then be made detailing progress towards implementation with a final published confirmation of same.

**Delay**

1.71 I accept there has been delay in the presentation of my Report. This is regrettable but has been due to a number of factors starting with the suspension of all work from October 2005 - May 2008 to allow a police investigation into the deaths of Adam, Lucy and Raychel. A detailed revision of the terms of reference, in consultation with all concerned, then followed. The scope of the terms of reference (both original and revised) required an ambitiously broad and time consuming range of investigation. Analysis of differing expert opinion in complex areas of hyper-specialism was particularly demanding. Differences of opinion required that not only the evidence and the clinical basis for conclusion be tested, but also underlying expert assumptions.

1.72 The scope of the Inquiry’s work broadened to examine the deaths (in various respects) of five children over a period of eight years. The work of the Department and the Chief Medical Officer together with clinicians and administrators from the following came within the remit of the Inquiry’s investigation:

(i) Royal Belfast Hospital for Sick Children.

(ii) Royal Group of Hospitals Trust (now Belfast Health & Social Care Trust).

(iii) Eastern Health & Social Services Board (now Regional Health & Social Care Board).

(iv) Erne Hospital.

(v) Sperrin Lakeland Trust (now Western Health & Social Care Trust).

(vi) Altnagelvin Area Hospital.
Altnagelvin Hospital Trust (now Western Health & Social Care Trust).

Western Health & Social Services Board (now Regional Health & Social Care Board).

Craigavon Area Hospital.

Craigavon Area Hospitals Group Trust (now Southern Health & Social Care Trust).

Southern Health & Social Services Board (now Regional Health & Social Care Board).

1.73 In addition, there were other investigations into the circumstances of the children’s deaths, namely at inquest and by the Police Service of Northern Ireland (‘PSNI’). The General Medical Council (‘GMC’) also investigated the conduct of a number of doctors involved with the cases of Lucy and Raychel and the Nursing and Midwifery Council likewise considered complaints relating to nursing care in two of the cases. The detail and documentation thereby generated was all potentially relevant and was analysed in full. Where appropriate it was shared.

1.74 Apart from the very real difficulties experienced in gathering the evidence, investigating and analysing testimony, I found the writing of this report exceptionally time consuming. This was due to the mass and complexity of detail together with the nature and nuance of the evidence. I recognise that it has been delayed and regret that it has taken so long. I offer my sincere apologies for any additional distress which this has caused.

Conclusion

1.75 It is the task of an Inquiry to focus specifically on what has gone wrong, not on what has gone right and such close focus can act as a distorting lens. It is to be stressed that critical comment of an individual does not necessarily imply that the same individual has not otherwise made much positive contribution to healthcare or that the pressures of modern clinical practice
have been taken for granted. It is recognised that untoward clinical incidents can cause terrible suffering, not only for patients and their families but also to the clinical professions.

1.76 The purpose of identifying underperformance is to highlight acts or omissions, attitudes or assumptions to be avoided in the future. Whilst it is proper that individuals be accountable, it is also better to learn than to punish. To place undue emphasis on blame is to encourage the cycle of defensiveness, concealment, indifference to learning and further harm. There is much for all who work in the Health Service to reflect upon and learn from in the sad narratives of this Report. In addition, I recognise that others, including Her Majesty’s Coroners, may draw insight and instruction from what has been revealed.

1.77 However, in each of the cases examined, deficiencies in practice and system did become apparent and in most cases the shortcomings were evident from the outset. Accordingly, I was surprised at how difficult it was to persuade some witnesses to be open and frank with the work of the Inquiry. All too often, concessions and admissions were extracted only with disproportionate time and effort. The reticence of some clinicians and healthcare professionals to concede error or identify the underperformance of colleagues was frustrating and depressing, most especially for the families of the dead children.

1.78 This remained largely the case until 30th August 2013 when Altnagelvin fully and publically accepted its responsibility for the death of Raychel Ferguson. Twelve years had passed since her death and ten years since the start of litigation. Altnagelvin’s concession, whilst belated, was correct and was to be followed by the Belfast and Southern Trusts in October 2013 when they accepted full responsibility for the deaths of Adam and Claire and the failings revealed in Conor’s case. They proffered formal apology for all the hurt caused by the acts and omissions of the Trusts. This was a

21 T-30-08-13 p.1
22 T-17-10-13 p.2 et seq
welcome and partial vindication of the work of the Inquiry but was achieved at considerable cost to all.

1.79 It should not have been so. Health service guidance for 25 years and more has repeatedly recommended transparency and openness in the interests of the patient. This has proved inadequate to the problem which is why this Report must recommend a statutory duty of candour in Northern Ireland.
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Introduction

2.1 Adam Strain was born on 4th August 1991 and died on 28th November 1995 in the Royal Belfast Hospital for Sick Children (the ‘Children’s Hospital’) having undergone renal transplant surgery. During his short life he lived with his mother and maternal grandparents in Holywood, Co Down. His devoted mother Debra Slavin paid warm tribute to her son, recalling that "no matter what life threw at him he faced it with a smile, he was such a happy little boy who endured more in his four short years than most people go through in a lifetime."

2.2 Adam was born with cystic dysplastic kidneys and a medical abnormality known as vesico-ureteric reflux causing him repeated and damaging urinary tract infection. He endured five surgical operations to re-implant the ureter and another procedure to treat gastro-oesophageal reflux. On a number of occasions he became critically ill and was admitted into Intensive Care. Feeding and nutrition were problematic and it became necessary to administer gastronomy feeds. Eventually he refused all feeds and took nothing by mouth. His condition deteriorated and he suffered renal failure necessitating peritoneal dialysis. Adam produced urine of poor quality and was described as polyuric. His kidneys were unable to regulate the salt content of his urine very well and he had suffered acute hyponatraemia following surgery in November 1991. He was assessed a potential candidate for renal replacement (without which he would not have survived) and was placed on the transplant register in July 1994.

2.3 Throughout this period he was the patient of Professor Maurice Savage, Consultant Nephrologist, who co-ordinated his “care, prescribed and monitored his dialysis treatment with support from a dietician, psychologist,
social worker, the renal nursing team, and of course his mother”⁹ who actually performed the home dialysis.

Expert reports

2.4 The Inquiry, guided by its advisors, engaged the following experts to address specific issues:

(i) Dr Simon Haynes¹⁰ (Consultant in Paediatric Cardiothoracic Anaesthesia and Intensive Care, Freeman Hospital, Newcastle-upon-Tyne) who provided reports on anaesthetic matters.¹¹

(ii) Dr Malcolm Coulthard¹² (Honorary Consultant Paediatric Nephrologist, Royal Victoria Infirmary, Newcastle-upon-Tyne) who reported on the roles and responsibilities of the nephrologists involved in Adam’s case and analysed the management of Adam’s fluid balance and electrolytes.¹³

(iii) Professor John Forsythe¹⁴ (Consultant Transplant Surgeon, the Royal Infirmary of Edinburgh and Honorary Professor, University of Edinburgh) and Mr Keith Rigg (Consultant Transplant Surgeon, Nottingham University Hospitals NHS Trust), who provided joint reports addressing aspects of paediatric renal transplant surgery.¹⁵

(iv) Professor Dr Peter Gross¹⁶ (Professor of Medicine and Nephrology, Universitätsklinikum Carl Gustav Carus, Dresden) who provided reports on hyponatraemia and fluid management.¹⁷

(v) Ms Sally Ramsay¹⁸ (former Director of Nursing and Family Services and Director of Nursing, Quality and Clinical Support at Great
Ormond Street Hospital for Children, NHS Trust) who advised on nursing care at the Children’s Hospital and in particular the care given Adam in November 1995.\textsuperscript{19}

(vi) Professor Fenella Kirkham\textsuperscript{20} (Professor of Paediatric Neurology, Institute of Child Health, London and Consultant Paediatric Neurologist, Southampton General Hospital) who provided neurological opinion as to the effect of fluid infusion upon the brain and the possible contribution, if any, of venous obstruction to Adam’s cerebral oedema.\textsuperscript{21}

(vii) Dr Waney Squier\textsuperscript{22} (Consultant Neuropathologist and Clinical Lecturer, John Radcliffe Hospital, Oxford) who advised on the histological slides of brain tissue and the autopsy photographs of Adam’s brain.\textsuperscript{23}

(viii) Dr Caren Landes\textsuperscript{24} (Consultant Paediatric Radiologist, Alder Hey Children’s NHS Foundation Trust) who reported on the chest x-rays taken at 13:20 and 21:30 on 27\textsuperscript{th} November 1995.\textsuperscript{25}

(ix) Dr Philip Anslow\textsuperscript{26} (Consultant Neuroradiologist, Radcliffe Infirmary, Oxford) who interpreted CT scans dated 7\textsuperscript{th} July 1995 and 27\textsuperscript{th} November 1995.\textsuperscript{27}

(x) Professor Dr Dietz Rating (Consultant in Paediatric Neurology at the Children’s Hospital at the University of Heidelberg) who reported on neurological issues arising in Adam’s case.\textsuperscript{28}
(xi) Professor Aidan Mullan\textsuperscript{29} (former Acting Chief Executive Officer and Director of Nursing and Clinical Governance, North Tees and Hartlepool NHS Trust) who provided his opinion on clinical governance issues.\textsuperscript{30}

(xii) Mr Stephen Ramsden\textsuperscript{31} (Chief Executive Officer of the Luton & Dunstable Hospital NHS Foundation Trust), who reported on hospital management and governance issues.\textsuperscript{32}

(xiii) Professor Sebastian Lucas\textsuperscript{33} (Department of Histopathology, St Thomas’ Hospital London) who commented on Adam’s autopsy and other aspects of coronial autopsy practice.\textsuperscript{34}

(xiv) Mr Geoff Koffman\textsuperscript{35} (Consultant Transplant Surgeon at Guy’s and St Thomas’s NHS Foundation Trust) who provided a report on the transplant surgery.\textsuperscript{36}

2.5 The Inquiry also had the benefit of expert opinion commissioned by the Coroner and the Police Service of Northern Ireland (‘PSNI’) from:

(i) Professor Peter Jeremy Berry (Professor of Paediatric Pathology, University of Bristol) who reported to the Coroner on 23\textsuperscript{rd} March 1996.\textsuperscript{37}

(ii) Dr Edward Sumner (Consultant Paediatric Anaesthetist at Great Ormond Street Childrens’ Hospital) who reported for the Coroner on 22\textsuperscript{nd} January 1996\textsuperscript{38} and the PSNI in September 2005.\textsuperscript{39}
(iii) Mr Geoff Koffman (Consultant Surgeon at Guy’s & St Thomas Hospital and Great Ormond Street Hospital, London) who provided a report to the PSNI on 5th July 2006.40

(iv) Dr John Alexander (Consultant Anaesthetist at Belfast City Hospital) who provided his expert opinion to the Coroner on 5th January 1996.41

Schedules compiled by the Inquiry

2.6 In an attempt to summarise the very considerable quantities of information received, the following schedules and charts were compiled:

(i) Chronology of events (clinical).42

(ii) List of persons - clinical.43

(iii) Schedule detailing experience of the anaesthetists and surgeons involved.44

(iv) Schedule of anaesthetic nurses and trainee anaesthetists involved.45

(v) Schedule detailing education and training of doctors involved.46

(vi) Table detailing education & training of nurses involved.47

(vii) Chronology of hospital management and governance.48

(viii) List of persons - governance.49
(ix) Chronology relating to draft recommendations submitted to the Coroner.\textsuperscript{50}

(x) Summaries of Inquiry expert opinion as to contributory factors to death, given before and after Newcastle-upon-Tyne meeting of experts (March 2012).\textsuperscript{51}

(xi) Glossary of Medical Terms\textsuperscript{52}

2.7 All of the above, together with the reports of the Inquiry experts, have been published on the Inquiry website.

**The Paediatric Transplant Service**

2.8 Professor Savage was appointed Consultant Paediatrician and Nephrologist at the Children’s Hospital in 1980.\textsuperscript{53} He is a Fellow of both the Royal College of Physicians (‘RCP’) and the Royal College of Paediatrics and Child Health (‘RCPCH’). He is now Professor Emeritus of the Medical Faculty of The Queens University of Belfast. For 15 years he was the only consultant paediatrician and nephrologist working in Northern Ireland but was always careful to maintain his broader professional contacts through the European Society of Paediatric Nephrology.\textsuperscript{54}

2.9 A paediatric renal transplant programme was started in 1980 at the Belfast City Hospital (‘BCH’) which was, at that time, providing an established adult transplant service.\textsuperscript{55} Professor Savage subsequently arranged for some paediatric renal transplants to be performed at the Children’s Hospital as well. The first renal transplant involving a child younger than five years took place in the Children’s Hospital in 1990.\textsuperscript{56} Whilst the BCH (which was run by a different Trust to that of the Children’s Hospital) was the recognised

\textsuperscript{50} 306-122-001
\textsuperscript{51} 306-016-130 & 306-017-146
\textsuperscript{52} 303-002
\textsuperscript{53} 306-018-004
\textsuperscript{54} 306-018-001 et seq
\textsuperscript{56} 300-021-033
Renal Transplant Centre for Northern Ireland, it appears that the Royal Group Hospitals Trust (the ‘Trust’) assumed control of those paediatric renal transplants performed in the Children’s Hospital.57

2.10 Professor Savage became the moving force behind a gradual transfer of paediatric renal transplant surgery to the Children’s Hospital. He explained that “as we gradually developed the service... and as we gained the skill to dialyse and transplant smaller and smaller children, it became obvious that we should be taking those children into the environment of a children’s hospital...”58

2.11 Paediatric renal transplants were a comparatively recent innovation in the 1980s and 1990s. Between 1984 and 1993 there were 1,406 paediatric renal transplants in the UK59 of which less than 10% involved children under the age of five years. In Northern Ireland an Ulster Medical Journal review of the years 1984-98 recorded 77 transplants for patients under 18 years.60

2.12 There was then comparative inexperience at both the BCH and the Children’s Hospital in renal transplant surgery for children as young as Adam.61 There was no dedicated paediatric renal transplant surgeon and there had been no paediatric transplants involving a living donor.62 The provision of cadaveric transplants meant that the Paediatric Renal Transplant Service was reliant upon the availability of the necessary expertise and resources ‘around the clock.’ On occasion, the offer of a kidney had to be declined because of the lack of key nephrology or surgical staff or the want of a post-operative intensive care bed.63

2.13 The British Association for Paediatric Nephrology produced a working party report in March 1995 on ‘The Provision of Services in the United Kingdom
for Children and Adolescents with Renal Disease\textsuperscript{64} which provides insight into paediatric nephrology and transplantation practice at that time. It recommended that to accumulate and maintain expertise, a population base of 3 million was the minimum necessary to sustain a comprehensive paediatric renal service although a population of 4 million was deemed optimal. However, it was recognised that some exceptions to this proposition were necessary and on geographical grounds Northern Ireland was recognised as a justifiable exception, notwithstanding a population in 1995 of approximately 1.6 million.\textsuperscript{65}

2.14 Northern Ireland paediatric transplant statistics at that time reveal comparable outcomes to those recorded in other transplant centres in the UK.\textsuperscript{66} Such is testimony to the work of Professor Savage and the anaesthetists, surgeons and nurses who collectively provided the paediatric renal transplant service. Accordingly, Dr Coulthard considered that the Children’s Hospital did have the experience, infrastructure and case load to undertake paediatric renal transplants in 1995.\textsuperscript{67} However, it was also clear that by 1995 the service required a second consultant to assist Professor Savage.

2.15 To that end Dr Mary O’Connor\textsuperscript{68} was appointed as an additional Consultant Paediatric Nephrologist in the Children’s Hospital on 1\textsuperscript{st} November 1995.\textsuperscript{69} She had trained under Professor Savage and advanced her specialism at the Southmead Hospital, Bristol.\textsuperscript{70} She returned to Belfast a little less than four weeks before Adam was admitted.\textsuperscript{71} Her appointment gave Professor Savage a consultant colleague with whom to share the workload and develop the service.

\textsuperscript{64} 306-065-001
\textsuperscript{65} ‘Population and Migration Estimates Northern Ireland’ (statistical report, NISRA 2011)
\textsuperscript{66} 306-065-027 & Transcript 17-04-12 p.24 line 21
\textsuperscript{67} 200-007-111
\textsuperscript{68} 303-001-002
\textsuperscript{69} WS-014-1 p.2
\textsuperscript{70} 306-030-001
\textsuperscript{71} WS-014-1 p.2
At that time Professor Savage prepared for transplant operations using a procedure protocol he had drawn up in 1990. This was a brief document developed as a checklist to be attached to the medical records of the patient in order to better inform the doctors and nurses involved. Dr O'Connor brought to Belfast a copy of the protocol used in Bristol which had been updated to 1995 and was a more detailed and comprehensive guide. It set out very clearly the steps to be taken from point of acceptance of a donor kidney for transplant through to the post-operative care to be delivered. This updated protocol was to be adopted in Belfast but not before Adam’s death.

Likewise, developments emerging from other transplant centres had yet to be adopted in Belfast. An important innovation referred to by Professor Forsythe and Mr Rigg was the detailed consideration of a patient’s case at the time of acceptance onto the transplant list. This was to be undertaken by a multi-disciplinary team including nephrologists, surgeons and renal nurses in order to better identify patient-specific issues. These could range from assessments of urgency and general health to necessary preparatory procedures and surgical difficulties. A summary of these considerations might then attach to the medical record and thereby save the transplant team valuable time when an offer of a donor kidney was made. An inherent disadvantage of cadaveric transplant surgery is that the timing of the offer of the donor kidney is unpredictable. If a kidney is a reasonable match then the necessity to accept it places pressure on the transplant team to act quickly. In such a context the advantage of preparatory work is clear.

I do not criticise Professor Savage’s 1990 Protocol nor the absence of multi-disciplinary team input because these developments had not yet become
standard by 1995. The existence of better practice elsewhere does not mean that the practices of the Children’s Hospital were sub-standard.

**July 1994 - November 1995**

2.19 Professor Savage had lengthy discussions with Ms Slavin at the time Adam was placed on the transplant register. She had volunteered donation of one of her own kidneys. Professor Savage did not support this idea (although success rates were favourable) because Ms Slavin was a single mother and were complications to arise then her ability to care for Adam might be affected, and even if all went well she might take months to recuperate. I cannot disagree with that approach.

2.20 Additionally, it has been suggested that the possibility of transfer to another transplant centre such as Great Ormond Street Hospital in London ought to have been discussed. However, Professor Savage maintained that he did not then believe that it was beyond the ability of local paediatric anaesthetists and surgeons with relevant experience to treat Adam and “as there was only one venue for transplant surgery in Northern Ireland for a child of Adam’s age, I did not offer Ms Slavin any other venue for the transplant.” While this was not unreasonable it would have been better had he discussed it with her.

2.21 Professor Savage described how Ms Slavin was given a copy of the ‘Kidney Transplantation in Childhood… a Guide for Families’ which explained that “Placement on the transplant waiting list follows discussion with the kidney specialist and transplant surgeon.” Ms Slavin could not remember this document nor indeed any discussion with a transplant surgeon. Professor Savage conceded that “the transplant surgeon did not participate in these multi-disciplinary team meetings, except by special arrangement, as he

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78 WS-002-3 p.6  
79 Professor Savage T-17-04-12 p.68-69  
80 Professor Savage T-17-04-12 p.70  
81 Professor Savage T-17-04-12 p.74 line 13  
82 WS-002-3 p.11  
83 Professor Savage T-17-04-12 p.74 line 15  
84 City Hospital Nottingham - WS-002-3 p.124  
85 WS-002-3 p.127
worked not on the Royal Victoria site but on the Belfast City site”\textsuperscript{86} and accepted that “it would have been better if one of the transplant surgeons had met Adam in advance... it’s one of my regrets that we didn’t have that arrangement.”\textsuperscript{87}

2.22 Professor Savage acknowledged that he did not make a record of what he said to Ms Slavin\textsuperscript{88} at that time but described how the relevant “information is repeated and drip fed over many months, not just by me, but by our renal nurse specialists...in the ward and by our social worker, by perhaps the psychologist...so that information is generally reiterated and built up.”\textsuperscript{89}

2.23 Photographs taken of Adam just a fortnight before his renal transplant show him looking happy and well. His mother described him, despite his renal problems, as being “back on top form again. He was really well at that point.”\textsuperscript{90} Accordingly, it is clear that while Adam required a transplant he was not an emergency patient and, if a donor kidney was not a particularly good match, it did not have to be accepted. Of course, were a reasonable match to become available then it would have been a good time to proceed because he was comparatively well.

**Offer of kidney, Sunday 26\textsuperscript{th} November 1995**

2.24 A donor kidney became available at the Glasgow Southern General Hospital at 01:42 on Sunday 26\textsuperscript{th} November 1995 from a 16 year old who had enjoyed previous good health.\textsuperscript{91} The kidney was formally offered to Professor Savage and it seems that he discussed it first with Ms Slavin, then Dr Robert Taylor,\textsuperscript{92} the on-call Consultant Paediatric Anaesthetist at

\textsuperscript{86} WS-002-3 p.19-20 & Professor Savage T-17-04-12 p.83 line 11
\textsuperscript{87} Professor Savage T-17-04-12 p.89 line 9
\textsuperscript{88} WS-002-3 p.11
\textsuperscript{89} Professor Savage T-17-04-12 p.82 line 13
\textsuperscript{90} WS-001-1 p.2
\textsuperscript{91} 306-007-043 & 059-006-012
\textsuperscript{92} 303-001-003
the Children’s Hospital,93 and then Mr Patrick Keane,94 a Consultant Urologist at BCH with transplant experience.

2.25 Dr Taylor was an experienced consultant who had previously anaesthetised Adam but had not previously acted as lead anaesthetist in a renal transplant. Nonetheless, he was a consultant paediatric anaesthetist in a regional centre and one who had responsibility for critically ill children in intensive care. He should therefore have had the necessary skills to manage Adam safely.95

2.26 Mr Keane had extensive experience of adult transplant surgery and had previously undertaken four paediatric transplants,96 the most recent being only weeks before and on a three year old child.97 He was therefore an appropriate surgeon in the local context.

2.27 Mr Keane required confirmation that the donor kidney was a reasonable match for Adam. Only limited information was available about donor size, age and anatomy. However, it was established that the tissue type match was an acceptable 50%98 and that the kidney could be brought to Belfast within a cold ischaemic time (‘CIT’) of 24 hours.99

2.28 On that basis Professor Savage conferred with Ms Slavin and decided to accept the kidney.100 Adam was admitted to the Children’s Hospital at 20:00 on 26th November 1995101 at which time the donor kidney had a CIT of about 19 hours. That was close to the 24 hour optimal CIT period within which to commence surgery.102

2.29 There was some disagreement between Professor Savage and Mr Keane as to the extent of the surgeon’s involvement in the decision to accept the
kidney.\textsuperscript{103} I do not however, attach much significance to the lack of clear recollection\textsuperscript{104} of the events of that Sunday evening, given that much time has passed since and those discussions became relatively unimportant given what was to happen in the next 24 hours.

2.30 Nor do I intend to analyse the much debated issue of the viability of the donor kidney given its CIT. Mr Keane believed that it was acceptable and Mr Koffman agreed.\textsuperscript{105} Professor Forsythe and Mr Rigg did not think that they themselves would have accepted the kidney, but recognised that other UK transplant surgeons might have.\textsuperscript{106} It had been removed from its donor early on the morning of 26\textsuperscript{th} November 1995 and offered to Professor Savage in the afternoon, perhaps having already been offered elsewhere.\textsuperscript{107} It was flown to Belfast with an intention of transplantation between 01:00 and 02:00 on 27\textsuperscript{th} November.\textsuperscript{108} However, and for reasons which remain unclear, the operation was delayed until approximately 08:00\textsuperscript{109} by which time the CIT was approximately 30 hours. It is impossible to be certain that the kidney was viable at the time of implantation but the likelihood is that it was. Whilst a CIT of 30 hours was certainly less than ideal and more than Professor Savage would have wanted, it was not the cause of Adam’s death. In addition, Mr Keane considered that the kidney was a sufficiently good match to warrant transplant.\textsuperscript{110} Expert evidence was received from those who agreed with this proposition and some who did not.\textsuperscript{111} However, on the basis that it has not been strongly suggested that death was associated with transplantation of an unsuitable kidney, I do not intend to make any finding on this issue.

\textsuperscript{103} WS-006-3 p.23 & Professor Savage T-17-04-12 p.131 line 24  
\textsuperscript{104} Professor Savage T-17-04-12 p.140 line 23  
\textsuperscript{105} 205-002-009  
\textsuperscript{106} 203-004-064  
\textsuperscript{107} Professor Savage T-18-04-12 p.14 line 17  
\textsuperscript{108} Professor Savage T-18-04-12 p.14  
\textsuperscript{109} 093-038-127 & WS-006-3 p.12  
\textsuperscript{110} Mr Keane T-24-04-12 p.9 line 22  
\textsuperscript{111} 205-002-009 & Professor Forsythe T-04-05-12 p.16
**Recruiting the transplant team**

2.31 Professor Savage was responsible for bringing together the team for Adam’s transplant and in particular for recruiting the anaesthetist and the surgeon.\(^{112}\) Confirmation of operating theatre availability and a post-operative bed in the Paediatric Intensive Care Unit (‘PICU’) must also have been obtained.\(^{113}\)

2.32 Discussions with Dr Taylor ensued and he “agreed to provide general anaesthesia for Adam with an experienced senior registrar, Dr T Montague, experienced theatre nursing staff and the ready access to experienced surgeons, and nephrologists…”\(^{114}\)

2.33 Dr Terence Montague,\(^{115}\) a Senior Registrar in anaesthesia, was recruited by Dr Taylor directly. He had no previous experience of paediatric renal transplants\(^{116}\) and indeed “from January 1995 until November 1995 [he] had not actually anaesthetised any children, supervised or unsupervised.”\(^{117}\) It seems that his commitment was for a limited period only\(^{118}\) because his 24 hour shift was to end at 09:00 on Monday 27\(^{th}\) November.\(^{119}\) His contribution was not therefore intended to be significant.

2.34 Over the course of the Sunday evening Professor Savage continued to assemble the transplant team.\(^{120}\) The details cannot now be recalled,\(^{121}\) but Mr Keane was to be assisted by Mr Stephen Brown,\(^{122}\) a senior Consultant Paediatric Surgeon who had operated on Adam before. Whilst his experience and familiarity with Adam ought to have recommended him, Ms Slavin was not informed of his inclusion and has said that she had previously made it clear to Professor Savage that she “**did not want Mr**
Brown to be involved in any surgery with Adam because previous experience had left me with no faith in him."\textsuperscript{123}

2.35 Professor Savage conceded that he knew of Ms Slavin’s concerns, but it is not clear that he knew the full extent of them\textsuperscript{124} and Mr Brown may not have been aware of these concerns at all. Indeed he said that had he known of her objection he would not have agreed to assist Mr Keane.\textsuperscript{125} In any event the role of the assistant surgeon was limited and, given that Mr Brown had no previous transplant experience,\textsuperscript{126} his role was always intended to be limited.

2.36 Even after Adam’s admission and until such time as the compatibility tests with the donor kidney had been satisfactorily concluded, there remained some uncertainty as to whether the transplant would proceed.\textsuperscript{127} Professor Savage believed that a positive compatibility result was received at some time after 01:00 hours on 27\textsuperscript{th} November.\textsuperscript{128} It was then that he obtained Ms Slavin’s consent to surgery.\textsuperscript{129}

**Consent process**

2.37 The consent of a parent on behalf of a child to something so serious as transplant surgery is an important matter. The fact that Adam was on the transplant register with his mother’s approval did not mean that she would automatically consent to the surgery. Professor Savage had been closely involved with Adam’s care and it must therefore have seemed natural that he would obtain her consent. He explained that in 1995 it was not uncommon for the “initial consent to be obtained by someone other than the surgeon carrying out the procedure”\textsuperscript{130} and accordingly he sought the consent.\textsuperscript{131} However, at that time Ms Slavin had neither spoken with the

\textsuperscript{123} WS-001-1 p.2
\textsuperscript{124} Professor Savage T-17-04-12 p.167 line 19
\textsuperscript{125} Mr Brown T-01-05-12 p.9 line 6-11
\textsuperscript{126} WS-007-1 p.3
\textsuperscript{127} WS-002-2 p.13
\textsuperscript{128} WS-002-2 p.13
\textsuperscript{129} WS-002-2 p.12
\textsuperscript{130} WS-002-3 p.27
\textsuperscript{131} WS-002-3 p.5
intended anaesthetist or surgeon nor, does she believe, discussed the risks involved, recalling “the only complication that was discussed with me was that of rejection.” Professor Savage remembered things differently, believing that he had discussed with her the process of the operation, the suitability of the donor kidney and the likelihood of a successful transplant. He believed that she “was aware of risks associated with surgery” excepting only the risk of fluid mismanagement because he did not foresee that as a likely problem.

2.38 The signed consent form is the sole record of their conversation and it contains scant detail. Likewise, Professor Savage was “unable to identify in Adam’s notes any recording of the discussions... in relation to obtaining consent, nor in relation to the detail of the transplant surgery.” He explained that it was “not my habit at that time to make such detailed notes, but would now be standard practice. Modern consent forms now require the list of potential complications discussed to be recorded. This was not so in 1995.”

2.39 It was suggested that Mr Keane, as lead surgeon, should have obtained the consent. It is clear that had Mr Keane or Dr Taylor spoken to Ms Slavin at that time they would then have had to examine Adam’s medical history and condition. That alone would have constituted an important step in preparation for the surgery and justification in itself for their engagement in the consent process.

2.40 My concern relates not so much to the fact that Professor Savage obtained the consent but rather that he did so before Ms Slavin had spoken to the surgeon or learned of the identity and experience of the transplant team. The Trust had at that time formally acknowledged that “patients and their

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132 WS-001-2 p.7-8
133 WS-001-2 p.5
134 WS-002-3 p.5 & Professor Savage T-18-04-12 p.33
135 Professor Savage T-18-04-12 p.48 line 5-15
136 Professor Savage T-18-04-12 p.48 line 17
137 058-039-185
138 WS-002-3 p.11
139 WS-002-3 p.11
140 203-002-032
families [are] entitled to be told the name and status of each person involved in their care.” Mr Keane considered that he ought to have been part of the process of consent and indeed Professor Savage had the opportunity to involve him. In the circumstances, I consider that, on balance, it was inappropriate for Professor Savage to have proceeded to take the consent as he did.

2.41 Evidence revealed that a new and detailed consent form had been issued to the Trust by the Management Executive of the Department in October 1995 with the direction that it be introduced by 31st December 1995. The fact that it was not used in relation to Adam five weeks before the deadline cannot be a matter for criticism. What is however a matter of much more particular concern, is that it took almost five years before it was eventually adopted in the Children’s Hospital.

**Overnight**

2.42 Adam was admitted at about 21:00 hours on 26th November 1995 to Musgrave Ward in the Children’s Hospital. He was seen by Dr Jacqueline Cartmill who prescribed fluids and took blood samples as part of routine pre-operative hospital procedures. A normal serum sodium concentration of 139mmol/L was recorded.

2.43 Dr Coulthard gave it as his view that “if you put all the evidence together as to what condition he was in when he went to theatre, everything else points to him being in a relatively good condition.”

2.44 In the early hours of Monday morning Dr Montague was contacted because of difficulty in re-siting the cannula used for the infusion of intravenous (‘IV’)

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142 Mr Keane T-24-04-12 p.135 line 5
143 Professor Savage T-18-04-12 p.32 line 4
144 305-002-004
145 210-003-022
146 057-013-017
147 303-001-002
148 058-035-144
149 058-035-144 as confirmed by Dr O’Connor T- 25-04-12 p.137 line 8
150 307-008-184
fluid. Dr Montague considered that if the paediatric doctors on the ward were unable to reinsert the cannula then it was unlikely that he could. Accordingly, he telephoned Dr Taylor for advice and was told that Dr Taylor would attend to it in theatre. As Adam was distressed it was decided to leave it until then.

**Preparation for theatre**

2.45 Dr Haynes explained that “preoperative assessment is an integral part of the anaesthetist’s duties... If not performed adequately, mistakes will inevitably be made.” Accordingly, and as part of that assessment, he would have expected Dr Taylor to have taken steps to ascertain the nature of Adam’s renal pathology, and to have noted his normal fluid balance, fluid intake, insensible fluid losses and urine production. Furthermore, in his view, Dr Taylor should have taken time to understand Adam’s electrolyte requirements and the fact that he could not regulate urinary sodium losses and required sodium supplements to maintain normal sodium serum levels. Dr Haynes emphasised that in particular Dr Taylor should have understood the “central importance” of Adam’s previous history of hyponatraemia and its implications for fluid management.

2.46 Dr Taylor did not attend on the Sunday evening to assess Adam or meet Ms Slavin. He now recognises that this “was a mistake.” Had he done so he would have had time to examine the extensive case record and note that inadequate sodium administration and/or water overload had previously resulted in hyponatraemia (including one instance when he had himself administered the anaesthetic in December 1991). He could then
have planned his IV fluid therapy in light of known risk and discussed any queries with Professor Savage.

2.47 Similarly, Mr Keane did not attend at the Children’s Hospital on Sunday 26th November to meet with Adam and Ms Slavin. He apologised for this omission but was unable to explain it.

2.48 At one stage it had been hoped to operate at approximately 02:00 on Monday; it was then decided to start at 06:00 and finally surgery was rescheduled for 07:00. Delay may have been justified in the hope of a well-rested transplant team but each delay increased the CIT. By 07:00 the donor kidney CIT was approximately 30 hours.

2.49 Professor Savage acted appropriately to ensure that Adam was in a suitable condition when he finally went to theatre. He had oversight of the overnight dialysis which was important because it affected both Adam’s fluid balance and his serum sodium levels. Notwithstanding, there is no record of his fluid balance upon completion of the dialysis at 05:00 nor any indication of the urinary sodium concentration. Whilst Professor Savage liaised with Dr Taylor and communicated relevant information including fluid status, urine output, and Adam’s “propensity to develop hyponatraemia,” Dr Taylor may not have been given the fullest of information and may not have read Professor Savage’s Renal Transplant Protocol. In any event, Dr Taylor did not make any record of what Professor Savage did tell him.

2.50 Nonetheless, it remained Dr Taylor’s responsibility to assess “the preoperative condition of the patient, including liaison with referring
2.51 It was thus that Adam was submitted to a surgeon and a paediatric anaesthetist whose knowledge in respect of his case was what they had gathered on the telephone late the previous evening\(^{174}\) and what they had learned when presented with his extensive medical record in theatre. That was less than adequate because Adam’s medical history of multiple previous surgical interventions and occasional hyponatraemia made the surgery and anaesthetic more demanding and the nature of his renal condition meant that particular attention had to be paid to the detail of fluid and electrolyte replacement.\(^{175}\) Dr Haynes suggested that the lead up to the transplant surgery meant that Dr Taylor “put himself... on the back foot.”\(^{176}\) I agree and believe that both Dr Taylor and Mr Keane were disadvantaged by inadequate preparation.

**The operation**

2.52 Adam entered the operating theatre at 07:00 hours.\(^{177}\) Ms Slavin accompanied him. He was crying.\(^{178}\) Professor Savage met with Dr Taylor in theatre\(^{179}\) and “*having checked that he felt he had all the information he needed*” withdrew “*and let him get on with the essential things that he had to do...*”\(^{180}\) Dr Taylor then anaesthetised Adam in the presence of his mother.\(^{181}\) No criticism is made of the induction of anaesthesia.

2.53 Throughout the transplant Dr Taylor was to take the lead in the “monitoring of vital signs and fluid/blood management.”\(^{182}\) His task was to assess ECG, blood pressure, temperature, heart rate and central venous pressure
(‘CVP’)\textsuperscript{183} in order to gauge the depth of anaesthesia and the stability of respiratory and cardiovascular systems. He was to make periodic checks on blood loss and urine output in order to manage fluids and perform blood gas tests for serum sodium concentration. In addition, he was to monitor the colour of blood, other losses and the general appearance of the veins so as to assess fluid replacement needs.\textsuperscript{184} Dr Taylor claimed to have made pre-operative fluid calculations to inform his fluid management in respect of deficit, maintenance and blood loss.

2.54 Shortly after the anaesthetic was administered, arterial access was obtained in order to monitor the arterial blood pressure\textsuperscript{185} and permit an assessment of electrolytes. Professor Savage recalled that he “\textit{made it clear to Dr Taylor that it was important that his sodium and electrolytes were checked...}”\textsuperscript{186} However, and significantly, this was not done. Mr Keane was unable to “\textit{explain why Adam’s electrolytes were not checked when the central line was inserted. He should have had his electrolytes checked once the central or arterial lines were inserted.}”\textsuperscript{187} Dr Taylor provided multiple explanations as to why he did not take a blood sample at that stage. However he has since acknowledged that he “\textit{omitted doing blood samples as requested by Professor Savage}”\textsuperscript{188} and should have sent “\textit{a blood sample for electrolyte analysis... before starting the operation. I should also have sent other samples as necessary and used those results to adjust the rate and type of the intravenous fluids.}”\textsuperscript{189} Given Adam’s history of electrolyte abnormality that was an important failure because it risked uncontrolled electrolyte disturbance during surgery.

2.55 In addition to the failure to measure Adam’s electrolytes after the induction of anaesthesia there was a failure to measure his urinary output during surgery. This was of particular importance for Adam because his urine
production was abnormal. Dr Haynes advised that “Adam produced significant volumes of urine and his urinary output should have been monitored when possible during the operation and a urinary catheter should have been inserted following induction of anaesthesia prior to commencing surgery.”190 This was so that Dr Taylor might know the rate of fluid lost as urine in order to calculate the correct rate for the IV fluid infusion.

2.56 However, Adam’s urinary output remained unmeasured until a catheter was inserted by Mr Keane at about 10:30.191 Mr Keane indicated that whilst there was no contra-indication to inserting a urinary catheter immediately after Adam was anaesthetised192 he nonetheless felt that “Adam’s urethra was very small and in my opinion urethral catheterisation was unnecessary. I wanted the bladder full.”193 However, it was the anaesthetist’s responsibility to manage fluid balance and that entailed monitoring the output of urine. Dr Taylor should have insisted that a urinary catheter be inserted for that purpose. He would then have been able to gauge the quantity of urine spent and review and adjust the volume of fluids Adam was receiving. Dr Taylor eventually conceded that this was “another element of care that... left me unable to reassess and review my fluid administration during Adam’s procedure.”194

**Fluids administered**

2.57 Dr Taylor commenced an infusion of Solution No.18195 in accordance with his own calculation of fluid requirements196 predicated upon a maintenance rate of 200mls per hour.197 He then administered 750mls of Solution No. 18 in the first hour of surgery198 in order to restore perceived deficit, provide maintenance and replace insensible losses.199 In total, he gave Adam

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190 204-002-031  
191 WS-006-3 p.8  
192 WS-006-2 p.6  
193 WS-006-3 p.9  
194 Dr Taylor T-20-04-12 p.51 line 10  
195 303-002-042 An IV solution containing 30mmol/litre of sodium and chloride or 1/5 the concentration occurring in natural body fluids such as blood.  
196 058-003-005  
197 WS-008-2 p.31  
198 WS-008-5 p.5 & 058-003-005  
199 011-014-101
1,500mls of Solution No.18 during surgery. Because Solution No. 18 contains one fifth of the sodium content of normal saline this equated to 300mls of normal saline and 1,200mls of “free water.” Other solutions given included 1,000mls of human plasma and 500mls of packed blood cells each containing similar levels of sodium to blood.

In justifying his fluid management Dr Taylor insisted that Adam would pass 200mls of dilute urine per hour and that because of kidney disease this was a “minimum loss” which may indeed have been “unlimited” rendering Adam like a hole in a bucket which he was obliged to fill. Consequently he argued that Adam would not retain “free water” and could not therefore suffer dilutional hyponatraemia.

Dr Coulthard’s expert opinion categorised this argument as “without foundation” and estimated urinary output as significantly less than 200mls. Indeed he was of the opinion that Adam’s urinary output was fixed, that the kidneys were working “flat out” and that if Adam were given more fluids than he could excrete, the surplus would be retained in the body.

Dr Haynes said that he was amazed at the suggestion that Adam might have had an hourly urine output of 200mls which would amount to 4.8 litres per day. He was surprised that the “simple arithmetic” did not strike Dr Taylor as “being extremely unusual and well beyond what would normally be expected, certainly for a 20-kilogram boy.”

Only belatedly did Dr Taylor reconsider his position and acknowledge that Adam did in fact have a fixed urine output of 70-80mls per hour. He then
conceded that his arguments about fluid requirements were wrong, that he “wrongly estimated or calculated his urinary losses”\textsuperscript{211} and that he administered Solution No.18 to Adam “at a rate in excess of his ability to excrete it, particularly in the first hour of anaesthesia.”\textsuperscript{212}

2.62 Such sodium as was lost in surgery through bleeding could not have been replaced by the low sodium Solution No.18. Whilst Solution No.18 may have served as a partial maintenance fluid it could never have been a sodium replacement fluid given the levels of sodium lost.

2.63 Dr Haynes considered that hyponatraemia was the inevitable consequence of administering the low sodium Solution No. 18 in significant volume.\textsuperscript{213}

2.64 In addition, expert evidence agreed that not only was the quantity of low sodium fluids administered excessive but the rate was “dramatically fast.”\textsuperscript{214} This led to an acute fall in Adam’s serum sodium levels and as Dr Coulthard explained the “absolutely critical element of management is about how quickly or how slowly you allow the sodium to fall. Letting the sodium fall quickly leads to cerebral oedema and brain death.”\textsuperscript{215} In the opinion of Mr Keane, Adam was given “no chance.”\textsuperscript{216}

2.65 When, at the end of surgery, Dr Taylor reversed the anaesthesia and removed the sterile towels from Adam’s face - Adam did not wake, he did not breathe. His pupils were fixed and dilated\textsuperscript{217} and his face was markedly swollen.\textsuperscript{218}

2.66 Adam’s death was avoidable.

\textsuperscript{211} Dr Taylor T-19-04-12 p.26 line 1
\textsuperscript{212} WS-008-6 p.3
\textsuperscript{213} 204-002-035
\textsuperscript{214} 200-002-054
\textsuperscript{215} 307-007-102
\textsuperscript{216} Mr Keane T-23-04-12 p.29 line 24
\textsuperscript{217} 058-035-135
\textsuperscript{218} WS-008-2 p.45
Other fluid management issues

2.67 From the outset, Dr Taylor persistently raised misleading assertion and argument in defence of his fluid management, namely:

 Fluid Deficit

2.68 Dr Taylor asserted that Adam was in fluid deficit before surgery and accordingly there was “an urgency to replace this deficit so that Adam did not become dehydrated...”219 However, expert opinion agreed that Adam was in little or no fluid deficit and was not dehydrated when he arrived in theatre.220 Not only was Dr Taylor’s assumption that Adam required fluid to correct a deficit wrong, but the nature of the fluid he chose to correct it was also wrong.221

 Solution No. 18

2.69 Dr Taylor claimed that Solution No.18 was the fluid recommended by the British National Formulary222 for the treatment of dehydration, however, as Dr Coulthard pointed out, the actual recommendation was for normal saline223 and the use of Solution No. 18 to “replace his deficit” was quite “simply wrong.”224 Further, Dr Taylor contended in his evidence that Solution No.18 was more widely used in 1995 than it is now. That proposition was accepted by Dr Haynes and others in their evidence but as Dr Haynes emphasised basic training warned against the inappropriate infusion of low sodium fluids.225

219 WS-008-1 p.3
220 Dr Coulthard T-08-05-12 p.169 line 17
221 200-007-126
222 093-038-132
223 200-005-094
224 200-002-054
225 Dr Haynes T-02-05-12 p.24 line12
Blood Loss

2.70 Dr Taylor maintained that he administered fluids to replace what he categorised as a "substantial ongoing blood loss" which he estimated to be as much as 1,411mls. However, Mr Keane recalled "no major bleeding in Adam’s case" and Dr Haynes, having examined the evidence, ventured an informed guess of 800-1,000mls. Dr Taylor conceded in evidence that it was “possible that there was an error on my measurement and otherwise of the blood loss.”

Monitoring the CVP

2.71 CVP readings were displayed throughout surgery and were an important guide for the safe management of Adam’s fluid balance. Notwithstanding that the readings were high indicating fluid overload, Dr Taylor ignored them and insisted that a mis-siting of the CVP catheter had rendered the readout inflated and unreliable. Rather than remedy the problem or disregard the reading altogether, he chose to silence the alarm and reinterpret the unreliable figures. Dr Coulthard was simply unable to “accept that it was good practice to assume that a monitoring system is not working, and to make clinical decisions that appear to conflict with its read-outs.” Dr Haynes pointed out that if the CVP readings were wrong then that was all the more reason not to use them as the basis for reinterpretation. If Dr Taylor did not believe the reading he should have agreed with Mr Keane at the outset to rectify the problem. It is unlikely that time thus spent would have had “significant negative impact.” Mr Keane said that if the reading

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226 011-014-096
227 WS-008-1 p.7
228 WS-006-2 p.14
229 204-006-337
230 Dr Taylor T-20-04-12 p.108 line 10
231 058-008-022
232 WS-008-2 p.12
233 Dr Taylor T-06-09-12 p.137 line 10
234 Dr Taylor T-19-04-12 p.76 line 15
235 200-002-055
236 204-013-395
237 204-004-155
238 203-004-076
could not be relied on then “the whole thing has to stop.” Dr Coulthard considered the correct approach would have been to delay surgery until a satisfactory CVP reading was available. Somehow and in the event Dr Taylor reassured the surgeons and allowed his lack of concern to reassure Dr O’Connor. Dr Taylor now recognises that he “shouldn’t have relied on that line at all” and ought to have considered ending the transplant because “this potentially should have been a show-stopper.” Had he taken the time to resolve this issue he would then have had a reliable measure of vascular fullness and would have known that Adam did not need extra fluid.

**Blood gas machine sodium level assessment**

Dr Taylor failed to make an early assessment of Adam’s sodium levels during surgery. After some time he did despatch a blood sample for analysis by blood gas machine and received the result at 09:32. It recorded a sodium value of 123mmol/L. Not only was this reading very low but it revealed a significant drop from normal in only a matter of hours. Dr Taylor ignored this result because he said that it was his understanding that the blood gas machine did not always provide reliable results for serum electrolytes. However, Dr Coulthard has since calculated that the “plasma sodium reading of 123mmol/L as measured is likely to be correct” and should in any event should have prompted an urgent blood sodium assessment from the hospital laboratory to inform fluid management. Dr Haynes agreed, observing that even if blood gas testing is not very accurate it does alert the anaesthetist to potentially dangerous changes in sodium levels more quickly than laboratory testing and “allows corrective action” In Adam’s case it may also have allowed

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239 Mr Keane T-26-04-12 p.95 line 6
240 Dr O’Connor T-25-04-12 p.129 line 14
241 Dr Taylor T-19-04-12 p.82 line 1
242 Dr Taylor T-19-04-12 p.82 line 1
243 058-003-003
244 Dr Taylor T-20-04-12 p.103
245 200-002-053
246 200-004-085
247 204-002-025
an opportunity to minimise his cerebral oedema. That was a missed opportunity. Dr Taylor belatedly acknowledged that he should have sent “a confirmatory sample to the lab. I did not do that and I regret that I did not do that” and further that he “should have done regular blood samples to adjust my fluids... and I also failed to do that.”

Dr Taylor

2.73 In addition to proceeding without understanding Adam’s sodium levels or urine output and with a profound misunderstanding as to his fluid management, Dr Taylor was wrong to ignore the danger signals given by the CVP and the blood gas sodium analysis. Furthermore, it was wrong and misleading of him to insist upon justifying his clinical performance in the way he did and false to assure the Coroner, Adam’s mother and others that his management of Adam was “caring, appropriate, expert and representative of the highest quality and intensity of care that I can provide.”

2.74 Dr Taylor steadfastly maintained his baseless justifications for many years and only changed his position in late 2011 after he was provided with the Inquiry expert reports. In early 2012, and having received legal advice which was independent of the Trust for the first time, he made a written statement admitting error. In April 2012, he acknowledged in oral evidence much that he had previously denied. He said:

“...I accept that it was my miscalculation of urine output that led me to give the inappropriate amount of fluids that led to a drop in his sodium called dilutional hyponatraemia which led to cerebral oedema.”

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248 204-002-033
249 Dr Taylor T-20-04-12 p.105 line 9-10
250 Dr Taylor T-19-04-12 p.74 line 4
251 011-002-009
252 WS-008-6
253 Dr Taylor T-19-04-12 p.40 line 5
2.75 However, Dr Taylor would not accept that Adam’s death occurred in consequence of the dilutional hyponatraemia.\textsuperscript{254} He relied on the evidence of Professor Kirkham that it could not have been so. For the reasons set out in the section of this report entitled “\textit{Fatal cerebral oedema: alternative causes and contributory factors}” (Para 2.177) I do not accept Professor Kirkham’s analysis.

2.76 Dr Taylor’s management of Adam’s fluids before and during the surgery of \textsuperscript{27}th November 1995 defies understanding. In his oral evidence, Dr Taylor accepted that he could not understand it either, nor could he explain or justify what he did or how he subsequently defended it,\textsuperscript{255} except to say that he found it “\textit{difficult to cope with [his] thought processes, going over such a devastating event. I think that has permitted me to say things that are clearly irrational, wrong, disturbed, confused, and I offer that as an explanation for making such really outrageous statements}.”\textsuperscript{256}

2.77 I heard a lot of evidence from Dr Taylor but do not believe I was told the full story. Dr Taylor offered no insight into why he did what he did during Adam’s transplant. Ms Slavin wanted to know why he had made so many mistakes.\textsuperscript{257} Inquiry counsel questioned how, given his experience and expertise, he could make such fundamental errors.\textsuperscript{258} Yet despite, or perhaps because, he provided so much evidence, Dr Taylor managed to keep his own thought processes obscure. Even though he now accepts what he did, he makes no attempt to explain it.

2.78 Dr Taylor made fatal errors in his treatment of Adam. I accept that this was most probably uncharacteristic\textsuperscript{259} and do not query his usual competence. However, and over and above the hurt inflicted on Adam’s family by death, Dr Taylor caused significant additional pain by acting as he did to avoid his own responsibility.

\textsuperscript{254} Dr Taylor T-20-04-12 p.189 line 13
\textsuperscript{255} Dr Taylor T-19-04-12 p.56 line 24
\textsuperscript{256} Dr Taylor T-19-04-12 p.57 line 25
\textsuperscript{257} Dr Taylor T-20-04-12 p.154 line 10
\textsuperscript{258} Dr Taylor T-19-04-12 p.67 line 3
\textsuperscript{259} Dr Taylor T-19-04-12 p.58 line 23
Other issues

**Assistant anaesthetist**

2.79 A question arose as to when Dr Montague left the operating theatre and whether he was replaced. This became an issue of potential concern because Dr Taylor accepted that he had himself left the theatre from time to time and accordingly, if he had been without an assistant anaesthetist at any such time, responsibility for monitoring Adam would have fallen to the anaesthetic nurse who cannot now be identified.

2.80 Considerable efforts were made to establish the facts. Dr Montague probably left at some point between 09:00 and 09:30. He is not to be criticised for leaving because he would not have done so without Dr Taylor’s approval and there is no suggestion that that was withheld. The evidence does not suggest that Dr Montague was replaced. No trace of replacement has been found.

2.81 The necessity for an anaesthetist to replace Dr Montague is not to be assumed. It depended in part upon whether there was a nurse actually present and assisting Dr Taylor with the anaesthetic. The evidence agreed that there would have been three nurses in theatre, one of whom would have helped Dr Taylor. Whilst none could remember who was there, all agreed that the appropriate number of nurses was present. I therefore accept, on the evidence, that there was such a nurse. Her role was a relatively minor one in 1995. Some vagueness as to who was present is understandable, the absence of written record is not.

2.82 Furthermore, and given that Dr Montague was inexperienced and probably only there to train and gain experience, I believe that Dr Taylor was in

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260 WS-008-2 p.9
261 306-002-003
262 Dr O’Connor T-25-04-12 p.71 line 3
263 Dr Taylor T-20-04-12 p.60 line 11
264 Staff Nurse Popplestone T-30-04-12 p.60 line 1
charge of anaesthesia at all times during Adam’s operation, irrespective of the presence or otherwise of any other doctor or nurse to assist him.

**Communication between surgical and anaesthetic teams**

2.83 The shared priority of surgeon and anaesthetist is patient safety. Accordingly effective exchange of patient information between them and their assistants is of particular importance.265 Expert witnesses to the Inquiry questioned whether the two teams communicated successfully during the transplant. Dr Haynes observed that “reading and re-reading the various witness statements does not reassure me that surgeon and anaesthetist were working effectively together as a team, communicating well with each other.”266 Communication was critical in relation to blood loss,267 CVP readings and fluid management at the time of re-perfusion of the transplanted kidney.268 Mr Keane confirmed that communication between them may not always have been “helpful”269 but emphasised that if Dr Taylor did not understand what he was to impart then he was expected to ask.270 I believe that had Dr Taylor explained what he was doing and had better dialogue with the transplant surgeon then the risk of gross fluid mismanagement may have been reduced.

**Determining what happened in the operating theatre**

2.84 It might be expected that a detailed analysis of Adam’s surgery would allow a clear understanding of events in theatre. However, establishing exactly what happened during surgery has proved to be one of the most difficult areas of the Inquiry’s investigation. There are issues about which it is not possible to make a clear finding, even on the balance of probabilities. Some issues are more important than others but the overall number of them is significant. This is troubling because of a concern that the full truth of what
happened in theatre may not have been revealed and that Adam’s surgery may not have been as recorded by the doctors and nurses in the case notes, or as described by them in their written statements to the Coroner, the Police and this Inquiry or as recounted by them under oath.

2.85 Doubts as to the accuracy of the broad narrative first emerged from the evidence of the Regional Transplant Co-ordinator for Northern Ireland, Ms Eleanor Boyce (née Donaghy),271 who made a statement to the Police Service of Northern Ireland (‘PSNI’) on 28th April 2006 recalling how Staff Nurse Joanne Sharratt (née Clingham)272 had informed her, when Adam was still in theatre, that he might even then be brain-stem dead. Ms Boyce described how, on entering the theatre, she had found the mood very sombre. She believed the surgeons were at the operating table and although she could not say what they were doing or what stage had been reached273 she could “...remember Patrick Keane (Surgeon) being at the table. There was another surgeon however I do not recall who it was. There were other staff present in the operating theatre; however I do not recall who they were. I remember when I was in the theatre wondering why they were continuing with the procedure if the child was supposed to be brain-stem dead.”274 She said that “there was an awareness that we were dealing with a very serious situation.”275 Her presence in theatre was confirmed by Dr O’Connor276 but her account was flatly dismissed by everyone.

2.86 Notwithstanding that uniquely Ms Boyce was independent of the Trust and had no apparent reason to invent such an account, her very different recollection of surgery was not initially accorded particular significance beyond that of puzzling anomaly. However, her statement assumed greater significance when a pre-inquest consultation minute taken by Mr George Brangam’s277 para-legal assistant, Ms Heather Neill, came unexpectedly to

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271 306-081-005
272 303-001-003
273 093-015-048
274 093-016-049
275 Ms Boyce T-27-04-12 p.120 line 13
276 Dr O’Connor T-25-04-12 p.75 line 22
277 306-081-006 The late Mr George Brangam, erstwhile partner in Brangam, Bagnall & Co Solicitors, retained by the Trust. His death precluded his giving evidence to the Inquiry
light in June 2012. On the 14th June 1996 she had recorded Dr Taylor and Professor Savage in discussion with Dr George Murnaghan, Dr Joseph Gaston and Mr Brangam and had noted an assertion that “during the surgery when this kidney was failing to operate a needle was put into the artery and no blood came out and clearly the kidney was not working when the operation site was closed however, the performance of the kidney was no longer relevant at this stage.” This perplexed because it is so markedly at odds with the other evidence about what happened in theatre, with the possible exception of Ms Boyce’s account.

In particular the operation record, far from noting any concern with perfusion, records in Mr Keane’s hand that “the kidney was perfused reasonably at the end.” Indeed, Mr Keane stated in his deposition for inquest that “the operation was difficult but a successful result was achieved at the end of the procedure” (by which he said he meant a “technically successful result”). Accordingly, had a needle been placed in the artery and no blood emerged so as to indicate that the “kidney was not working”, then that most certainly would have been recorded.

The possibility that an ‘unknown event’ had occurred in theatre, which was being concealed, focused attention on the totality of evidence in the search for answers. An unexpected degree of vagueness and inconsistency emerged. I found this very surprising because I had been told repeatedly that the death of a child in hospital is a rare event. It might therefore be supposed that those involved would remember with some clarity what had gone wrong, no matter whose fault it was or even if it was nobody’s fault. However, even the evidence identifying where the operation took place, when it took place and who was there, is worryingly unclear:

278 122-001-001
279 306-081-005
280 306-081-003 to 004
281 122-001-005
282 059-006-013
283 011-003-010
284 Mr Keane T-23-04-12 p.60 line 15
285 122-001-005
(i) There is no record as to which theatre was used. Not even the reported closure of the theatre\(^{286}\) after the catastrophic event generated any documentary evidence. The only available record is the swab count marked “Theatre II.”\(^{287}\) Doubt however emerged in oral evidence\(^{288}\) as to whether this could be correct.

(ii) There is no reliable record as to who was present in theatre at the time of surgery. Dr Taylor believed that Dr Montague was replaced by a trainee anaesthetist. Despite extensive enquiry this individual could not be identified.\(^{289}\) Likewise, Dr Taylor indicated that an anaesthetic nurse was present. Again, despite exhaustive efforts by the Inquiry and the Directorate of Legal Services (‘DLS’), that nurse remains unidentified.\(^{290}\) An auxiliary nurse would have been present in theatre\(^{291}\) and another made entries in the record of blood loss.\(^{292}\) These individuals also remain unidentified.\(^{293}\)

(iii) Additionally, there is a problem determining when surgery started and when it ended. Timings do not appear in the record and reliance must be placed upon the recollection of those involved. Professor Savage recalled that Adam was taken to theatre at 07:00.\(^{294}\) Mr Keane deposed that “the operation started at 7.30am.”\(^{295}\) Subsequently and upon reflection he stated “… it would now appear that the surgery started at around 8:00am”\(^{296}\) and then gave his “best possible estimate… a start time of 8:10.”\(^{297}\) Witnesses were at odds about the timing of events in surgery. Dr Taylor believed
anastomosis occurred shortly after 09:30 but Dr O’Connor was astounded that he should think that and said that it was not achieved until around 10:30. Dr Taylor was driven to concede “discrepancy in the notes” and could neither recollect nor explain why nothing was seemingly done between 10:15 and 11:00. The anaesthetic record ends at 11:00 when Dr Taylor administered drugs to reverse the neuromuscular blockade, however he was quite unable to explain what was done subsequently between then and midday.

Furthermore, the evidence detailing events in theatre was contradictory.

(i) Mr Keane has stated that when he left theatre “… the kidney was reasonably well perfused.” However, his deposition for inquest indicated that “at the end of the procedure it was obvious that the kidney was not perfusing as well as it had initially done.” Conversely, Staff Nurse Gillian Popplestone remembered “… it was discoloured and then that seemed to subside.” Other witnesses were similarly inconsistent in relation to the condition of the donor kidney. Dr O’Connor said it was described as “bluish.” Mr Brown in his statement to the PSNI recalled that “from what I can remember the kidney turned pink... As far as I can remember the kidney remained pink...” Dr Taylor informed the Coroner that at around 10:00 the donor kidney was not looking good and not producing urine. Mr Keane recalled urine being produced whereas Mr Brown was clear that none had been produced.
(ii) Neither the time of Mr Keane’s departure from the operating theatre nor the time of wound closure is recorded. Mr Keane has stated that he left the operating theatre at “approximately 10-30am”\textsuperscript{313} and yet when he gave his evidence at inquest he made no reference whatsoever to leaving early or of relying upon Mr Brown to close the wound and complete the operation.\textsuperscript{314} Similarly Mr Brown, in his statement to the Coroner, made no reference to Mr Keane’s departure before the end of transplant surgery or to the fact that he had closed the wound.\textsuperscript{315} Subsequently, and in response to police questioning, he stated that “it would appear to be the case that Mr Keane left myself to sew up the wound. I do not have any recollection of the end of the operation or the anaesthetist trying to bring Adam round.”\textsuperscript{316}

(iii) Mr Keane claimed to have left the theatre “10 minutes prior to the end of the anaesthesia” to attend an emergency\textsuperscript{317} explaining that he had received a call from the BCH about “a patient who was undergoing a percutaneous nephrolithotomy, was bleeding heavily in the operating theatre there and they needed help urgently.”\textsuperscript{318} Despite extensive enquiry this emergency was uncorroborated and remained a mystery until Mr Keane conceded that there may not have been an emergency at all but suggested that he might have returned to BCH for a scheduled operation for which he may already have been late.\textsuperscript{319}

(iv) Mr Keane’s surgical notes are poor and remarkably, Mr Brown made no notes at all.\textsuperscript{320} Professor Forsythe and Mr Rigg in their joint report describe the operating record as brief.\textsuperscript{321} Whilst it does record key
issues, lesser matters are omitted. Some entries lack detail, there is no timing for the beginning or end of anastomosis and no comment on the perfusion of the kidney after removal of the clamps. Furthermore, the post-operative assessment was not completed, kidney performance at the end of surgery was left unrecorded and there is no post-operative management plan.

2.90 The inevitable suspicion was that Adam had suffered a failed transplant and had died earlier than previously indicated and in unclear circumstances. It is to be emphasised that none of the experts believe that the infarction of the kidney contributed to Adam’s death. Accordingly, suspicion as to what else may have happened in theatre is almost certainly irrelevant to the history of the development of hyponatraemia, its role in Adam’s death and the principal focus of this Inquiry. Nonetheless, the matter assumed considerable importance because it was so clearly relevant to the candour and credibility of all involved in the operating theatre. Were there to have been concealment of facts, such would only have been possible by an active conspiracy of silence and deceit involving all those doctors and nurses engaged in the operating theatre, and some perhaps who were not.

2.91 Such a proposition was entirely speculative but would perhaps have accounted for the unexplained delays in theatre, the inconsistencies relating to exchange of CVP values and the perfusion of the kidney, the poor operation notes, the departure of the lead surgeon, the failure of the surgical team to speak to Ms Slavin and the opinion of some experts as to the likely timings of kidney infarction and brain stem death. Accordingly, hearings were arranged and witnesses recalled in order that the matter be further examined in detail.

2.92 Those involved in the operating theatre had their recollection and previous evidence tested under focused examination. Inevitable minor discrepancies

322 058-003-006
323 011-007-022
324 200-022-267
325 In September 2012
were revealed but I found the general version of events to be as previously described and no new issues were revealed.

2.93 In particular the evidence of Ms Boyce and the consultation note of Ms Neill were subjected to the closest scrutiny.

(i) Ms Neill was able and experienced and had recorded a minute of a private consultation between the Trust’s witnesses and the Trust’s solicitor. She made it for internal legal purposes without any intention of wider circulation. To that extent it might be thought to possess the detachment necessary to lend it weight. There is no reason to suspect that Ms Neill sought to distort or invent what was said at the meeting. It is hard, likewise, to comprehend how she might have misunderstood or misinterpreted what was said. Despite a lack of medical training, much of her note is self-evidently correct. However, the fact remains that identifiable mistakes do appear in the minute, there is re-ordering of subject matter by theme obscuring the nuance and context of the discussion and, with some rearrangement of punctuation and emphasis, less troubling meanings can be found in the controversial wording. The contentious account deals specifically with the surgeon’s role but it must be noted that there was no surgeon at the meeting and no surgical perspective on the issue under discussion. Indeed the statement cannot be attributed with confidence to any one individual. The minute was not checked by Ms Neill’s principal, Mr Brangam, nor was it circulated for comment or agreement. The account recorded differs so obviously from those depositions already held from the witnesses that Mr Brangam might have been expected to query this particular version of events. Ms Neill would, I am quite sure, have recorded any such discussion. None is noted. Accordingly, I conclude on the balance of probabilities, that the consultation note is not to be relied upon in its entirety and is therefore an unsound basis upon which to make a finding of fact.
(ii) Ms Boyce did not make her statement recalling her presence in theatre until long after Adam's death. Whilst I do not doubt her sincerity, there was nobody who agreed with her recollection. The fact that it differs from everybody else's is a valid reason for taking it seriously but it is also a valid reason for suspecting its accuracy if it is not completely compelling. Ms Boyce gave evidence that she watched from a distance as surgeons worked with Adam and wondered why if he was already dead. Her account was based on what she sensed of the mood in theatre and interpreted in the light of what she remembered being told. If she had misunderstood the context then she may have misinterpreted the scene. She said that she remained in theatre until the end and did so because of her interest in Adam as a patient known to her. Her inability, however, to recall how long she stayed is hard to understand in the circumstances described, as indeed was her failure, then or at any time thereafter, to enquire about what had happened. If she had confused one memory with another that could lead to error. Very properly she accepted the possibility that her memory was wrong. On balance, and on the hearing of the evidence, I am unable to conclude that Ms Boyce's perception and recollection of what she witnessed necessarily reflects what actually occurred.

2.94 It is with frustration that I cannot make findings from the evidence as to what did happen at all times during Adam’s surgery. The available evidence was degraded by the passage of time, the paucity of documentation, the absence of contemporary investigation, the number of inconsistencies and the decidedly poor quality of some of the oral testimony given at public hearings. However, I consider my inability to form a view after so rigorous an inquiry into the avoidable death of a child in Northern Ireland’s Regional
Paediatric Centre to be, of itself, a grave indictment of both the Trust and its systems.

**Early appraisal of condition and communication with Ms Slavin**

2.95 The first assessment of the cause of Adam’s death appears to have been made at the conclusion of surgery by Dr O’Connor when she “was called back to theatre when the fixed dilated pupils were apparent." She “formed a view that he had cerebral oedema” and “a significantly positive fluid balance.” She proceeded to telephone Professor Savage who “rapidly went to the intensive care unit and reviewed the situation, with her... with a rapid calculation we thought he had had 1,500ml of fluid more in than out... so at that stage with a low sodium and subsequently with a lower sodium coming back from the laboratory, I think Dr O’Connor and I felt that there was a situation where his fluid balance was excessive on the positive side. He had a lot of fifth normal saline and we felt he had probably got cerebral oedema and coned.” Dr O’Connor concluded that “the picture seemed to be of fluid overload” and felt that it was Professor Savage who was best placed to speak to Ms Slavin.

2.96 Professor Savage recalls discussing “with Dr Taylor that Adam looked bloated and... would appear to [to have] had excessive amounts of fluid and that that was the cause of his cerebral oedema... I said that I believed that I then had to go and explain that to Debra Strain and asked him to accompany me.”

2.97 Ms Slavin arrived at the PICU at 12:15. She saw Adam and was struck by “how bloated he was.” She was met by Professor Savage, Dr Taylor and Staff Nurse Susan Beattie. Professor Savage explained to her that

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330 Dr O’Connor T-25-04-12 p.112  
331 Dr O’Connor T-25-04-12 p. 114 line 21  
332 Dr O’Connor T-25-04-12 p.115 line 21  
333 Professor Savage T-18-04-12 p.151 line 6  
334 Dr O’Connor T-25-04-12 p.151 line 6  
335 WS-014-2 p.4  
336 Professor Savage T-22-06-12 p.136 line 5  
337 WS-001-1 p. 2  
338 303-001-003
“Adam had cerebral oedema with a swollen brain causing pressure on his vital centres,”\textsuperscript{339} “there had been an imbalance of fluids in his body”\textsuperscript{340} and that “hope of recovery was remote.”\textsuperscript{341} He told her that he did not yet understand why this had happened, principally because he felt that “it did not seem an appropriate time to get into [dilutional hyponatraemia] with Mrs Strain, bearing in mind that I knew she would likely only remember the bad news that I was giving her.”\textsuperscript{342} She was informed by Dr Taylor that something was “drastically wrong” and that it was a “one in a million thing.”\textsuperscript{343} Dr Taylor has since apologised for “this really quite silly statement” of meaningless statistics.\textsuperscript{344}

2.98 After the operation the surgeons did not speak to Ms Slavin. Mr Keane explained that whilst he would normally speak to the family, on this occasion and in his absence he “expected Mr Brown to speak to Adam’s family.”\textsuperscript{345} Mr Brown stated that he did not consider it his responsibility to speak to Adam’s mother because “this was not a paediatric surgery operation, but a transplant.”\textsuperscript{346} He subsequently acknowledged that he “should have spoken to the mum because there was nobody else to speak to her.”\textsuperscript{347} Expert evidence agreed that a surgeon would normally be expected to join in such a conversation.\textsuperscript{348} As Professor Savage observed in his oral evidence “it would have been good if one of the surgeons had come and spoken to them, but they didn’t.”\textsuperscript{349} I share this view and furthermore believe that active attempts should have been made to secure the attendance of one of the surgeons.

2.99 Mr Keane returned to the Children’s Hospital the following morning and having reviewed the notes,\textsuperscript{350} came to his own conclusion as to the cause

\textsuperscript{339} WS-002-1 p.4
\textsuperscript{340} 058-038-181
\textsuperscript{341} WS-002-1 p.4 & 059-006-016
\textsuperscript{342} Professor Savage T-22-06-12 p.16 line 20
\textsuperscript{343} WS-001-1 p.4
\textsuperscript{344} Dr Taylor T-20-04-12 p.136 lines 12-21
\textsuperscript{345} WS-006-2 p.7
\textsuperscript{346} WS-007-3 p.6
\textsuperscript{347} Mr Brown T-01-05-12 p.141 line 9
\textsuperscript{348} 200-007-118
\textsuperscript{349} Professor Savage T-18-04-12 p.158 line 11
\textsuperscript{350} Mr Keane T-23-04-12 p.30-1
of death. He spoke with Professor Savage and “confirmed that I was seriously worried about what had happened in terms of the fluid management...”\(^{351}\) He said: “all I can remember of the encounter was that he had his head buried. I think he was crying.”\(^{352}\)

2.100 Dr Terence Montague recalled how he “came into the hospital the next morning and... met Dr Taylor in the theatre where the surgery had taken place... and he told me that Adam was likely to die, that Adam had cerebral oedema, and at that stage he was pointing out to me that the anaesthetic machine was being quarantined so that it could be examined...”\(^{353}\)

2.101 The 11:30 serum sodium test result was received at 13:00. It revealed a sodium value of 119mmol/L.\(^{354}\) Dr O’Connor noted this in the record at about 13:20,\(^{355}\) and entered a query as to whether this might not be a case of dilutional hyponatraemia.\(^{356}\)

2.102 Neurological advice was sought from Dr David Webb\(^{357}\) who saw Adam at 19:30 on 27th November 1995. His examination, witnessed by Dr Rosalie Campbell,\(^{358}\) was the first part of the formal clinical assessment necessary to confirm brain stem death.\(^{359}\) Dr Webb spoke with the clinicians in PICU, examined Adam and reviewed the CT scan. He recorded that “the examination is comparable with brain stem death 2” severe acute cerebral oedema. This may have occurred on the basis of unexpected fluid shifts – ‘osmotic disequilibrium syndrome.’\(^{360}\) It may be significant that he made no reference to Adam’s hyponatraemia. He said “if I’d been aware of the low sodium, I would have considered hyponatraemia to be the likely cause of the fluid shift.”\(^{361}\) Dr Webb should have been aware of Adam’s low sodium reading. The notes clearly record the laboratory sodium results of

\(^{351}\) Mr Keane T-23-04-12 p.31, line 14
\(^{352}\) Mr Keane T-23-04-12 p.31 line 23
\(^{353}\) Dr Montague T-11-05-12 p.153-54
\(^{354}\) 058-040-186
\(^{355}\) 059-006-016, 058-035-138 & Dr O’Connor T-25-04-12 p.157 line 15
\(^{356}\) 303-001-003 Consultant Paediatric Neurologist
\(^{357}\) 303-001-001 to 002
\(^{358}\) 058-004-009 & 058-035-139
\(^{359}\) 058-035-140
\(^{360}\) WS-107-2 p.4

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119mmol/L. Dr Webb however, believed that he may not have appreciated this or may have been told that this result was unreliable, because he was prompted to conduct medical literature research in order to explain the brain swelling.\textsuperscript{362} This is not necessarily convincing. A consultant paediatric neurologist asked for his formal opinion in relation to a brain stem death test would undoubtedly examine the notes and even if told that the sodium result was suspect, could not justify ignoring it. Dr Webb must be open to the criticism that he either did not properly review the notes, or alternatively, that he deliberately avoided entering a diagnosis of hyponatraemia with its inherent suggestion of fluid mismanagement.\textsuperscript{363}

2.103 In making the necessary clinical assessment to confirm brain stem death, Drs Webb, Campbell and O’Connor had each to satisfy themselves that there was an underlying cause for the brain stem death and, importantly, that other potential reasons for coma, including metabolic causes or drugs, were excluded. The drug record should therefore have been double-checked and the metabolic disorder of hyponatraemia corrected before the tests were undertaken.\textsuperscript{364}

2.104 Notwithstanding,\textsuperscript{365} Dr Webb recorded the brain stem death criteria to be fulfilled at 09:10.\textsuperscript{366} Consent was then sought from Ms Slavin to discontinue life support\textsuperscript{367} and this was done with Adam on her knee\textsuperscript{368} at 11:30 on 28\textsuperscript{th} November 1995.\textsuperscript{369}

2.105 Professor Savage then notified the Coroner because he “knew that there had to be a coroner’s inquest”\textsuperscript{370} but did not seemingly report his views on the mishandling of fluids.\textsuperscript{371} He then attended the post-mortem “probably

\textsuperscript{362} WS-107-2 p.2
\textsuperscript{363} Dr Webb provided two witness statements to the Inquiry relating to the death of Adam Strain. For personal reasons he was unable to attend the oral hearings to give evidence.
\textsuperscript{364} 204-014-003 & 204-012-386 & Dr Haynes T-03-05-12 p.115 line 19
\textsuperscript{365} Dr Haynes T-03-05-12 p.112 line 1
\textsuperscript{366} 058-004-009
\textsuperscript{367} WS-001-1 p.4
\textsuperscript{368} 016-004-015
\textsuperscript{369} WS-001-1 p.4 & 016-004-015
\textsuperscript{370} Professor Savage T-22-06-12 p.3 line 19
\textsuperscript{371} 011-025-125
just to make sure that the conclusions we had reached were correct™️ and to ensure "that Dr Armour understood my perception of the fluid balance situation.™️ The pathologist Dr Alison Armour™️ could not remember speaking with Professor Savage and does not appear to have understood the "fluid balance situation" until sometime later.™️

2.106 Professor Savage wrote to the Strain family GP on 4th December 1995™️ to advise as to the circumstances of Adam’s death. He did not however refer to the cause of death because he “probably thought it would have been inappropriate for me to suggest a diagnosis in advance of the coroner’s inquest.”™️ Ms Slavin recalled that she “knew that the cause of Adam’s death was the swelling of his brain but at no time do I recall anyone telling me that this had happened because he had been given too much fluid.”™️ Nor does it seem that anyone told her that Adam’s sodium levels had fallen so far and that he had severe hyponatraemia.™️

2.107 There is no evidence to suggest any formal communication with Adam’s family by the Trust, not even a letter of condolence.

**Adam Strain Governance**

2.108 It is understandable and perhaps all too easy to make a mistake working in the complex field of medicine. However, after an unexpected death like Adam’s, it might have been expected, even by the standards of 1995, that those involved would openly and honestly analyse what had happened in order to minimise the risk of recurrence. Analysis should have taken place immediately, when memories were fresh, so that lessons could be learned straight away. A major failing in Adam’s case is that, according to the
evidence, that analysis did not take place. How and why that happened will be explored below but central to it was reluctance to accept or attribute fault.

**Adverse incident reporting**

2.109 No Serious Adverse Incident (‘SAI’) report of Adam’s death was made within the Children’s Hospital or the Trust. There was, however, no formal requirement to do so at that time.

2.110 The Medical Director, Dr Ian Carson, explained that “unexpected or unexplained deaths during or following anaesthesia and surgery would be reported externally to H.M. Coroner, and internally to Dr G Murnaghan in his capacity as Director of Medical Administration” but “were not formally reported to the Medical Director as a routine.” However, in the case of “death where a doctor’s practice is called into question or patients are put at risk, those are cases that quite definitely should have been referred to the Trust Medical Director” and the Clinical Director of Paediatrics.

2.111 An oral report of the death was made to Dr George Murnaghan who, in his capacity as Director of Medical Administration, was charged with risk management and the defence of medical negligence claims. He served on the Clinical Risk Management Group which was responsible for untoward incident reporting in clinical matters. He was, in addition, responsible for the Trust’s engagement with the Coroner and the internal dissemination of lessons drawn from inquests. He was ideally placed to ensure that relevant issues were brought to the attention of all those who needed to know within the Trust. His reporting line was to the Medical Director, he sat in “attendance at the Board,” reported to the Hospital
Council on behalf of the Medical Risk Management Group\footnote{391} and kept the Chief Executive “\textit{in the loop}.”\footnote{392} His role was significant within the Trust. He was a link between clinicians and the Trust Board and the connection between the internal procedures of the Trust and the external requirements of the Coroner.

2.112 Dr Murnaghan liaised with Dr Gaston who, as Clinical Director of Anaesthetics, Theatre & Intensive Care (‘ATICS’), likewise held a ‘governance’ position in the Trust and was also Dr Taylor’s clinical lead. Dr Gaston was experienced in critical incident reporting, incident investigation and audit\footnote{393} and was an appointed surveyor with Kings Fund Organisational Audit (‘KFOA’).\footnote{394}

2.113 Dr Gaston did not seek a written report in respect of this unexpected and unexplained death. Nor, would it seem, did he really expect one.\footnote{395} He heard about the death from a nurse on a corridor.\footnote{396}

2.114 Notwithstanding, and within days, Professor Savage and Dr Taylor\footnote{397} did submit written statements. They cannot however have been of much assistance to Drs Murnaghan and Gaston, omitting as they do all reference to hyponatraemia and any explanation for Adam’s unexpected death.

2.115 Professor Savage received a copy of Dr Taylor’s statement very soon after.\footnote{398} He immediately informed Dr Murnaghan that there was an explanation for what had happened and stated his belief that “\textit{Adam’s cerebral oedema and death were related to fluid mismanagement}.”\footnote{399} Dr Murnaghan accepts that Professor Savage brought this to his attention.\footnote{400}
2.116 Dr Murnaghan said that then “informally, if not formally, I brought the matter up with the Medical Director, Dr Carson”\textsuperscript{401} and that he was “almost certain that I would have told him that Dr Taylor had a different view... that the Coroner was involved and was going to hold an Inquest. And I do not know what we agreed after that.”\textsuperscript{402}

2.117 Dr Carson was very clear that Dr Murnaghan did not bring Adam’s death to his attention whether formally or informally until the time of the inquest.\textsuperscript{403}

There is no evidence of any involvement of Dr Carson before then, whether as Medical Director or as a fellow anaesthetist. Had he been notified I believe he would have taken some action or at the very least sought some information - which he seemingly did not. The sole suggestion that he was notified was made by Dr Murnaghan, whose evidence on the point was far from compelling.\textsuperscript{404}

He was unable to provide any detail about what was said or agreed or done in respect of this most important communication. On balance I do not believe that Dr Murnaghan reported Adam’s death to the Medical Director until very much later. Instead he proceeded to act without reference to Dr Carson.

2.118 Nor did Drs Murnaghan or Gaston report the death to the Clinical Lead of the Paediatric Directorate, the Director of Nursing or the Chief Executive.

2.119 The acting Clinical Lead of the Children’s Hospital\textsuperscript{405} was Dr Conor Mulholland.\textsuperscript{406} He had only recently assumed this responsibility in addition to his full time practice as a Consultant Paediatric Cardiologist and his role as Clinical Director in Cardiology and Cardiac Surgery.\textsuperscript{407} There was no written guidance to assist him in his duties as acting Clinical Director of

\textsuperscript{401} Dr Murnaghan T-25-06-12 p.155 line 6
\textsuperscript{402} Dr Murnaghan T-25-06-12 p.165 line 1
\textsuperscript{403} Dr Carson T-15-01-13 p.156 line 6
\textsuperscript{404} Dr Murnaghan T-25-06-12 p.152 line 15
\textsuperscript{405} The Directorate of Paediatrics
\textsuperscript{406} 306-081-004
\textsuperscript{407} Dr Mulholland T-21-06-12 p.141
Paediatrics.\textsuperscript{408} His principal administrative concerns at that time in the Children’s Hospital were financial.\textsuperscript{409}

2.120 With hindsight he accepted that he should have received a report into Adam’s death\textsuperscript{410} in order to understand what had happened.\textsuperscript{411} However, on hearing of the death, he assumed that the matter would be taken forward by Drs Murnaghan and Gaston,\textsuperscript{412} that the Medical Director would be informed\textsuperscript{413} and that the death would be formally dealt with by the Coroner. On the basis of these assumptions he did nothing\textsuperscript{414} and remained “completely outside the loop on Adam Strain.”\textsuperscript{415}

2.121 Dr Mulholland had appointed Consultant Paediatric Anaesthetist Dr Peter Crean\textsuperscript{416} to be his Sub-Director in the Children’s Hospital with responsibility for anaesthetics. Dr Crean did not, however, report Adam’s case within the Paediatric Directorate because he was accountable to Dr Gaston’s ATICS Directorate\textsuperscript{417} and the matter had already been reported to Dr Gaston.

2.122 The necessity for the Clinical Director of Paediatrics to become involved in the investigation of a death in the Children’s Hospital was obvious, yet the system imposed no obligation to report the matter to him, gave him no guidance as to what was expected of him and left him no time from his other duties to engage. A structural confusion of reporting lines left him in ignorance and allowed others to proceed without him.

2.123 The Director of Nursing and Patient Services was Miss Elizabeth Duffin.\textsuperscript{418} She reported to the Chief Executive, received reports from nurse managers and talked regularly with Drs Murnaghan and Carson.\textsuperscript{419} Her responsibilities included clinical quality assurance and the Trust application
for KFOA accreditation. Nonetheless, she also claimed to have heard nothing about Adam’s death and to have learned nothing about it for many years. She said she thought this “very strange” and was quite unable to explain it given that she would have expected to hear about it on her own ‘grapevine.’

2.124 The Trust’s Clinical Risk Management Group was charged on paper with responsibility for untoward clinical incident reporting. In reality this group does not appear to have fulfilled this function and its existence may have been largely aspirational. It was chaired by the Medical Director Dr Carson.

2.125 Dr Carson was aware of the correct procedures for serious adverse incident reporting. He possessed the ‘Risk Management in the NHS’ manual received from the Management Executive of the Department in 1993-4. It provided guidance on clinical incident reporting as did KFOA in its published criteria for accreditation (1994).

2.126 More current advices were also then available from The Report of the Independent Inquiry into deaths on the Children’s ward at Grantham & Kesteven General Hospital (the ‘Allitt Inquiry’) also published in 1994. In relation to clinical incidents it was emphatic that “There must be a quick route to ensure that serious matters... are reported in writing to the Chief Executive of the hospital...All District Health Authorities and NHS Trust Boards should take steps immediately to ensure that such arrangements are in place” These advices were not acted upon nor were policies for

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420 Miss Duffin T-26-06-12 p.58 line 11
421 Miss Duffin T-26-06-12 p.35 line 10
422 Miss Duffin T-26-06-12 p.24 line 18
423 Miss Duffin T-26-06-12 p.27 line 20
424 WS-273-1 p.9
425 Dr Murnaghan T-25-06-12 p.71 line 12
426 WS-061-2 p.263
427 Dr Carson T-16-01-13 p.6 line 2
428 Dr Carson T-16-01-12 p.44 line 5
429 306-117-013
430 211-003-026
431 210-003-038
critical and serious clinical incident reporting developed within the Trust. That was primarily a failure of the Trust Board.

2.127 The lack of formal obligation and mechanism to report such a death to the Medical Director was an obvious deficiency in control and one which created a system dangerously vulnerable to abuse and failure. These systemic shortcomings are clear and should have been clear in 1995 not least to the Medical Director.

2.128 Notwithstanding the lack of leadership from the clinical directors on the Trust Board, Drs Murnaghan and Gaston both held ‘governance’ positions within the Trust and both knew from their professional experience that a potentially avoidable hospital death should be formally reported to the medical director. In Dr Haynes’ view that was just “commonsense.”432 Dr Carson agreed, even “in the light of very early developments in our clinical governance agenda.”433 The failure of Drs Murnaghan and Gaston in this regard, foreshadows their later failures to investigate, manage and assess.

Investigation

2.129 The investigative response of the Trust was led by Dr Murnaghan in liaison with Dr Gaston.434 Dr Murnaghan acknowledged that where there “was a possibility that medical care and treatment would have contributed to a death I would have expected that to be the cause of an investigation.”435

2.130 There was no investigation of the case involving the Medical Director of the Trust.

2.131 There was no investigation of the case within the Paediatric Directorate. Dr Mulholland conceded that Adam’s case should have been discussed at a paediatric mortality meeting and that a written record should have been

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432 Dr Haynes T-03-05-12 p.129 line 7
433 Dr Carson T-15-01-13 p.160 line 5
434 Dr Gaston T-18-06-12 p.114 line 25
435 WS-273-1 p.4
However, there is no record of any such meeting\textsuperscript{437} and Dr Mulholland did not believe that Adam’s case was reviewed.\textsuperscript{438}

2.132 There was no investigation of the case within nursing.\textsuperscript{439} Miss Elizabeth Duffin said that had she been notified she would have pursued a nursing investigation to “to prevent something similar happening again.”\textsuperscript{440} That would indeed have been useful because then the nurses in theatre could have been identified from the “record of the staffing in theatre.”\textsuperscript{441} She said she would have expected Dr Murnaghan to involve nurses in his investigation\textsuperscript{442} and expressed her dismay that he had failed to seek statements from the nursing staff.\textsuperscript{443}

2.133 Mr Keane said that he “would have expected a full clinical... investigation of this, with no lawyers...”\textsuperscript{444} That didn’t happen. Professor Savage expressed to the Inquiry his “eternal regret that there wasn’t a more detailed internal inquiry...”\textsuperscript{445} and Mr Brown conceded that this was “self-evidently unsatisfactory.”\textsuperscript{446}

**Dr Gaston’s role in investigation**

2.134 Despite the fact that Dr Gaston was an anaesthetist, he did not review the anaesthetic record.\textsuperscript{447} Dr Taylor explained his calculations\textsuperscript{448} but Dr Gaston neither assessed the intraoperative fluid balance nor made any search of the medical literature. He did, however, understand that there was a problem because he “felt we needed an external assessor because it wasn’t

\begin{footnotesize}
\begin{enumerate}
\item Dr Mulholland T-21-06-12 p.156 line 14
\item Dr Savage T-22-06-12 p.69 line 24
\item Transcript 21-06-12 p.156 line 11
\item Staff Nurse Popplestone T-30-04-12 p.95
\item Miss Duffin T-26-06-12 p.26 line 4
\item Miss Duffin T-26-06-12 p.32 line 21
\item Miss Duffin T-26-06-12 p.34
\item Miss Duffin T-26-06-12 p.32 line 11
\item Mr Keane T-10-09-12 p.38 line 25
\item Professor Savage T-22-06-12 p.68 line 4
\item Mr Brown T-01-05-12 p.151 line1
\item Dr Gaston T-19-06-12 p.15 line 10 et seq
\item Dr Gaston T-18-06-12 p.127 line 21
\end{enumerate}
\end{footnotesize}
particularly clear right at the beginning... and there were differences of opinion and it needed to be... clarified.”

2.135 Despite these differences of professional opinion, Dr Gaston did not commission an external assessment but rather arranged for an internal investigation to be conducted by his anaesthetic colleague Dr Fiona Gibson, because she was “the one person... in Northern Ireland who would have experience of... major Paediatric Anaesthesia and who I considered independent...”. She was asked to review the processes and equipment involved in Adam’s case and to discuss the matter with Dr Taylor. Her inspection took place on 2nd December 1995 and focused on anaesthetic issues. She was not asked to speak to Professor Savage, Dr O’Connor or the surgeon.

2.136 At the same time Drs Gaston and Murnaghan instructed two Trust Technical Officers to check the equipment in the operating theatre. The lead technician Mr John Wilson was then a member of Dr Gaston’s ATICS Management team. Dr Gibson was not present when Messrs Wilson and McLaughlin carried out their inspection. Nonetheless, her report states that she “was accompanied by Mr J. Wilson and Mr B. McLaughlin, senior Medical Technical Officers, on the site who carried out checks into the ventilators and other equipment in the theatre. The technical checks... found nothing at fault...” Her report concluded that “a very carefully thought out and well monitored anaesthetic was delivered with great care to fluid management” and that “the protocols for

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449 Dr Gaston T-19-06-12 p.10 line 2
450 303-001-002 due to ill health the late Dr Gibson was unable to provide oral evidence
451 Dr Gaston T-19-06-12 p.20 line 13
452 093-026-069
453 059-069-162
454 059-069-161
455 093-023-065c & 093-025-068b
456 306-081-006
457 Dr Gaston T-18-06-12 p.99 line 24
458 306-081-006
459 WS-109-1 p.3
460 059-069-162
461 059-069-162
monitoring, anaesthetic set-up and drug administration in this area are among the best on the Royal Hospital site...”\(^{462}\)

2.137 Quite apart from Dr Gibson’s praise for protocols which may be doubted to exist\(^{463}\) it is now clear that the relevant medical devices were not actually examined. Her conclusion that great care was paid to fluid management, is hard to comprehend in the absence of recorded urinary output. Her involvement was not independent and her conclusions were not reliable. Her worryingly uncritical report was submitted to Dr Murnaghan on 11th December 1995.\(^{464}\)

Dr Gaston’s approach

2.138 Dr Gaston believed strongly in Dr Taylor’s outstanding professional ability\(^{465}\) and was concerned because “there was more to this than just that event... there were issues about... a shortage of anaesthetists at that time.”\(^{466}\) He went further to say that should Dr Taylor “stop giving anaesthetics... we probably would have had the collapse of anaesthesia and ICU in Northern Ireland.”\(^{467}\)

2.139 Dr Gaston offered support to Dr Taylor and listened to his “feelings about the anaesthetic, his feelings about what had happened, his feeling about how he was going to actually take it forward and how he would cope with it.”\(^{468}\) He did not question or pursue inconsistency between what he was being told and Dr Taylor’s written statement nor draw it to the attention of anyone else. He now concedes that he should have done so.\(^{469}\)

2.140 Dr Gaston thought “it was important that Dr Taylor had an opportunity to speak to some of the people of a senior level... partly as a follow up to the

\(^{462}\) 059-069-162
\(^{463}\) 305-014-001
\(^{464}\) 059-065-151
\(^{465}\) Dr Gaston T-19-06-12 p.130 line 19
\(^{466}\) Dr Gaston T-19-06-12 p.113 line 6
\(^{467}\) Dr Gaston T-19-06-12 p.138 line 13
\(^{468}\) Dr Gaston T-19-06-12 p.24 line13
\(^{469}\) Dr Gaston T-19-06-12 p.65 line 16
counselling type situation.” Accordingly, and rather than report the matter to the Medical Director and fellow anaesthetist Dr Carson, he approached an even more senior anaesthetic colleague Dr Samuel Morrell Lyons (President of The Association of Anaesthetists of Great Britain and Ireland and Chairman of the Central Medical Advisory Committee of The Department of Health).

Dr Gaston then led a delegation of Dr Lyons and Dr Murnaghan to speak with the Coroner. By that stage the Coroner had already commissioned expert opinion on Adam’s case from consultant anaesthetist Dr John Alexander. Drs Gaston and Lyons cautioned the Coroner against relying upon such opinion because Dr Alexander had “little if any experience in this very specialist field.” They urged upon the Coroner the importance of obtaining the opinion of a consultant paediatric anaesthetist. To that end, the Trust recommended that the Coroner approach Dr Edward Sumner.

After the meeting the Coroner wrote that “their considered view is that the death had nothing to do with anaesthetics.” I consider it remarkable that a senior Trust delegation to the Coroner could have felt confident to advance a “considered view” exonerating the anaesthetics on the basis of so little investigation. Dr Lyons has confirmed that he has “no recollection of being involved in any formal review or interviews of any of the doctors involved in the care of Adam Strain,” Dr Gibson’s Report had not then been received, there had been no examination of the anaesthetic equipment and Dr Gaston had probably not even read the anaesthetic record. More troubling is Dr Murnaghan’s tacit association with this view.

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470 Dr Gaston T-19-06-12 p.25 line 6
471 306-081-006
472 093-024-066 – (11th December 1995)
473 303-001-010
474 011-027-128
475 303-001-010
476 011-027-128
477 093-024-067
478 059-065-151: meeting with Coroner, Monday 11th December 1995
479 Dr Gaston T-19-06-12 p.15
given what he had been told by Professor Savage regarding Dr Taylor’s mismanagement of the fluids.\textsuperscript{480}

2.143 Dr Gaston was unrepentant when he gave evidence about how Adam’s death was dealt with: “Yes, it would have been better to have had an investigation, better to have a discussion, but it was important that Dr Taylor’s confidence and his ability as an anaesthetist, was not damaged by the process. And I still believe... that today, and I think history backs that up.”\textsuperscript{481} Such an approach may have seemed pragmatic to Dr Gaston but it was clearly wrong, even by the standards of 1995 to risk patient safety in the interests of a single individual, no matter how important. Long term confidence in, and respect for, the Health Service, depends upon proper response to critical incidents, rather than an approach which fails to engage with a problem in the hope that it will not recur.

\textbf{Dr Murnaghan’s role in investigation}

2.144 Even though internal control systems within the Trust at that time were rudimentary, Dr Murnaghan’s responsibilities were clear. He was to lead the Trust in assisting the Coroner and respond to the challenges of risk management and litigation.\textsuperscript{482} It was his task to decide what and how to investigate. He might reasonably have been expected to analyse what had gone so tragically wrong. That is at least what Dr Armour, the pathologist, believed when she volunteered to Dr Murnaghan her willingness to attend any meeting to review Adam’s case because she felt her “opinion... relevant... and as such the case could be discussed in full.”\textsuperscript{483} Her input was not sought.

2.145 Dr Murnaghan has stated that “no steps were taken apart from... involving... clinicians in discussion with pathologists and the anaesthetic technical staff in attempting to clarify the cause of death and thereby assist

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\textsuperscript{480} Professor Savage T-22-06-12 p.22 line 19
\textsuperscript{481} Dr Gaston T-19-06-12 p.138 line 23
\textsuperscript{482} 093-025-068
\textsuperscript{483} 059-063-149
\end{flushright}
the Coroner...” If there were any such discussions they were neither recorded nor monitored. Almost nothing was put in writing. There was no multi-disciplinary meeting to discuss the issue, no consideration of the matter within the Paediatric Directorate and no involvement of nursing staff in any consideration of Adam’s case. Dr Murnaghan did not even request a list of the staff on duty.

2.146 Dr Murnaghan explained that he did not fully review the death because “it was a Coronial investigation, it wasn’t my investigation.” He worked on the assumption that the Trust had to await the views of the Coroner’s experts. Such an approach was not only potentially dangerous but ran contrary to the specific advice of the Health and Personal Social Services (‘HPSS’) ‘Complaint Procedure Guide’ which stressed how important it was “for the Trust... to initiate proper investigations regardless of the Coroner’s inquiries.”

2.147 On 30th November 1995 the Coroner wrote to request that Dr Murnaghan obtain a statement from “the technician responsible for the equipment in the theatre confirming that it was functioning properly.” Dr Murnaghan did nothing. The Coroner wrote again to Dr Murnaghan on 8th December 1995 stressing that it was “imperative that the equipment [is] now independently examined.” Dr Murnaghan decided instead to rely upon the internal investigation report submitted by Messrs Wilson and McLaughlin which clearly indicated that they had not been able to inspect all the equipment. Notwithstanding, Dr Murnaghan then asserted that “this examination observed [that] the equipment was found to be in satisfactory condition.”
On 30th November 1995 the Coroner also requested that Dr Murnaghan forward statements from the clinicians involved as soon as possible. Dr Murnaghan sought only a limited number of statements, advising witnesses to restrict content to factual matter and exclude opinion. Dr O’Connor was not asked to make a statement. Dr Montague was not asked to make a statement. No member of the nursing team or technical staff was asked to make a statement. By so doing Dr Murnaghan allowed a restricted number of uninformative reports to be furnished to the Coroner on the basis that that was “the information that was provided and I was the conduit for that information.”

When Dr Murnaghan asked for Professor Savage’s factual statement he advised him not to draw any conclusions because that was the role of the Coroner. Accordingly and notwithstanding that Professor Savage believed that Adam’s death was due to fluid mismanagement, he made a statement on 28th November 1995 omitting not only his own opinion as to the cause of hyponatraemia but also the relevant known factual information relating to Adam’s sodium levels and the quantities of fluid infused.

Mr Keane, who had likewise formed the view that Adam’s death was due to fluid mismanagement, made a statement for the Coroner and failed to identify anything untoward. He was unable to explain this omission.

On 6th December 1995 Dr Murnaghan wrote to Dr Webb requesting his statement for the Coroner. Dr Webb obliged and he too omitted all reference to Adam’s hyponatraemia.

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494 059-073-166
495 Dr O’Connor T-20-06-12 p.115 line 6
496 Dr Montague T-11-05-12 p.153 line 18
497 093-025-068b
498 Dr Murnaghan T-25-06-12 p.131 line 16
499 Professor Savage T-22-06-12 p.90 line 18
500 Professor Savage T-22-06-12 p.22 line 19
501 059-066-154
502 Mr Keane T-23-04-12 p.71 line 22 et seq
503 059-071-164
2.152 Mr Brown supplied his statement on 20th December 1995 to inform only that "the transplantation procedure appeared to be technically satisfactory and at no stage during the operation was I conscious of any problem with his general condition." Mr Brown’s remarkable detachment extended so far as to even avoid any reference to the death.

2.153 Dr Taylor prepared his statement for Dr Murnaghan on 30th November 1995. He stated that he was unable to “offer a physiological explanation for such severe pulmonary and cerebral oedema in the presence of normal monitoring signs.” Given what Dr Taylor must have known of the abnormal CVP and sodium readings – that assertion was clearly suspect and should have prompted inquiry. Likewise, Dr Taylor’s claim that he “regarded the fluids to be appropriate and discussed this with other doctors present in the theatre” presented further obvious issues for discussion and enquiry which were seemingly ignored.

2.154 Dr Murnaghan’s failure, then and subsequently, to query the content of these statements, given what he had been told by Professor Savage, is remarkable. His failure to ask any questions about fluid management is striking. This cannot have been accidental. Not only did the Trust thereby disregard the opportunity to establish what had happened, but it denied the Coroner assistance he might reasonably have expected.

*The Coroner’s expert anaesthetic reports received*

2.155 On 5th January 1996 the Coroner forwarded to Dr Murnaghan a copy of the report he had received from Dr John Alexander, Consultant Anaesthetist. It concluded that Adam’s requirements “led to the administration of a large volume of hypotonic (0.18%) saline which produced a dilutional hyponatraemia and subsequent cerebral oedema."
He cited Professor Arieff's paper in support. This was clear support for Professor Savage's stated opinion.

2.156 Dr Sumner’s anaesthetic report was then received at the end of January 1996.511 It was even more damning in its conclusion and provided additional external confirmation for Drs Murnaghan and Gaston that Dr Taylor may have been wrong in both his anaesthetic and his argument. Even though Dr Murnaghan claimed that he would have gone to the Medical Director had anaesthetic colleagues advised him that something was seriously wrong,512 he still neglected to inform Dr Carson and no further steps were taken to question the clinicians or examine the case in the light of these reports. Dr Murnaghan’s continued omission to report to the medical director is hard to understand unless it was to avoid the formalised response and investigation a medical director might expect. Dr Gaston was unable to explain his reason for not informing the Medical Director.513

2.157 It should be noted that throughout this period, Professor Savage maintained contact with Adam’s mother514 and was content to discuss both Dr Alexander’s and Dr Sumner’s medical opinions with her “provided that Dr Murnaghan was happy and there were no medico-legal reasons to suggest otherwise.”515 He was cautious lest he say anything inappropriate from the point of view of the Trust,516 perhaps because he knew that “Debbie Strain, at that time, felt that someone should take the blame for what happened to Adam.”517 He wrote to her to say that “once the cause of Adam’s death is established it is right we should try and work out why.”518

2.158 Dr Murnaghan and Dr Gaston were part of the ‘governance’ investigation into Adam’s death519 but their failure to investigate was blatant. I believe their failure to conduct a thorough investigation was deliberate. Their
response to Adam’s death was to commit as little to writing as possible and to reveal as little by investigation as was consistent with appearing to assist the Coroner. Realising, as they must have done, the vulnerabilities of the Trust to criticism, I interpret their actions on behalf of the Trust as essentially defensive. That was inappropriate. Whilst this failing was grave and principally the responsibility of Dr Murnaghan, I consider that all involved must bear responsibility because the necessity to investigate what had happened to Adam must have been obvious to all.

Assessment of Dr Taylor

2.159 Dr Murnaghan described an informal and off-the-record routine for managing the problem of the skilled doctor who has made a mistake. In such situations, he said the lead clinicians together with their colleagues might review the problem, the doctor and his performance. A decision would then be made amongst themselves about how best to proceed and “almost certainly there might be an element of supervision.”

2.160 It was in this context, and rather than report the death formally to the Medical Director, that I believe Dr Murnaghan allowed Dr Taylor’s anaesthetic colleagues some control of the situation, not least because they were “separately and severally... all totally supportive of Dr Taylor.” Dr Murnaghan “knew and had been reassured that Dr Taylor had never ever in all his time... in the Royal... ever had a problem... he was probably the most diligent of all the anaesthetists in the RBHSC.” Indeed, Dr Taylor received support from the most senior anaesthetist in the Trust, Dr Dennis Coppell, who wrote to say that he did “not believe on reading the information available to me that there is any negligence on your part and, to the contrary, you demonstrated considerable professional skills and expertise.”

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520 Dr Murnaghan T-25-06-12 p.35 line 17 et seq
521 Dr Murnaghan T-25-06-12 p.157 line 23
522 Dr Murnaghan T-25-06-12 p.155 line 15
523 122-048-002
2.161 It was Professor Savage who sensed that Dr Taylor was “ill advised”\(^{524}\) by his anaesthetic colleagues. He suggested that “...what was allowed to happen was that Dr Taylor did not get advice from anyone that said ‘look, the evidence from Dr Sumner, from the Autopsy, from Dr Savage, from Dr O’Connor is such that we think the position you are taking is untenable.’ No one ever said that to him, I don’t think. Therefore he was allowed to proceed down that road and, unfortunately, has got into the difficulties that he is now in.”\(^{525}\)

2.162 That was a mistaken approach. When Dr Sumner’s report confirming Dr Taylor’s error was received, Dr Murnaghan did nothing because “Dr Taylor had a view which differed from Dr Sumner’s view and he received a degree of support from Dr Gaston in relation to that view... I wasn’t in a position to make a judgment on that.”\(^{526}\) What I believe he should have done was to seek the opinion of someone who was in a position to make a judgment. That would then have obligated Dr Taylor to either accept his error or, if he wished to defend it, to do so from a position independent of the Trust.

2.163 To make matters worse, Dr Murnaghan did not assess Dr Taylor’s fitness to practice because he had been “reassured that his colleagues were looking after him, overseeing his work.”\(^{527}\) That approach meant that the safety of Dr Taylor’s patients may have become dependent upon the supervision his colleagues provided.\(^{528}\) That was unacceptable. Dr Murnaghan justified his actions on the basis that “This was a singular aberration that he would have learned from as well as everybody else... He didn’t cause dilutional hyponatraemia again.”\(^{529}\) However, Dr Murnaghan knew that Dr Taylor did not accept the aberration\(^{530}\) and could not therefore have been satisfied that lessons had been learned.

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\(^{524}\) Professor Savage T-10-09-12 p.125 line 7  
\(^{525}\) Professor Savage T-10-09-12 p.128 line 12  
\(^{526}\) Dr Murnaghan T-25-06-12 p.185 line 16  
\(^{527}\) Dr Murnaghan T-25-06-12 p.160 line 25  
\(^{528}\) Dr Murnaghan T-25-06-12 p.162 line 4  
\(^{529}\) Dr Murnaghan T-25-06-12 p.223 line 17  
\(^{530}\) Dr Murnaghan T-25-06-12 p.221 line 8
Drs Gaston and Murnaghan failed to place patient safety before other interests. Dr Murnaghan has conceded that “on reflection... we should have done things earlier and we didn’t do, even then afterwards, what we should have done. And I’m sorry.”

Post-mortem

Adam’s death was reported to the Coroner on 28th November 1995. Upon his instruction a post-mortem was carried out on 29th November 1995 at the Royal Victoria Hospital by Dr Alison Armour, a trainee Forensic Pathologist of Senior Registrar grade employed within the State Pathologist’s Department. She was at that time an experienced pathologist who had been a member of the College of Pathologists for a number of years. Dr Armour had 10 files of medical notes and records made available to her. She performed external and internal examinations and amongst other things noted “complete infarction” of the transplanted kidney.

Dr Armour examined the brain on 12th January 1996 noting swelling and “massive cerebral oedema of the cortex and white matter.” She subsequently described the severity of Adam’s cerebral oedema as “the worst she had ever seen.” Dr Armour sought the input and advice of others, namely Drs Mirakhur, O’Hara and Bharucha.

Dr Murnaghan then made an approach to Dr Armour. He wrote to her on 7th February 1996 that “I have spoken on the telephone with Bob Taylor and obtained his permission to share the attached with you on the
understanding that its contents are for your personal information and as a background briefing, in order to assist in coming to your conclusions in this difficult matter." His attachment was a note prepared by Dr Taylor pointing out the "several major problems" he had identified in the evidence of Drs Sumner and Alexander together with Dr Taylor’s assertion that both experts had "failed to comprehend the physiological difference in this case and have used dubious scientific argument in an attempt to explain cerebral oedema." If this was an attempt to influence Dr Armour it was to fail because she was quite confident that she "did not agree with him and he knew I did not agree with him."

2.168 Dr Armour completed her work and produced an Autopsy Report in which she referred to Professor Arieff’s 1992 paper and formulated the cause of Adam’s death as:

"1 (a) cerebral oedema due to

(b) dilutional hyponatraemia and impaired cerebral perfusion during renal transplant operation for chronic renal failure (Congenital Obstructive Uropathy)."

She did not implicate the infarcted kidney in the cause of cerebral oedema or death.

2.169 The Autopsy Report is undated. Copies were sent to the Coroner on 22nd April 1996 and to Adam’s mother, Dr Murnaghan and Dr Sumner.

2.170 Dr Armour’s reference to “impaired cerebral perfusion” arises from her identification of “a suture in situ on the left side of the neck at the junction
of the internal jugular vein and the sub-clavian vein" which she thought had impaired the blood flow to Adam’s brain. She believed that this had exacerbated the effect of the cerebral oedema and was thus relevant to her conclusions as to cause of death.

2.171 Evidence was received that the presence of such a suture was improbable. On this issue (which is relevant but not central to the investigation of Adam’s death) I believe that Dr Armour’s identification of a suture was mistaken. She subsequently acknowledged this herself, having considered the expert opinion of others.

2.172 However and apart from that, her identification and analysis of the important issues was more than competent. Professor Sebastian Lucas advised the Inquiry as to the content of her report. He found her autopsy to have been “performed competently” and to have been “internally consistent.” He stated that he would grade the report as “good” because it “addressed the central issue and produced a coherent answer.”

2.173 Dr Waney Squire also praised “a very well worked commentary... Dr Armour has looked at the clinical story in some detail and she has done her best to make a detailed account of the factors which may have been relevant in death and how they fit in with what she has seen.” However, she believed the Autopsy Report was open to criticism in relation to the possible ligation of the left internal jugular vein and the failure to investigate the cause of infarction in the transplanted kidney. She also noted some inconsistency between contemporaneous notes and the Autopsy Report and questioned the involvement of Drs O’Hara and Bharucha without supporting documentation. Seemingly Dr Armour formed an opinion differing from that of Drs O’Hara and Bharucha. Dr Squire stated that in such a complex case “specialist assistance should have been sought formally and the reports of...
those specialists included as signed reports within the final pathology report."\textsuperscript{560}

2.174 The input of Drs O’Hara and Bharucha is unknown but it is clear that their input should have been recorded and Dr Mirakhur’s contribution formally incorporated by way of signed report.\textsuperscript{561}

2.175 Professor Lucas observed in relation to coronial autopsy practice at that time that there was “no governance, no standard of quality demanded by Coroners, no obligatory linkage with feedback of autopsy findings with pre-mortem clinical practice and no agreed level of investigations for particular scenarios of death.”\textsuperscript{562} Furthermore, in 1995 the State Pathologists Department generally “did their own neuropathology”\textsuperscript{563} gave limited training,\textsuperscript{564} had no formal system of referral for expert opinion,\textsuperscript{565} did not retain a paediatric pathologist and did not attend mortality meetings for the purposes of clinico-pathological correlation.\textsuperscript{566} It is not believed that the State Pathologist reviewed Dr Armour’s report.\textsuperscript{567} It would therefore be harsh to criticise Dr Armour’s work. I find that her Autopsy Report was independent and, more importantly, correct in its principal finding.

2.176 Dr Armour’s Autopsy Report was received by Dr Murnaghan at the end of April 1996.\textsuperscript{568} It was in broad agreement with Dr Sumner and yet Dr Taylor’s performance was still not reviewed nor his fitness to practice assessed. The lessons to be learned from Adam’s death could have been learnt by the end of April 1996.

\textsuperscript{560} 206-004-030
\textsuperscript{561} Dr Armour T-13-06-12 p.67 line 17
\textsuperscript{562} 209-001-009
\textsuperscript{563} Dr Armour T-13-06-12 p.45 line 8
\textsuperscript{564} Dr Armour T-13-06-12 p.90 line 8
\textsuperscript{565} Dr Mirakhur T-12-06-12 p.31 line 8
\textsuperscript{566} Dr Armour T-13-06-12 p.37 line 20
\textsuperscript{567} WS-012-3 p.3
\textsuperscript{568} 059-039-083
Fatal cerebral oedema: alternative causes and contributory factors

2.177 Arising from the expert opinions received by the Inquiry, a range of potential alternate causes for Adam’s fatal cerebral oedema emerged together with a number of possible contributory factors, including:

(i) Pre-existing central nervous system condition.
(ii) Acute cerebral venous sinus thrombosis.
(iii) Chronic cerebral venous sinus thrombosis.
(iv) Thrombosis of the paravertebral plexus.
(v) Reduced jugular venous drainage or possible venous obstruction.
(vi) Cerebral blood flow, anaemia and reduced cerebral O2 delivery/low CO2.
(vii) Hypoxia.
(ix) Seizure(s) during surgery.
(x) Halothane in anaesthetic giving rise to cerebral vasodilation.
(xi) Dilutional anaemia.
(xii) Head down position during surgery.

These were exhaustively considered and two schedules summarising contrasting expert views compiled. For the sake of completeness it may be stated that whilst the condition of the kidney did not contribute to death, the possibility cannot be discounted that dilutional hyponatraemia and

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569 306-016-130 & 306-017-146
cerebral oedema might have contributed to the non-functioning of the kidney.\textsuperscript{570}

2.178 In addressing these many issues, the Inquiry sought the neurological opinion of Professor Kirkham, practising Consultant Paediatric Neurologist and Professor of Paediatric Neurology, as to the effect of the fluid infusion upon Adam’s brain and the possible contribution of venous obstruction to the cerebral oedema.

2.179 Amongst other things, Professor Kirkham gave it as her opinion that hyponatraemia was not, in fact, the primary cause of Adam’s death and that he would have survived had it not been for other and unrelated conditions. Whilst conceding the possibility that dilutional hyponatraemia was implicated in a secondary role, she advanced specific vascular pathologies as the likely primary cause of the fatal cerebral oedema.

2.180 Her views raised issues going to the heart of the work of the Inquiry. They contradicted the inquest verdict and the opinions of Drs Sumner, Armour and Alexander and ran expressly counter to the analysis and conclusions of Professor Dr Gross, Dr Coulthard and Dr Haynes. Whilst her opinion was unsupported by the neuro-pathological and radiological findings of Drs Squier\textsuperscript{571} and Anslow,\textsuperscript{572} it was apparent that her opinion could not be disregarded because her hypothesis could not be excluded. Accordingly, expert response to her opinion was sought and meetings arranged in early 2012 in order to explore the emerging difference in diagnosis.\textsuperscript{573}

2.181 Consensus was not possible\textsuperscript{574} and the necessity for a second paediatric neurological opinion became obvious. Accordingly Professor Dr Dietz Rating of the Children’s Hospital, University of Heidelberg\textsuperscript{575} was commissioned to analyse the evidence, consider the diagnosis and give his opinion. He too disagreed with Professor Kirkham, concluding that it was

\textsuperscript{570} Professor Forsythe T-04-05-12 p.145 line 8 & Professor Risdon T-03-05-12 p.38-39
\textsuperscript{571} 208-003-050
\textsuperscript{572} 208-004-051
\textsuperscript{573} 307-007-073, 307-008-162, 306-016-130 & 306-017-146
\textsuperscript{574} 306-017-146, 309-008-230 & 307-008-242
\textsuperscript{575} 306-097-001
the “acute overload with free water, nothing else.”\[^{576}\] Whilst I am unable to make a definitive judgment in such a complex field, I believe that the evidence nonetheless permits a finding on the balance of probabilities.

2.182 Professor Kirkham advanced her opinion because she was unable to accept the proposition that hyponatraemia alone could, on the balance of probabilities, have caused Adam’s death. This was on the basis that she could find no proof for it. She was very clear that available medical literature disclosed no data to confirm that such a large infusion of hypotonic fluid or such a drop in sodium levels had ever given rise to fatal cerebral oedema in the absence of another pre-existing brain compromise.\[^{577}\]

2.183 Conceding that the literature did not extend much beyond Arieff “and the number of cases reported is relatively small”\[^{578}\] she argued that those patients comprising Professor Arieff’s study group must all have presented with other pre-existing risk factors and that dilutional hyponatraemia was not therefore the primary cause of their fatal cerebral oedemas. Examination of Professor Arieff’s paper, did not however appear to support this interpretation. It is further to be noted that Professor Arieff has not subsequently amended his central findings\[^{579}\] but has maintained his conclusion that the cause of cerebral oedema in such cases is the ill-considered use of hypotonic intravenous fluids. It is in any event unlikely that the literature could encompass cases directly comparable to Adam.\[^{580}\]

2.184 Professor Kirkham pointed out that Adam had survived previous similar episodes of hyponatraemia and that there must therefore have been other factors involved. However upon analysis it was found that the rate of fall of his serum sodium levels was at least five times greater than that recorded

\[^{576}\] 240-002-045
\[^{577}\] Professor Kirkham T-14-01-13 p.54 line 1
\[^{578}\] Professor Kirkham T-15-01-13 p.41 line 9
\[^{580}\] 307-007-094 & Professor Dr Rating T-15-01-13 p.32 line 22
for his previous episodes. The rate of fall remained for Professor Dr Rating a key diagnostic feature.

2.185 Nonetheless and proceeding on the basis that dilutional hyponatraemia was not the primary cause of death, Professor Kirkham gave her opinion, again on the balance of probabilities and largely on the basis that Adam presented with what may have been relevant risk factors, that he was likely to have suffered a cerebral venous sinus thrombosis (‘CVST’) and/or posterior reversible encephalopathy syndrome (‘PRES’) and that these pathologies caused the cerebral oedema. Whilst they might also have rendered Adam vulnerable to the effects of the dilutional hyponatraemia, she believed he would have survived but for the CVST and/or PRES.

2.186 Whilst demonstrating that these conditions were possible and that there was no basis upon which to positively exclude them, she was unable to present evidence that Adam actually had them. In particular, there was no persuasive evidence that Adam was neurologically vulnerable or that he had suffered previous neurological disorder, or that he suffered any venous sinus thrombosis or any PRES event whether in isolation or together or at any time.

2.187 Professor Kirkham further advanced the proposition that hyponatraemia could not have been the primary causative factor unless hypoxia was also present. The evidence for hypoxia was equivocal and in any event the conclusion that dilutional hyponatraemia could not cause cerebral oedema without it, uncertain.

2.188 Considerable debate surrounded the interpretation of the neuropathological investigations and whether or not the findings were more or
less typical or indicative of this condition or that. This provided no more conclusive evidence than imperfect analogies drawn from experimentation with piglets. Diagnosis on the basis of risk factors led to analysis of the hypothetical. Ultimately the problem of diagnosis in the absence of comprehensive information became a matter for informed clinical interpretation of the patho-physiology.

2.189 In determining the causative factors for the acute event which befell Adam, the overload of approximately 5% of his own body weight in free water cannot on the evidence be disregarded. Adam was well before he went to theatre, by common agreement received an excessive quantity of free water very much too quickly and within hours suffered acute hyponatraemia and was dead. It is hard not to make the connection given that no other cause can be demonstrated and dilutional hyponatraemia is recognised in the medical literature as a cause of potentially lethal cerebral oedema.

2.190 Professor Kirkham conceded very fairly that the infusion of so much free water may have been a factor in the fatal cerebral oedema. However she considered it rather more likely that the increase in Adam’s blood pressure had given rise to a hypertensive encephalopathy and that was the major factor. However, as she herself pointed out, the evidence and the literature were not conclusive in supporting such a diagnosis. Nonetheless and on the balance of probabilities she preferred it.

2.191 Professor Dr Rating remained at variance with Professor Kirkham. Whilst acknowledging the fine judgments inherent in defining the primary and secondary causes of cerebral oedema, he said that a conventional application of physiological rules permitted the conclusion that dilutional hyponatraemia alone could cause a fatal cerebral oedema. He said it was a diagnosis that he would accept immediately being for him “as a
clinician the most logical and reliable explanation. Having reviewed the arguments and the theory he said he was “not convinced” that there was any other primary cause and that on the balance of probabilities, hyponatraemia was the primary cause of Adam’s fatal cerebral oedema.

2.192 In this Professor Dr Rating was in accord with the other available expert comment as to the cause of death. All proposed that dilutional hyponatraemia was most probably the cause of Adam’s fatal cerebral oedema. Accordingly, Professor Kirkham’s rejection, on the balance of probabilities, of the consensus diagnosis in preference for a more speculative differential diagnosis could not stand without positive supporting evidence. That evidence was lacking.

2.193 Accordingly and given that there was broad agreement as to a plausible diagnosis and there was no compelling reason for me to prefer any other explanation, I conclude on the balance of probabilities that Professor Kirkham’s opinion does not prevail.

Inquest preparation

2.194 Dr Murnaghan had six months to prepare the Trust for Adam’s inquest. His activity in meeting the Coroner and forwarding representations to Dr Armour may be contrasted with his inactivity elsewhere. Dr Murnaghan was aware of his obligation to assist the Coroner in clarifying the cause of death but he took no further steps to formally investigate the death or interview all those involved in order to clarify the conflicting opinions received.

2.195 Dr Murnaghan liaised with the Trust’s Solicitor, Mr George Brangam, and arranged meetings with the Trust witnesses prior to inquest.

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598 Professor Dr Rating T-15-01-13 p.93 line 9
599 Professor Dr Rating T-15-01-13 p.91 line 5
600 In these circumstances I determined that no useful purpose was served by seeking Professor Kirkham’s opinion as to the cause of Raychel Ferguson’s death.
601 093-025-068b
602 093-025-068b
603 059-036-069
Consultation with witnesses was undertaken in April and May 1996. Solicitor’s advices were received. Mr Brangam advised Dr Murnaghan on 30\textsuperscript{th} May 1996 that Dr Sumner’s views were capable of creating difficulties for the Trust at inquest and moreover that Professor Savage agreed with them. In addition Mr Brangam reiterated Professor Savage’s suggestion that the Trust should adopt the attitude “…that everyone concerned in the care of this child was devastated by his death and that where possible, answers will be provided to the queries raised by the solicitors on behalf of the next of kin.”

2.196 Dr Taylor’s attitude remained assertive and defiant throughout. He informed Dr Murnaghan that it was unacceptable “to speculate on the cause of Adam’s death without direct post-mortem evidence and by misrepresenting the quantities and types of fluids given.” He found “several fundamental problems” with Dr Armour’s report and pointedly observed that he “would hope that reasons [were] not being generated or misrepresented to suit the diagnosis.”

2.197 Dr Murnaghan was all too keenly aware that Dr Taylor disagreed with both Dr Sumner and Professor Savage. His response was to arrange further discussion with Dr Taylor and Dr Gaston to reconsider the issue of Adam’s fluid management. A final meeting with the solicitor, Dr Taylor, Professor Savage and Dr Gaston was convened on 14\textsuperscript{th} June 1996 presumably in an attempt to establish an agreed position before proceeding to inquest, however, Dr Taylor refused to accept that there had been fluid overload or that Adam had suffered from dilutional hyponatraemia. The
most that seems to have been agreed was that they would not use the words “fluid overload.”

2.198 In Dr Murnaghan’s view “the purpose of the meeting [was]... to inform the Trust’s legal advisor who was to ... represent the Trust at the Inquest.” Indeed Mr Brangam might, when informed of the contradictory opinions expressed by the Trust witnesses as to cause of death, have considered that a conflict existed in the Trust position and suggested separate legal representation for Dr Taylor at the inquest. He did not.

2.199 That was a very unsatisfactory position for the Trust and as Professor Savage observed “it seemed to be that the people who were advising on the approach to the Coroner’s Inquest were saying ‘Dr Savage has that view, Dr Taylor has that view, and we must allow him to put that view forward.’” To have allowed a medical witness on behalf of the Trust to give evidence relating to the circumstances of a death which was known to be contrary to the beliefs of other medical witnesses appearing on behalf of the Trust was inappropriate. It conflicted the Trust's position and encouraged witnesses to minimise rather than articulate the differences between them.

2.200 Dr Gaston did not attend the pre-inquest consultations as a potential witness but in his governance capacity as a clinical director. Notwithstanding that he was aware of the differences of opinion between Professor Savage and Dr Taylor as to the cause of Adam’s death, he did not, even then, think it appropriate to inform the medical director but rather continued “with a view to ensuring the evidence that was presented reflected fairly Dr Taylor’s position so that the Coroner had the opportunity to hear the other points of view...” I believe that Dr Gaston was principally motivated to support Dr Taylor at a time when he and Dr Murnaghan should have been primarily concerned with ensuring that all involved complied with
their legal duty\textsuperscript{618} to inform the Coroner about what they knew of the facts and circumstances of Adam’s death.

**Inquest into Adam’s death**

2.201 Adam’s inquest opened on 18\textsuperscript{th} June 1996 before H.M. Coroner, Mr John Leckey, and heard from a number of witnesses including Adam’s mother,\textsuperscript{619} Dr Armour,\textsuperscript{620} Dr Alexander\textsuperscript{621} and Mr Keane\textsuperscript{622} before resuming on 21\textsuperscript{st} June 1996 to hear Dr Taylor\textsuperscript{623} and Professor Savage.\textsuperscript{624} No nursing or technical evidence was given. Mr Brown did not give evidence.

2.202 It is significant, that of the opinions expressed as to cause of death at inquest, it was Dr Taylor alone who dissented. He insisted that Adam’s polyuric condition meant that he could not develop dilutional hyponatraemia and that this could not therefore have been the cause of death.\textsuperscript{625} Mr Keane did not proffer his opinion as to what had gone wrong and Professor Savage, whilst indicating his agreement with Dr Sumner\textsuperscript{626} was less critical of Dr Taylor’s fluid management than might have been expected. Indeed, he was reluctant to say that there had been "gross fluid overload."\textsuperscript{627}

2.203 During the course of the inquest, the Trust provided the Coroner with draft "recommendations for the prevention and management of hyponatraemia arising during paediatric surgery."\textsuperscript{628} These were signed by Dr Taylor and submitted as evidence of how such cases might be managed in the future.\textsuperscript{629} These recommendations were drafted by Dr Gaston,\textsuperscript{630} in liaison with Dr Murnaghan,\textsuperscript{631} and endorsed by consultant paediatric anaesthetist

\textsuperscript{618} Pursuant to section 7 of the Coroners Act (Northern Ireland) 1959. [www.legislation.gov.uk/apni/1959/15/section/7](www.legislation.gov.uk/apni/1959/15/section/7)

\textsuperscript{619} 011-009-025

\textsuperscript{620} 011-010-030

\textsuperscript{621} 011-012-079

\textsuperscript{622} 011-013-093

\textsuperscript{623} 011-014-019

\textsuperscript{624} 011-015-109

\textsuperscript{625} 011-014-098

\textsuperscript{626} 122-044-034

\textsuperscript{627} 122-044-035

\textsuperscript{628} 060-018-036

\textsuperscript{629} 122-044-048

\textsuperscript{630} 060-018-035 & WS-013-2 p.4

\textsuperscript{631} 093-025-068b
Dr Seamus McKaigue.\textsuperscript{632} The draft received the approval of Dr Crean\textsuperscript{633} who stated that the primary purpose of the recommendations was that they might be produced at Adam’s inquest.\textsuperscript{634}

2.204 The recommendations specifically claim to be made with regard to the Arieff paper and the circumstances of Adam’s case and seek to reassure that in future all anaesthetic staff will be made aware of the complications of hyponatraemia and advised to act appropriately.

2.205 Professor Arieff’s paper was referenced because it was the medical literature cited by Drs Alexander, Armour and Sumner in support of the conclusion that Adam’s cerebral oedema was caused by dilutional hyponatraemia resulting from an excess administration of low sodium fluids. Dr Sumner described it as a “very important paper on the subject - about which [there is] not much general knowledge.”\textsuperscript{635}

2.206 Rule 23(2) of The Coroner’s (Practice and Procedure) Rules (Northern Ireland) 1963 allowed the Coroner discretion to report the circumstances of Adam’s death to the relevant authorities, if he considered…“that action should be taken to prevent the occurrence of fatalities”\textsuperscript{636} The suspicion arose that the draft recommendations had been cynically provided to the Coroner in order to deflect him from issuing a Rule 23(2) report by reassuring that action would indeed be taken.

2.207 Evidence was received that the recommendations were not distributed beyond the same small group of anaesthetists which had drafted them in the first place.\textsuperscript{637} They were not circulated amongst other clinicians or paediatricians involved in paediatric surgery or amongst other paediatric anaesthetists. In fact, nothing was done with the ‘recommendations.’ Accordingly, their principal reassurance that “all anaesthetic staff will be made aware of the paediatric phenomena [dilutional hyponatraemia] and

\begin{itemize}
\item \textsuperscript{632} 303-001-002, 060-014-025 & 093-023-065b
\item \textsuperscript{633} 060-014-025
\item \textsuperscript{634} WS-130-1 p.16
\item \textsuperscript{635} 122-044-011
\item \textsuperscript{636} 303-052-715
\item \textsuperscript{637} WS-130-1 p.16
\end{itemize}
advised to act accordingly”\textsuperscript{638} was almost certainly insincere. Given the lack of any subsequent dissemination of these recommendations or of “the information contained in the paper by Arieff”\textsuperscript{639} it must be concluded that they were indeed drafted solely for production at the inquest and accordingly that their purpose must have been to provide comfort to the Coroner and dissuade him from making a Rule 23 report.

2.208 In the event, the Coroner was not convinced that such a report was necessary. He considered that Professor Savage’s proposal “to monitor electrolytes more closely”\textsuperscript{640} was clear\textsuperscript{641} and was persuaded “that changes would be made in relation to the future management of cases such as that of Adam’s.”\textsuperscript{642}

2.209 In an apparently separate exercise the same draft recommendations were then developed into a “press release.” This was forwarded to the Trust’s Public Relations department on 21\textsuperscript{st} June 1996\textsuperscript{643} “in anticipation of media interest at the conclusion of the Inquest.”\textsuperscript{644} It subsequently found reference in both the Belfast Telegraph\textsuperscript{645} and The Irish News.\textsuperscript{646} The press and public were thus given the same empty assurances as were given the Coroner. It was, indeed, an exercise in public relations.

2.210 With hindsight, it was also a wasted opportunity to familiarise clinicians in Northern Ireland with the risks of dilutional hyponatraemia in children. It was later noted by Mr Clive Gowdy\textsuperscript{647} that the references to hyponatraemia “were of such general application to be of interest and significance to other hospitals likely to be treating young patients.”\textsuperscript{648} The fact that Dr Mulholland, then acting Clinical Director for Paediatrics, and Dr Terence Montague, Senior Registrar in Anaesthetics at the Children’s Hospital, were both

\textsuperscript{638} 011-014-107a
\textsuperscript{639} 011-014-107a & Dr Crean T-04-06-13 p.34 line 5
\textsuperscript{640} 122-044-034
\textsuperscript{641} 122-044-051
\textsuperscript{642} 006-015-311
\textsuperscript{643} 059-007-023 & WS-105-2 p.19
\textsuperscript{644} 305-020-001
\textsuperscript{645} 070-016-073
\textsuperscript{646} 070-016-070
\textsuperscript{647} Permanent Secretary, Department of Health, Social Services and Public Safety (DHSSPS) Northern Ireland
\textsuperscript{648} WS-062-2 p.10
unaware of the Arieff paper\textsuperscript{649} emphasises the importance of this missed opportunity, which may have been significant for the care Claire Roberts was to receive only months later in the Children’s Hospital.

2.211 Mr Gowdy went further and observed that he would have expected a copy of the recommendations to be sent to the Department and to Dr Henrietta Campbell, the Chief Medical Officer (‘CMO’) because of regional implication and the desirability of wider dissemination. The CMO herself believed that had they been brought to her attention she would have considered them an appropriate matter for discussion within the Specialty Advisory Committees (‘SAC’) for anaesthetics and paediatrics.\textsuperscript{650}

2.212 The Inquest verdict given on 21\textsuperscript{st} June 1996 found the cause of Adam’s death to be “(A) Cerebral Oedema due to (B) Dilutional Hyponatraemia and impaired cerebral perfusion during renal transplant operation for a chronic renal failure (congenital obstructive uropathy).”\textsuperscript{651} The Coroner made an additional finding that the onset of “gross cerebral oedema was caused by the acute onset of hyponatraemia from the excess administration of fluids containing only very small amounts of sodium.”\textsuperscript{652}

2.213 The Coroner’s verdict was damning for Dr Taylor and the Trust.

\textbf{Post-inquest}

2.214 After the inquest, Dr Murnaghan noted that “generally the outcome was satisfactory with fair write up in Friday evening’s Telegraph.”\textsuperscript{653} The newspaper report was headlined “Death left me devastated - op doctor. Boy’s death prompts action from Royal Hospital Trust.”\textsuperscript{654} He telephoned the Editor of the Belfast Telegraph to thank him.
2.215 The Trust’s solicitor, Mr Brangam, wrote to Dr Murnaghan on 2nd July 1996 hoping that “everyone involved was satisfied by the way in which matters progressed and, indeed, I believe it is not without note that the Coroner did not issue a recommendation in this case, which I believe was in a large part due to the fact that the deponents gave their evidence in fair, objective and professional manner and at the same time were alert and aware of those issues which might cause an erosion of public confidence.” He also sought to place on “record my appreciation for the sterling help and assistance given at the hearing of this matter by Dr Gaston.”

2.216 Mr Brangam was to write further to Dr Murnaghan on 19th March 1997 in respect of the medical negligence claim brought by Adam’s mother to advise that “from a liability point of view, this case cannot be defended, and this is based largely upon the information given by one of the independent experts retained by H.M. Coroner at the Inquest. Additionally I believe that it would unwise for The Trust to engage in litigation in this matter given the particularly tragic circumstances of the death and the opportunity for the exploration of any differences of opinion which might exist between a number of the attending physicians.”

2.217 The solicitor thus reveals what I believe to have been the Trust tactic at inquest. Given that Dr Sumner’s views were likely to prevail and that there were issues which could cause an erosion of public confidence, it was decided to draw as little attention as possible to the differences of opinion between doctors lest the full extent of what may have gone wrong be explored. That was an approach which, in effect, withheld relevant information and analysis from the Coroner and discouraged review.

2.218 Dr Carson recalled “Dr Murnaghan coming into my office after the Inquest to say basically, the Inquest went all right... satisfactory.” Having acknowledged that there could be nothing “satisfactory” about such a
verdict from the point of view of the Trust, Dr Carson explained that Dr Murnaghan must have thought it “went all right” from the perspective of “reputational risk - being damaged by an adverse outcome in an Inquest.”

2.219 I conclude that overall Dr Murnaghan engaged in a ‘damage limitation’ exercise to protect the reputation of the hospital. That was not the role of one who should had been motivated to assist the Coroner.

**Informing the Medical Director**

2.220 Dr Murnaghan informed Dr Carson about the inquest but did not seemingly communicate the crucial point that Dr Taylor had made a grievous error and refused to acknowledge it. Dr Carson explained that he had not been told that there was criticism of Dr Taylor or that the Coroner had suggested a dissemination of information and it was thus that he did not “give any thought to a review or investigation of any sort into the case.”

2.221 However, Dr Murnaghan did inform Dr Carson that the inquest had raised risk management issues and Dr Carson seemingly agreed that this warranted a seminar as soon as possible with Drs Taylor, O’Connor, Mulholland and Gaston, Professor Savage and Mr Keane. This did not happen and Dr Carson did not pursue it. Nor did he ask to see the Coroner’s verdict or enquire if Dr Taylor accepted it. He asked no questions, sought no report, and made no report to the Board.

2.222 The absence of any engagement by the Medical Director, Dr Carson, with the issues generated by the Inquest verdict is extraordinary and may have had a major bearing on how the Trust responded to the Coroner’s finding, managed Dr Taylor and learned from the tragedy.

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659 Dr Carson T-16-01-13 p.151 line 17
660 Dr Carson T-16-01-13 p.158 line 7
661 Dr Carson T-16-01-13 p.159 line 11
662 Dr Carson T-16-01-13 p.175 line 9
663 Dr Carson T-16-01-13 p.164 line 13
664 059-001-001
665 Dr Carson T-16-01-13 p.155 line 25
666 Dr Carson T-16-01-13 p.156 line 24
Post-inquest response

2.223 It was Dr Taylor alone who did not accept the finding of the Coroner. He continued to brazenly defend his position to both the PSNI and this Inquiry until he was finally obliged to concede error in February 2012. He did not, however, publicly disagree with the inquest verdict and somehow managed to leave his colleagues unclear as to exactly what his position was.

2.224 It is to be regretted that the Trust took no formal steps to find out if Dr Taylor accepted the verdict. Mr Keane “thought that the verdict of the inquest would have perhaps offered an opportunity for other people to talk to him” but as Professor Savage recalled - “the Coroner made his decision, we accepted it and things seemed to have ended there.”

2.225 Mr Koffman was of the view that “if the Coroner’s verdict was that this was an avoidable hyponatraemic death, it has to be accepted by the team. If you do not accept that, you cannot be part of that team. So I would immediately say he could do no transplant work. But the problem with hyponatraemic illness is that it could relate to any operation; it is not just specific to transplantation. So that is why there is a wider connotation.” I believe that was the proper response and the one which should have been adopted by the Trust in 1996. Until such time as the Trust could be confident that such an error would not be repeated, patient safety was potentially jeopardised. Steps ought to have been taken to formally assess and, if necessary, retrain Dr Taylor at that time. Instead, Dr Taylor was permitted to continue in his practice.

2.226 However in 1996, the Trust did not assess the clinical performance of its medical staff. Dr Gaston recalled “no policy... for the appraisal of

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667 Dr Montague T-11-05-12 p.155 line 21 & Professor Savage T-18-04-12 p.171 line 12
668 WS-008-6 p.3
669 Dr Gaston T-11-09-12 p.108 line 20
670 Mr Keane T-26-04-12 p.171 line 10
671 Professor Savage T-22-06-12 p.99 line 3
672 Mr Koffman T-16-05-12 p.153-154
anaesthetic staff after an unexpected death.” There was no external review and as Mr William McKee advised, no “process of assessing and developing the competence of doctors outside the GMC.” There was no referral to the General Medical Council (‘GMC’), whether by the Trust or its medical staff, notwithstanding the clear duty imposed by the GMC Code of Good Practice to protect patients when clinical performance was thought to pose a threat. Mr McKee stated that the Board “relied on the wider clinical team to ascertain whether there should be a referral to the GMC.” However, as Dr Murnaghan explained “there wasn’t a culture of referral to the GMC.” That must however have been known to all.

2.227 The consultant paediatric anaesthetists in the Children’s Hospital do not appear to have even considered referring Dr Taylor to the GMC. They did discuss Adam’s case but somehow allowed themselves to understand that whilst Dr Taylor may not have agreed with the Inquest verdict he did acknowledge error in respect of his care of Adam. They appeared to have been content to leave it at that without further reassurance as to his competency in fluid management. In short, they appear to have trusted to luck. Professor Savage and the nephrology team do not seem to have been so trusting and in consequence of Adam’s death they made it their “business to be in theatre for the duration of every transplant and to have discussions with the Anaesthetist about the fluids beforehand and during and actively observe all the fluids that were given.”

2.228 I can only conclude that the Trust lacked a proper system to manage the consultant who failed to acknowledge error or the risk he might pose to patients or the extent to which further training might be necessary. The
Trust had no means of satisfying itself that the clinicians involved in the paediatric renal transplant programme were competent or that problems would be addressed. Because there was no proper review to identify poor performance, clinicians were left with only themselves to satisfy that the service they provided was of an appropriate standard. Left alone, not even a critical Coroner’s verdict on a patient’s death could prompt them to formally question their performance or refer to the GMC. This approach amounted to the Trust surrendering such mechanisms of risk management control as it claimed to a culture of uncritical medical self-regulation about which it did not enquire. This was a failure in leadership of the Medical Director, the Board of the Trust and the Chief Executive.

*Post-inquest audit and review*

2.229 The Inquiry was informed that the Paediatric Directorate held regular medical audit meetings in 1995. Indeed the Royal Hospitals Annual Report 1993-94 described “... sessions on case note review, discussion and presentation of audit projects... More recently there has been a move toward multi-disciplinary audit (clinical audit)...”

2.230 There was no clinical audit of Adam’s case before the Inquest because as Dr Taylor said he “did not do anything in terms of clinical audit as it was a Coroner’s case.” Regrettably, he did nothing about a clinical audit of the case after the inquest either. Nor was Adam’s case seemingly presented at any other Paediatric Directorate meeting.

2.231 Dr Taylor believed however that Adam’s case could have been presented at an ATICS mortality meeting by Dr Gaston but was unable to identify any learning to have emerged from the meeting. That is probably because it was the meeting held on 10th December 1996 when Dr Gaston chose to openly praise the excellence of Dr Taylor’s record keeping in the

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684 305-011-572
685 WS-061-2 p.58
686 WS-008-03 p.43
687 Dr Taylor T-21-06-12 p.109 line 20
688 Dr Taylor T-21-06-12 p.114 line 19
689 Dr Taylor T-21-06-12 p.115 line 19
context of assisting the Coroner’s investigation. Given what was by then known about Adam’s death I believe that this reveals an underlying institutionalised reluctance to admit major shortcomings. Furthermore, and given that Dr Taylor had not, at that stage, accepted the Coroner’s verdict I consider that proper discussion of the case should have focussed on Dr Taylor’s position and how it might have been dealt with.

2.232 Dr Murnaghan described the response within the Trust to the introduction of clinical audit as slow and incorporating a “touch of resistance.” I find that the evidence revealed concrete resistance in 1996 to any meaningful audit, review or analysis of Adam’s case.

Lessons

2.233 Ms Slavin observed that “families may still be angry. However, if they can be assured, both that lessons have been learned and that changes have been made, then it may ease their grief and give them solace and closure.”

2.234 In general, I agree with the view expressed to the Inquiry by Mr Ramsden that “in 1995 I would have expected a more formal approach to the lessons learned to be taken by the RBHSC. I have seen no formal report from RBHSC summarising the incident, the lessons learned and an Action Plan for implementing improvement. In view of the seriousness of this case, I would have expected to see a report created by RBHSC in 1995, summarising all this... certainly such a report should then have commented on whether any broader lessons on fluid management and the prevention of hyponatraemia were needed.”

2.235 At inquest the Coroner had a discussion with Dr Sumner about how Dr Sumner’s views “could be disseminated amongst the medical profession in...
The Coroner “assumed that the Royal Belfast Hospital for Sick Children would have circulated other hospitals in Northern Ireland with details of the evidence given at the inquest and, possibly, some ‘best practice’ guidelines” and further that he “attached great importance to [this] bearing in mind that the Royal Victoria Hospital was pre-eminently a teaching hospital.” He was to be disappointed. Mr McKee advised that “prior to July 2004 there was no formal mechanism or requirement within Northern Ireland to report lessons learned from Inquest.”

Dr Murnaghan did not report the outcome of the inquest to the Trust Board and neither the Chief Executive nor the Clinical Director of Paediatrics was informed of the verdict or the Coroner's intention that information be shared. Dr Gaston claimed not to remember the Coroner discussing how lessons might be shared and gave no thought to the identification of lessons or the prevention of a possible recurrence.

In respect of learning lessons within the hospital, Mr McKee advised that “until 1999 the Director of Medical Administration ensured the internal dissemination of lessons learned from Inquests.” There is no evidence that Dr Murnaghan did anything. Whilst he did discuss convening a seminar involving Professor Savage, Drs Mulholland, Gaston, O’Connor, Taylor, Hicks and Mr Keane to address “the other issues identified” he did not pursue the idea. Dr Murnaghan spoke of his “regret to this day that I forgot totally about this important issue.”

With hindsight it is indeed to be regretted that Dr Murnaghan’s idea of a seminar was forgotten because the principal learning from the death was...
available and had been since January 1996 in the reports of Drs Alexander and Sumner. Both had relied for authority upon Professor Arieff’s paper ‘Hyponatraemia and death, or permanent brain damage, in healthy children’ (1992) as indeed had Dr Armour and all the consultant paediatric anaesthetists in the Children’s Hospital. The Arieff paper therefore became the obvious basis for teaching about IV administration of hypotonic fluids and the risks of dilutional hyponatraemia in children. Dr Sumner could so easily have been invited to the Children’s Hospital for an open discussion as to the issues arising. An invitation to Dr Armour or Professor Savage would have been simpler still.

2.239 Arieff’s study analysed a group of patients who had died or suffered brain damage from hyponatraemia. The paper had broad Children’s Hospital application because none of Arieff’s study group had undergone renal transplantation or even major paediatric surgery but had been hospitalised by minor fevers, appendicitis and other non-critical conditions. Most were admitted with symptoms of lethargy, emesis or weakness. It is to be remembered that only four months after Inquest, Claire Roberts was admitted to the Children’s Hospital with symptoms of lethargy, emesis and nausea.

2.240 Drs Taylor, McKaigue and Crean, who had all felt it appropriate to endorse the draft recommendations for the Coroner with “regard to the information contained in the paper by Arieff et al (BMJ 1992)” all still practiced in the hospital at the time of Claire’s admission but had made no attempt to share Arieff’s guidance or give any relevant training whatsoever in what was Northern Ireland’s only regional paediatric training hospital. Dr Taylor conceded that “it ought to have been read and understood and put into the...
practice of all anaesthetists and paediatricians... who are looking after children in Northern Ireland."\(^{714}\)

2.241 It is in this context additionally unsettling to record that Lucy Crawford was admitted to the Erne Hospital in 2000 with a history of lethargy, drowsiness and floppiness,\(^{715}\) and Raychel Ferguson to the Altnagelvin Area Hospital in 2001 for an appendectomy.\(^{716}\) They, and Claire, all presented with symptoms similar to those recorded in Arieff’s study and all were to receive IV infusion of the hypotonic Solution No.18.

2.242 Professor Arieff’s concluding paragraph now seems particularly relevant to the treatment given Claire in that he advised that "when a paediatric patient receiving hypotonic fluid begins to have headache, emesis, nausea or lethargy the serum sodium concentration must be measured. Although these symptoms are somewhat non-specific, the diagnosis is easily established at minimal cost and with virtually no risk to the patient by evaluating plasma electrolyte values."\(^{717}\)

2.243 There was ample opportunity to direct and influence the learning from Adam’s case.\(^{718}\) The lead members of Adam’s transplant team, Professor Savage, Dr Taylor and Mr Keane all held teaching posts at Queens University, Belfast.\(^{719}\) Professor Savage chaired the Faculty of Medicine Education Committee in 1995\(^{720}\) and Dr Taylor served on the Education Sub-Committee of the Anaesthetics, Theatre and Intensive Care Directorate 1995-1997 and was in a position to influence post-registration training.\(^{721}\) This additional aspect of Dr Taylor’s practice emphasises the importance which should have been attached to assessment of his clinical competence in respect of fluid management in the context of end-stage renal failure.

\(^{714}\) Dr Taylor T-21-06-12 p.98 line 20
\(^{715}\) 027-009-020
\(^{716}\) 020-006-010
\(^{717}\) 011-011-077
\(^{718}\) Professor Savage T-22-06-12 p.119 line 9
\(^{719}\) 306-018-004 & 306-019-010 & 306-023-003
\(^{720}\) 306-018-008
\(^{721}\) 306-019-011
2.244 Indeed, Dr Haynes expressed concern about Dr Taylor’s teaching role given the mistakes made by him in fluid management and his failure to acknowledge error.\textsuperscript{722} However Dr Taylor, doubtless intending to reassure, claimed to have “\textit{stuck to textbook teaching about the management of fluids.}”\textsuperscript{723} That must, however, have meant that his teaching was then at odds with his explanations to the PSNI and this Inquiry. Dr Taylor categorised his “\textit{answers to the Police as... irrational.}”\textsuperscript{724} I categorise his answers as dishonest.

2.245 I believe that by refusing to accept Adam’s dilutional hyponatraemia, Dr Taylor restricted the scope for learning. His opinion alone seems to have been a limiting factor because even eight years later when the Trust was asked by the Department whether anything had been learned from Adam’s case, the Trust’s Press and Public Relations Officer responded having “\textit{just spoken with Dr Bob Taylor, Consultant Anaesthetist in PICU, who was involved in the management of Adam Strain and gave evidence at the Inquest. Following a detailed examination of the issues surrounding patient AS there were no new learning points, and therefore no need to disseminate any information.}”\textsuperscript{725}

2.246 The Coroner has said that “\textit{looking back, it was one of the most important inquests I’ve ever held...}”\textsuperscript{726} It is therefore not only disappointing but disturbing that so little should have been learned from it. Dr Gaston considered that the responsibility for the failing to learn lessons was collective.\textsuperscript{727} I agree, but would add that those involved were not given the necessary guidance or leadership from within the Trust. In the light of the critical verdict at inquest, Drs Carson and Murnaghan should never have allowed so important a learning opportunity to go unexplored.

\textsuperscript{722} Dr Haynes T-02-05-12 p.29 lines 6-14
\textsuperscript{723} Dr Taylor T-21-06-12 p.136 line 19
\textsuperscript{724} Dr Taylor T-21-06-12 p.138 line 1
\textsuperscript{725} 023-045-105
\textsuperscript{726} Dr Murnaghan T-25-06-12 p.132 line 9
\textsuperscript{727} Dr Gaston T-19-06-12 p.146 line 7
2.247 The learning to be extracted from Adam’s death was left to the discretion of the doctors and the individual judgement of Dr Murnaghan. Those individuals could not be relied upon. Dr Murnaghan was still engaged in ‘defending’ the medical negligence claim and unlikely to draw attention to deficiencies in clinical care; Dr Taylor was still denying that Adam had dilutional hyponatraemia and the doctors involved remained predictably averse to focusing on clinical failings.

2.248 That Dr Murnaghan was expected to disseminate learning from inquests in addition to all his other responsibilities was unrealistic. That he should have been left alone to manage matters of such importance without reference to the Trust Board, confirms to me that the Board was not engaged with patient safety. From the point of view of the Children’s Hospital that was deeply unsatisfactory.

Medical negligence litigation

2.249 No apology was given to Adam’s mother as contemplated by ‘The Complaints Procedure.’ Her litigation was concluded by settlement on 29th April 1997 without admission of liability and subject to confidentiality. The terms of settlement appear to have been drafted by Mr Brangam and the confidentiality clause inserted on his advice. Refusal to admit liability made it very much less likely that Ms Slavin would ever receive a clear explanation about her son’s death and the imposition of confidentiality stifled discussion.

2.250 Mr Brangam had previously advised the Trust about handling complaints. He had observed that “too often in the past clinicians seemed to entertain the notion that the complaints process of itself was threatening, potentially hostile and one where possibly too much information was given to complainants” and advised that “to say ‘sorry’ is not an admission of liability but rather ought to be seen as a proper and sympathetic approach to
matters which may have caused a patient or their family concern.” These advices were shared with Dr Murnaghan but do not appear to have tempered their shared approach to litigation which was directed at disposing of potentially embarrassing litigation as quietly and unapologetically as possible.

2.251 Ms Slavin expressed her frustration, annoyance and disappointment with a litigation settlement process which was confidential and did not admit fault. She said that “the inquest and subsequent civil proceedings should have brought closure to my grief. They did not.” It was not until 17th October 2013 that the Trust eventually offered Ms Slavin an admission of liability, an apology and an expression of sympathy. This could and should have been done after the Inquest in June 1996. The delay was inexcusable and further distress was unnecessarily caused.

2.252 On 12th November 2013 the Chief Executive of the Belfast Health and Social Care Trust Mr Colm Donaghy publically acknowledged that the way “litigation has been handled by the Belfast Trust has added to the hurt and grief felt by the families... I wish to apologise unreservedly to the families for the unacceptable delay in the Belfast Trust accepting liability.”

2.253 That nothing was done to review the medical negligence claim after settlement or draw anything from it confirms my view that the way claims were processed acted as an obstacle rather than a support to the practice of learning from error. That was an obvious waste of opportunity for clinical improvement.

2.254 Dr Murnaghan’s role as manager of litigation was untenable. His responsibility to defend claims against the Trust was in potential conflict

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732 126-021-001
733 WS-001-2 p.16
734 WS-001-2 p.17
735 T-17-10-13 p.2-3
736 Which incorporated the former Royal Group of Hospitals Trust (‘RGHT’)
737 Mr Donaghy T-12-11-13 p.5 line 15
with his duties as impartial investigator of fact, facilitator to the Coroner and disseminator of learning. The arrangement did not work.

**Response within paediatric renal transplant service**

2.255 Professor Savage continued to lead the Paediatric Renal Transplant Service and to rely upon the services of Dr Taylor and Mr Keane. He and Dr O’Connor revised the 1990 Renal Transplant Protocol to ensure that, prior to being called for transplant, each child and family would meet with the surgeon and an individualised transplant plan would be prepared.\(^{738}\) They tried to make sure that Solution No.18 would not be administered\(^{739}\) and that urinary output and sodium concentrations would be measured.\(^{740}\)

2.256 In April 2011 Dr O’Connor was able to advise that all 50 paediatric renal transplant patients operated on in the Children’s Hospital since Adam’s death had survived transplant surgery.\(^{741}\) Dr Taylor performed the anaesthesia for six of them\(^{742}\) and Mr Keane the surgery for two.\(^{743}\) Of the transplants performed in 2010-2012 she advised that “100 per cent of the transplants are working, which equals the best results in the UK.”\(^{744}\)

**Other issues: unsatisfactory evidence**

2.257 I found the evidence of the surgeons before this Inquiry to be so unsatisfactory as to justify my singling them out for specific comment. It was Dr Taylor who observed that “It’s very unusual for a patient of any age to die on the operating table and has a devastating effect on the operating department.”\(^{745}\) That might be thought self-evident. However, Mr Brown gave evidence from the perspective of one so little marked by the event as to be unable to recall almost anything of it. I did not always find that convincing and consider Mr Brown knew more than he was prepared to

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\(^{738}\) Professor Savage T-22-06-12 p.130 line 4  
\(^{739}\) Professor Savage T-17-04-12 p.62 line 14  
\(^{740}\) Professor Savage T-18-04-12 p.77 line 14  
\(^{741}\) WS-014-2 p.20  
\(^{742}\) 301-047-414  
\(^{743}\) Mr Keane T-24-04-12 p.6 line 9 & 301-047-414  
\(^{744}\) Dr O’Connor T-25-04-12 p.182 line 3  
\(^{745}\) Dr Taylor T-19-04-12 p.57 line 4
say. He did say by way of an unexpected aside that “my mantra is I don’t know and I don’t remember.”\(^{746}\) I found his attitude inappropriate.

2.258 By contrast it was Mr Keane’s evidence I found inappropriate. It was so undermined by inconsistency\(^ {747}\) that only limited reliance could be placed on it. I formed the view that Mr Keane initially told Professor Savage the truth about Adam’s fluid overload but for ‘internal’ purposes only. Later, and for the ‘external’ purpose of inquest, he avoided what he knew to be true hoping that the Coroner would correctly identify the cause of death and relieve him of his obligation to assist.\(^ {748}\) Then having stated “as far as I was concerned the anaesthetic went ahead on a very difficult patient without any particular problems”\(^ {749}\) he placed himself in a position of inescapable inconsistency as far as this Inquiry was concerned. He failed in his professional duty to assist the Coroner and I believe he failed in his professional duty to assist me.\(^ {750}\)

**Concluding remarks**

2.259 Even though I found defensiveness, deceit and a strong inclination amongst colleagues to close ranks, I do not conclude that the Trust itself engaged in a systematic ‘cover-up.’ It is to be recognised that Dr O’Connor recorded the provisional diagnosis of dilutional hyponatraemia within hours of Adam’s admission to PICU. Dr Taylor carefully filed the anaesthetic notes and the CVP trace in the chart. The death was notified promptly to the Coroner who commissioned a post-mortem report, investigated and sought

\(^{746}\) Mr Brown T-01-05-12 p.102 line 21  
\(^{747}\) For example, inconsistent evidence in relation to:  
(i) the decision to accept kidney (see: WS-006-3 p.23 & Mr Keane T-24-04-12 p.16)  
(ii) an arrangement to leave before the completion of surgery (see: Mr Keane T-24-04-12 p.83 line 15 & Mr Keane T-24-04-12 p.87 line 17)  
(iii) checking the catheter before inserting supra-pubic catheter (see: Mr Keane T-23-04-12 p.96 line 17 & WS-006-3 p.8)  
(iv) the CVP readings sought from Dr Taylor (see: WS-006-3 p.17 & Mr Keane T-23-04-12 p.117 line 12)  
(v) his role in wound closure (see: 093-010-030 & Mr Keane T-10-09-12 p.16 line 20)  
(vi) his reason for leaving the theatre before completion of surgery (see: WS-006-2 p.7 & Mr Keane T-26-04-12 p.163-64)  
(vii) non-participation in subsequent paediatric transplant surgery (see: 301-127-001 & Mr Keane T-24-04-12 p.17 & 301-047-414)  

\(^{748}\) Mr Keane T-23-04-12 p.73 line 2  
\(^{749}\) 059-034-067  
\(^{750}\) 315-002-009
the views of consultant anaesthetist Dr Alexander. Dr Murnaghan and the paediatric anaesthetists advised the Coroner to obtain the additional expert advices of Dr Sumner. These independent reports were shared with Ms Slavin and Professor Savage was authorised to explain them to her. He met and corresponded with her. Neither the diagnosis nor the implications were concealed and Professor Savage advised her in February 1996 that “after Adam came out of theatre and we knew his sodium was low we realised this was dilutional.”751 Thereafter Dr Armour’s Autopsy Report was forwarded to her.752 Professor Savage placed on record his disagreement with Dr Taylor,753 advised the Trust’s solicitors accordingly and publically endorsed the conclusions of Dr Sumner at inquest.

It is, however, impossible to avoid the conclusion that the Trust, by its systems and employees, allowed the barest possible constructive response to Adam’s death. Lessons were not learned and that was to compound tragedy.

751 306-090-001
752 011-061-196
753 059-003-005
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Introduction

3.1 Claire Roberts was born on 10th January 1987, the youngest child of Alan and Jennifer Roberts. She was admitted to the Royal Belfast Hospital for Sick Children (the ‘Children’s Hospital’) on 21st October 19961 with symptoms of vomiting and lethargy and died there two days later.2 Her death was not reported to the Coroner.3 The post-mortem examination was confined to her brain4 and a Death Certificate was issued citing cerebral oedema secondary to status epilepticus as the cause of death.5 Mr and Mrs Roberts never quite understood from what they were told at the Children’s Hospital what had happened to Claire or why she had died.6

3.2 Eight years later, on 21st October 2004, they watched the documentary ‘When Hospitals Kill’ on Ulster Television. The programme focused on the deaths of Adam Strain, Lucy Crawford and Raychel Ferguson and on whether the circumstances of their deaths might have been the subject of a cover-up. Mr and Mrs Roberts were struck by similarities between Claire’s death and those others featured in the programme. They contacted the Children’s Hospital the next day.7 In consequence, Claire’s death was re-considered and referred to the Coroner.8 An inquest was held in May 2006 and a verdict given that death was caused by:

“(a) cerebral oedema due to

(b) meningoencephalitis, hyponatraemia due to excess ADH production and status epilepticus.”9
The addition of Claire’s case to the Inquiry

3.3 When this Inquiry resumed in 2008, having been stayed for three years to permit Police investigation into the other cases, I added Claire’s death to those I had been tasked to investigate. I did so because hyponatraemia had contributed to her death and because she had died in the same hospital as Adam, just four months after the inquest into his death. In addition to my concern about the treatment Claire had received, I was troubled by the obvious failure to report Claire’s death to the Coroner in 1996 and what was revealed at her inquest ten years later.

Expert reports

3.4 The Inquiry, guided by its advisors, engaged experts to appraise the involvement of the doctors and nurses involved in Claire’s care, particularly the Consultant Paediatrician, Consultant Paediatric Neurologist and the nurses on duty in Allen Ward. The experts were:

(i) Dr Robert Scott-Jupp (Consultant Paediatrician of Salisbury District Hospital) who reported on the role and responsibilities of the Consultant Paediatrician and on paediatric medical issues.

(ii) Professor Brian Neville (Consultant Paediatric Neurologist and Professor of Childhood Epilepsy, Institute of Child Health, University College London and Great Ormond Street Hospital), who advised on neurological issues and the role and responsibilities of the Consultant Paediatric Neurologist.
(iii) Ms Sally Ramsay\textsuperscript{17} (Independent Children’s Nursing Advisor) who provided a report on the nursing care.\textsuperscript{18}

3.5 The Inquiry also engaged experts to address specific issues, including:

(i) Professor Keith Cartwright\textsuperscript{19} (Consultant Clinical Microbiologist) who provided reports on the cerebral spinal fluid (‘CSF’) sample, the CSF report and changes in Claire’s white blood cell count.\textsuperscript{20}

(ii) Professor Brian Harding\textsuperscript{21} (Consultant Paediatric Neuropathologist and Professor of Pathology & Laboratory Medicine, University of Pennsylvania) who provided a supplemental report to that provided by him to the PSNI on 22\textsuperscript{nd} August 2007\textsuperscript{22} dealing with the diagnosis of encephalitis in relation to neuropathological changes.\textsuperscript{23}

(iii) Dr Waney Squier\textsuperscript{24} (Consultant Neuropathologist and Clinical Lecturer, John Radcliffe Hospital, Oxford) who provided neuropathological opinion on histological slides.\textsuperscript{25}

(iv) Dr Philip Anslow\textsuperscript{26} (Consultant Neuroradiologist, John Radcliffe Hospital, Oxford) who interpreted the Computerised Tomography (‘CT’) scans of 23\textsuperscript{rd} October 1996.\textsuperscript{27}

(v) Dr Caren Landes\textsuperscript{28} (Consultant Paediatric Radiologist, Alder Hey Children’s NHS Foundation Trust), who examined and reported on chest x-rays taken at 03:50 and 07:15 on 23\textsuperscript{rd} October 1996 and a CT scan taken the same day.\textsuperscript{29}
(vi) Dr Jeffrey Aronson\(^{30}\) (Consultant Pharmacologist, Oxford University Hospitals NHS Trust) who provided a report on pharmacological issues and in particular the probable effects of the medication prescribed and/or administered.\(^{31}\)

(vii) Dr Roderick MacFaul\(^{32}\) (Consultant Paediatrician, now retired) who reported on governance considerations and in addition addressed incidental clinical issues.\(^{33}\)

(viii) Professor Sebastian Lucas\(^{34}\) (Professor of Clinical Histopathology and Consultant Histopathologist, Guys and St Thomas’ Hospitals Trust, London) who provided expert opinion on the autopsy.\(^{35}\)

(ix) Dr Audrey Giles (former Head of The Questioned Documents Section of the Metropolitan Police Forensic Science Laboratory; now Lead of the Giles Document Laboratory) who provided a handwriting analysis report.\(^{36}\)

3.6 In addition the Inquiry had the benefit of two further reports prepared for inquest, by:

(i) Dr Robert Bingham\(^{37}\) (Consultant Paediatric Anaesthetist at the Hospital for Sick Children, Great Ormond Street, London),\(^{38}\) and

(ii) Dr Ian Maconochie\(^{39}\) (Consultant in Paediatric Accident and Emergency Medicine, St Mary’s Hospital London).\(^{40}\)
Schedules compiled by the Inquiry

3.7 In an attempt to summarise the very considerable quantities of information received, a number of schedules and charts was compiled:

(i) List of Persons - Clinical\(^{41}\) and Governance.\(^{42}\)

(ii) Chronology of Events - Clinical\(^{43}\) and Chronology of Hospital Management and Governance.\(^{44}\)

(iii) Timeline of treatment (21\(^{st}\) - 23\(^{rd}\) October 1996).\(^{45}\)

(iv) Schedule of Consultant Responsibility (22\(^{nd}\) - 23\(^{rd}\) October 1996).\(^{46}\)

(v) Schedule of Medication.\(^{47}\)

(vi) Schedule of Fluid and Medication Input.\(^{48}\)

(vii) Timeline of Over-lapping Medication.\(^{49}\)

(viii) Schedules of Expert Views on Cause of Death\(^{50}\) & Cerebral Oedema.\(^{51}\)

(ix) Schedule of Glasgow Coma Scale (`GCS`) scores (22\(^{nd}\) October 1996).\(^{52}\)

(x) Schedule of Recorded Sodium Levels (21\(^{st}\) - 23\(^{rd}\) October 1996).\(^{53}\)

(xi) Schedule of Blood Cell Counts (21\(^{st}\)-24\(^{th}\) October 1996).\(^{54}\)

\(^{41}\) 310-024-001
\(^{42}\) 310-023-001
\(^{43}\) 310-004-001
\(^{44}\) 310-021-001
\(^{45}\) 310-016-001
\(^{46}\) 310-005-001
\(^{47}\) 310-006-001
\(^{48}\) 310-015-001
\(^{49}\) 310-020-001
\(^{50}\) 310-009-001
\(^{51}\) 310-019-001
\(^{52}\) 310-011-001
\(^{53}\) 310-013-001
\(^{54}\) 310-022-001
3.8 All of the above schedules and reports have been published on the Inquiry website in accordance with Inquiry Protocol and procedures.

**Clinical history prior to October 1996**

3.9 When Claire was six months old, she suffered a number of seizures.\(^{57}\) No clear cause was ever identified.\(^{58}\) Her condition was assessed and controlled with Epilim (an anti-convulsant medicine) which stabilised her condition from July - September 1987.\(^{59}\) The treatment worked allowing the Epilim to be reduced and then discontinued at least 18 months prior to her admission to the Children’s Hospital in October 1996.\(^{60}\) By then she had not suffered seizures of any sort for at least four years.\(^{61}\)

3.10 Claire was also diagnosed with developmental delay and a moderate learning difficulty.\(^{62}\) She attended Tor Bank School, which was able to cater for her needs and where she thrived. She was described as a happy, loving, vibrant and active child who enjoyed all sorts of outdoor activities, adventure playgrounds, trampolines and her motorised bicycle. She was said to have made a positive impact on all who knew her.

3.11 In May 1996, she was seen by Dr Colin Gaston,\(^{63}\) Consultant Community Paediatrician, in relation to behavioural issues. In his letter to Claire’s GP, Dr Gaston referred to her as having both moderate learning and attentional difficulties and suggested a brief trial with a stimulant medication such as Ritalin.\(^{64}\)
3.12 Dr Gaston saw the family again on 1st August 1996 and discussed some additional options with them. Claire was then treated with Ritalin on a daily basis until 2nd October 1996 but by the time of her admission to the Children’s Hospital on 21st October, she was no longer taking any medication.

**Admission to the Children’s Hospital on 21st October 1996**

3.13 On Friday, 18th October 1996, Claire suffered a loose bowel motion but without diarrhoea. The following day she visited her paternal grandparents for 3 or 4 hours and came into contact with her 12-year-old cousin who had had a stomach upset earlier in the week. Claire spent the afternoon of Sunday, 20th October, with her maternal grandparents, having been to church in the morning. Her state of health over the weekend was regarded as normal and she went to school as usual on Monday, 21st.

3.14 However, during the course of the school day, Claire’s teacher noted her to be unwell and made a record in the homework diary, describing her as pale and lethargic. When Claire returned home at approximately 15:15, she vomited several times.

**Examination by GP**

3.15 The family GP, Dr Deirdre Savage, was called and examined Claire at home at approximately 18:00. She noted “No speech since coming home. Very lethargic at school today. Vomited x 3 – speech slurred. Speech slurred earlier.”

3.16 Dr Savage described Claire as pale and photophobic on examination. She was unable to find any neck stiffness but did think Claire’s tone was

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65 090-013-016
66 090-022-050
67 WS-253-1 p.2
68 WS-253-1 p.2
69 WS-253-1 p.19
70 WS-253-1 p.2
71 WS-253-1 p.2
72 310-003-004
73 090-011-013
increased on the right side and suggested that Claire was perhaps post-seizure and/or had an underlying infection. Mr and Mrs Roberts did not themselves think that she had suffered a seizure but were advised to and did take Claire to the Children’s Hospital.

**Examination at Accident & Emergency**

3.17 Claire entered the Accident and Emergency Department (‘A&E’) of the Children’s Hospital at approximately 19:00 on Monday, 21st October 1996. The initial nursing assessment recorded:

"Medication- none... Epileptic... H/O off form and lethargy. GP referral with H/O seizure. Apyrexic O/A pale and drowsy. O/A mental handicap."

3.18 She was seen by Senior House Officer (‘SHO’) Dr Janil Puthucheary in A&E. This was his first posting and he had been there for 2 months. He assessed Claire at 19:15 and took a history of severe learning difficulties and a past history of epilepsy. He noted that she was no longer taking anti-epileptic medication and had been fit-free for three years. Whilst he did not record diarrhoea, cough or pyrexia, he did note that she had been vomiting since earlier that evening and that her speech was very slurred. Indeed, he observed that she was hardly speaking.

3.19 On examination, Dr Puthucheary noted that Claire was drowsy, tired and apyrexic, with no abnormality other than increased left sided muscle tone and reflexes. Whilst her pupils were reacting she did not like the light. Her tone was generally increased and her tendon reflexes were heightened on the left compared to the right. He observed Claire’s plantar reflexes to be
reduced bilaterally, in contrast to the GP’s observation of some asymmetry.\textsuperscript{82}

3.20 Dr Puthucheary made a primary diagnosis of encephalitis on the basis of Claire’s altered mental state. He noted the GP’s finding of photophobia and her concerns about a possible fit or underlying infection.\textsuperscript{83}

\textbf{Admission to Allen Ward}

\textit{Examination by Dr O’Hare}

3.21 Dr Bernadette O’Hare\textsuperscript{84} was then asked to review Claire.\textsuperscript{85} She was the on-call Paediatric Registrar and had been a Registrar since December 1995.\textsuperscript{86} Dr O’Hare examined Claire at 20:00 and took a history from Mrs Roberts.\textsuperscript{87} Her note refers to Claire having vomited on an hourly basis since 15:00. There is a record of slurred speech, drowsiness, a loose bowel motion 3 days before and having been off-form the previous day. The history records that Claire was usually capable of meaningful speech and made reference to the recent trial of Ritalin.\textsuperscript{88}

3.22 Dr O’Hare observed that Claire was unresponsive to her parents’ voices, staring vacantly and responding only intermittently to deep pain stimulus.\textsuperscript{89} She recorded Claire’s pulse at 96 beats per minute, slowing to 80. This was within the normal range for a child of her age.\textsuperscript{90}

3.23 She made an initial working diagnosis of “1. viral illness 2. Encephalitis,”\textsuperscript{91} but then scored out her secondary diagnosis on the basis that it was unlikely in the absence of fever.\textsuperscript{92} In addition, Dr O’Hare thought that she must also
have considered the possibility of sub-clinical seizures at that time, because
she gave a direction that Claire be given diazepam in the event of such a
seizure.\textsuperscript{93}

3.24 At about 20:45, Dr O’Hare decided to admit Claire.\textsuperscript{94} Mr and Mrs Roberts
were not expecting this.\textsuperscript{95} Her admission was made under the care of Dr
Heather Steen,\textsuperscript{96} the on-call Consultant Paediatrician.\textsuperscript{97} Dr Steen was not
informed at that time or at any time that night about Claire’s admission,
condition or treatment.

3.25 Claire was formally admitted onto Allen Ward at 21:14.\textsuperscript{98} Her nursing
admission sheet was completed about 21:45 by her “accountable nurse”\textsuperscript{99}
Staff Nurse Geraldine McRandal.\textsuperscript{100} The “reason for admission” was
entered as “\textit{? seizure, vomiting}.”\textsuperscript{101}

3.26 Mr and Mrs Roberts stayed with her until she fell asleep at about 21:00.
Before they left the hospital, they were told that Claire had a viral infection.
They felt relieved it was not meningitis.\textsuperscript{102}

3.27 Dr O’Hare directed a number of tests\textsuperscript{103} including a full blood count,
bacterial culture, viral titres and urea and electrolytes. It is likely that the
blood sample for these tests was taken on Allen Ward at 22:30 at the same
time as a cannula was inserted for IV fluids.\textsuperscript{104} Claire was started on an IV
infusion of Solution No. 18 at a rate of 64 mls per hour.\textsuperscript{105}

3.28 Dr Robert Scott-Jupp, Consultant Paediatrician, provided favourable expert
comment on Dr O’Hare’s “\textit{clear and competently set out}” admission

\begin{thebibliography}{99}
\bibitem{93} WS-135-1 p.3
\bibitem{94} 090-012-014
\bibitem{95} Mr and Mrs Roberts T-31-10-12 p.28 line 14
\bibitem{96} 310-003-003
\bibitem{97} 090-014-020
\bibitem{98} 090-014-020
\bibitem{99} 090-041-143
\bibitem{100} 310-003-005
\bibitem{101} 090-041-142 to 143
\bibitem{102} 096-001-004
\bibitem{103} 090-022-052
\bibitem{104} 090-038-133
\bibitem{105} 090-038-134
\end{thebibliography}
notes. However, he considered her initial investigation “somewhat limited” and thought, albeit with hindsight, that a diagnosis of encephalopathy and/or status epilepticus might have been included. In addition, he indicated that would have expected more extensive biochemical tests to have been performed.

3.29 Professor Brian Neville, Consultant Paediatric Neurologist, regarded Dr O’Hare’s examination of Claire to be “competent,” but considered:

(i) That hyponatraemia/cerebral oedema should have been considered as part of a differential diagnosis in light of Claire’s vomiting and reduced consciousness.

(ii) That Dr O’Hare should have contacted the on-call Consultant, Dr Steen.

(iii) That a CT scan should have been performed to explore potential causes for Claire’s reduced consciousness.

(iv) That more extensive biochemical tests should have been undertaken.

3.30 In considering these criticisms, I have taken account of the following:

(i) Dr O’Hare’s competence has been acknowledged by both experts.

(ii) Professor Neville’s specialism in paediatric neurology might lead him to be rather more alert to the range of possibilities than a paediatric registrar.
(iii) The Children’s Hospital did not have the night staffing necessary to conduct the suggested steps.

(iv) There was ample opportunity for the suggested failings in Dr O’Hare’s approach to be remedied the following day.

3.31 In her oral evidence, Dr O’Hare agreed that, whilst it would have been reasonable to perform liver function tests,114 her overall view was that the other tests suggested were matters to have been pursued the following morning had there been no improvement.115 This has some force. It is relevant that in oral evidence, both experts were less critical than they had been in writing. Indeed, Professor Neville accepted that, on reflection, a CT scan was not required on Monday night but remained of the view that it should have been performed as soon as possible the following day.116 By the time they gave their evidence, Dr O’Hare had given hers and explained in clear and reflective terms what she did and why. Her evidence was impressive as indeed was her engagement with the Inquiry in trying to understand how things had gone so terribly wrong. In the circumstances, I believe that it would be unfair to single her out for criticism.

3.32 There are many ‘if onlys’ about what happened to Claire, including that if only Dr O’Hare had contacted Dr Steen on the Monday night, as suggested by Professor Neville117 (but not Dr Scott-Jupp),118 Dr Steen might then have become involved from the start. However, I do not believe that it would be fair to blame Dr O’Hare in this regard because she could not possibly have known on the Monday night that at no point on the Tuesday would any consultant paediatrician have any contact with Claire.

114 Dr O’Hare T-18-10-12 p.138 lines 15-18
115 Dr O’Hare T-18-10-12 p.155 line 13
116 Professor Neville T-01-11-12 p.70 line 12
117 232-002-007
118 Dr Scott-Jupp T-12-11-12 p.39 lines 1-9
**Review at midnight**

3.33 Dr O’Hare reviewed Claire at midnight. She found no signs of meningitis and recorded a slight improvement in responses. On that basis, she suggested that Claire be observed overnight and re-assessed in the morning.119

3.34 It is thought that shortly after midnight, the results of the blood tests became known. They were recorded in Claire’s notes as:


The entry was made immediately below the record of Dr O’Hare’s midnight review. However, the entry is untimed with the result that the timing of the test sample itself is not immediately apparent. It is unclear who made the written entry121 but it does not seem to have been either Dr O’Hare or the SHO Dr Andrea Volprecht.122

3.35 Of note, was the serum sodium reading of 132mmol/l123 which was just below the normal range of 135-145.124

3.36 Notwithstanding some difference of opinion, I accept that the slightly lowered sodium level was not one that should have triggered any further action or investigation that night. Furthermore, I accept that it was reasonable to leave the IV fluid infusion of Solution No. 18 unchanged at 64mls per hour.125 However, I do find that the lowered serum sodium reading was a marker to be followed up the following morning.

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119 090-022-052
120 090-022-052
121 Dr O’Hare T-18-10-12 p.153 & Dr Volprecht T-01-11-12 p.17
122 310-003-002
123 090-031-099
124 090-031-099
125 090-038-134
3.37 The other blood test result of note was the white cell count (‘WCC’) which was high at 16.5 (normal range 4 - 11).\textsuperscript{126}

3.38 Whilst Dr Volprecht did not enter the Urea & Electrolyte (‘U&E’) results into Claire’s records, she did add the downward pointing arrow beside the “\textsuperscript{132}” and the upward pointing arrow beside the “16.5” WCC, to indicate that the readings were outside the expected range.\textsuperscript{127} The balance of the evidence was that this should have acted as a reminder the next morning to re-test to see if Claire’s sodium had fallen further.\textsuperscript{128} Indeed, Dr Volprecht assumed that a repeat U&E test would be undertaken in the morning.\textsuperscript{129}

\textit{Fluid management on 21\textsuperscript{st} October 1996}

3.39 On admission, Dr O’Hare had directed IV fluid management and suggested that any seizure activity be treated with intravenous diazepam. She also indicated the necessity to review after administration of fluids.\textsuperscript{130}

3.40 Claire’s ‘Nursing Care Plan’ allowed for the administration of ‘IV fluids as prescribed by doctor, according to hospital policy.’\textsuperscript{131} Dr Volprecht seemingly made the IV Fluid Prescription for 500ml of Solution No. 18 at 64ml/h.\textsuperscript{132} It was at this rate that Solution No. 18 would continue to be infused until Claire was eventually transferred to the Paediatric Intensive Care Unit (‘PICU’).\textsuperscript{133}

3.41 Dr O’Hare considered that the prescription was correct for Claire’s maintenance fluid requirements and was for a fluid in standard use in paediatrics in 1996.\textsuperscript{134} Moreover, she indicated that it was not then conventional practice to restrict fluids in a child who was vomiting “unless

\textsuperscript{126} 090-032-108 & 090-022-052
\textsuperscript{127} 090-022-052 & Dr Volprecht T-01-11-12 p.17 line 17
\textsuperscript{128} Dr Volprecht T-01-11-12 p.24 line 5
\textsuperscript{129} Dr Volprecht T-01-11-12 p.19 line 1
\textsuperscript{130} 090-022-052
\textsuperscript{131} 090-043-146
\textsuperscript{132} 090-038-134 equivalent to 65ml/kg /24h
\textsuperscript{133} 090-022-060
\textsuperscript{134} WS-135-1 p.11
the electrolytes indicated that they were significantly hyponatraemic."\textsuperscript{135} Dr Steen agreed and described Claire’s fluid regime as "normal."\textsuperscript{136}

Care and treatment overnight and into the morning of 22\textsuperscript{nd} October 1996

‘\textit{Nursing Care Plan}’

3.42 Claire’s ‘\textit{Nursing Care Plan}’ was devised by Staff Nurse McRandal on admission and was subject to daily review.\textsuperscript{137} It indicated the necessity to "\textit{ensure safe administration of IV fluids}\textsuperscript{138}" and noted the potential for further vomiting and seizures.\textsuperscript{139} Observations were planned for every four hours to include temperature, pulse and respiration.\textsuperscript{140}

3.43 Otherwise planned "\textit{Nursing Actions}" included,

(i) Administering medicine as prescribed and observing effects.

(ii) Recording an accurate fluid balance chart.

(iii) Reporting abnormalities to doctor/nurse in charge.\textsuperscript{141}

(iv) Informing doctor of seizures.

3.44 The Inquiry nursing expert, Ms Sally Ramsay, was mildly critical of the planned frequency for vital sign observations\textsuperscript{142} but was otherwise generally positive about the plan for nursing care. In particular, she thought that the nursing actions were "\textit{comprehensive}\textsuperscript{143}" were prepared "\textit{in a timely manner}\textsuperscript{144}" and reflected the problems likely to be associated with a child who may have had seizures and had vomited.
Ms Ramsay considered that recording the urinary output of children receiving IV fluids is a nursing responsibility and should have been done. She noted that whilst nurses did make accurate entries of fluid intake they failed to measure the output. They recorded it only as “PU” (‘passed urine’) giving no indication of the volume of urine actually passed. In Ms Ramsay’s opinion this was “not an accurate measurement of output” and indicated furthermore that “urine output could easily have been measured by weighing nappies before and after use.”

Additionally, she believed that in the case of a child with altered consciousness, the nurses should have been aware of the possibility of dehydration or fluid overload and consequently of the importance of making an accurate fluid balance chart. However, as Ms Ramsay acknowledged, such failure was in keeping with custom and practice at that time. Indeed, and as Staff Nurse McRandal pointed out, had medical staff required a more accurate measurement of urinary output, they could have asked for it, as they sometimes did, but they did not.

The overnight nursing records indicate that between 22:30 on Monday and 07:00 on Tuesday, Claire suffered one medium and five small vomits. These were recorded as bile stained in contrast to her vomits at home, which had been described as non-bilious. Ms Ramsay indicated that the volume of vomit was appropriately recorded, but considered that it would have been better had the colour of vomit been noted as well.
Care and treatment on the morning of 22nd October 1996

Nursing handover

3.48 Staff Nurse McRandal recorded at 07:00 the next morning 22nd October that Claire “Slept well. Much more alert and brighter this morning”.\textsuperscript{157} She then handed care over to Staff Nurse Sara Jordan (née Field)\textsuperscript{158} at about 07:45.\textsuperscript{159} She told her that Claire had been admitted with suspected seizure activity and for the management of vomiting. She indicated Claire’s history of learning difficulties and previous seizure activity.\textsuperscript{160} Whilst Staff Nurse Jordan could not recall any reference to a diagnosis of viral illness or encephalitis,\textsuperscript{161} she was given a sound ‘Nursing Care Plan’, Staff Nurse McRandal’s 07:00 entry and a verbal handover. That represented appropriate nursing teamwork.

Medical handover

3.49 Dr O’Hare had started work on Monday at 09:00 as the on-call registrar in Musgrave Ward.\textsuperscript{162} Later at 17:00, she assumed responsibility for all 120 hospital beds and A&E. It was thus that she came to see Claire in both A&E and on Allen Ward. During her night shift, she had the support of nursing staff, one SHO in A&E and one SHO on the wards. At 09:00 on Tuesday, instead of going home after 24 hours on duty, she started a further day shift. Accordingly, and in order to correctly perform all her formal handovers on the Tuesday morning, she would have had to visit a number of wards speaking to all those coming on duty, at a time when she herself was expected to start her next shift on Musgrave Ward.\textsuperscript{163}

3.50 Dr O’Hare’s ability to effect handovers was therefore compromised by unsatisfactory staffing levels. However, she indicated that she would have

\textsuperscript{157} 090-040-140  
\textsuperscript{158} 310-003-005  
\textsuperscript{159} WS-148-1 p.6  
\textsuperscript{160} WS-148-1 p.6  
\textsuperscript{161} WS-148-1 p.6  
\textsuperscript{162} WS-135-1 p.2  
\textsuperscript{163} WS-135-2 p.5
made an informal handover had she been concerned about a patient.\textsuperscript{164} Her fellow Paediatric Registrars, Dr Andrew Sands\textsuperscript{165} and Dr Brigitte Bartholome,\textsuperscript{166} both agreed that informal handovers were often conducted.\textsuperscript{167}

3.51 It seems to me that making even an informal handover would have been difficult, given Dr O’Hare’s responsibilities from 09:00 on Tuesday. Her evidence was that, had she handed over to a doctor on Allen Ward, she would have indicated that she was unsure about Claire’s condition and suggested a review at ward round.\textsuperscript{168} I think it unlikely that she was able to conduct a handover. In any event, Dr Sands, the registrar who came on duty on Tuesday morning, gave evidence that when a ward round came to a new patient such as Claire, doctors would take a fresh history, investigate, examine and draw up their own management plan.\textsuperscript{169} This seems close to the sort of review, which would have been urged on them in any event by Dr O’Hare, and one which would necessarily have entailed review of the blood test results.

3.52 The lack of clear procedure for handovers between doctors was a weakness in the clinical care provided. There would appear to have been too little focus on this critically important aspect of care. Despite the pressures of work, none of the clinicians engaged in Claire’s case took responsibility to ensure that effective handover procedures were followed or that communication between doctors was better ordered.

\textit{Dr Steen’s involvement in Claire’s case}

3.53 Dr Heather Steen remained the named Consultant Paediatrician responsible for Claire’s care from the time of her admission on Monday evening to the time of transfer to PICU on Wednesday.\textsuperscript{170} She did not
attend upon Claire during that period. It is to be noted that Dr Steen may have been disadvantaged in giving her evidence by reason of ill health.

3.54 Normally, but not invariably, ward rounds were led by consultants but this did not happen in Claire’s case. Her round was led by Dr Sands171 who was a paediatric registrar of limited experience having been appointed less than three months before after some four months as a locum registrar in paediatric cardiology.172 However, his evidence was that it was not unusual for him to lead a ward round in 1996 given the commitments of Dr Steen and others.173

3.55 I have already indicated that Dr O’Hare was justified in not contacting Dr Steen on Monday night, but how was it that Dr Steen did not see Claire on the Tuesday? This was extensively considered.

3.56 Dr Steen’s duties at that time involved taking a clinic outside the Children’s Hospital at Cupar Street.174 This was off-site, but not far from the hospital. Her clinic started at 13:00. Dr Steen’s evidence was that before that, she would have been in the hospital and available to her patients, junior doctors and nurses, whether in person, by bleeper or telephone. She would thereafter have made contact with Allen Ward at approximately 17:30 when her clinic finished in order to discuss issues of concern and to decide whether she needed to return.175

3.57 Dr Sands did not recall where Dr Steen was on the Tuesday. He stated that whilst he did not believe her to have been in the hospital, he thought she was nonetheless contactable by telephone.176 There was some limited evidence to suggest that Dr Steen may have seen another patient on Allen Ward and in the same room as Claire in the morning177 and some evidence to suggest that she was involved in the morning discharge of another
patient because she had noted a change in medication.\textsuperscript{178} However, there is no record in Claire’s medical or nursing notes of any contact with Dr Steen nor any discussion between her and any other member of the medical or nursing team before Claire’s collapse on 23\textsuperscript{rd} October.

3.58 Claire was however seen before midday by Dr Sands on his ward round, and having seen her, Dr Sands brought her case to the attention of Dr David Webb,\textsuperscript{179} Consultant Paediatric Neurologist. If Dr Steen had been available, I believe that Dr Sands would have spoken to her as a matter of course and urgency. The fact that he did not leads me to conclude that, for whatever reason, Dr Steen was not available to Dr Sands. I do not know why that was and nor seemingly, does anyone else. On the totality of the evidence presented, I cannot say where Dr Steen was or what she was doing on the Tuesday morning.

3.59 Thus, whilst it is reasonable that Claire should not have been seen by Dr Steen on the evening of Monday 21\textsuperscript{st}, it is a matter of significance and concern that she was not seen by her on Tuesday 22\textsuperscript{nd}.

\textbf{Ward round on morning of 22\textsuperscript{nd} October 1996}

3.60 Dr Sands was accompanied on his ward round by two SHOs, Dr Neil Stewart\textsuperscript{180} and Dr Roger Stevenson.\textsuperscript{181} Staff Nurse Kate Linskey\textsuperscript{182} was also in attendance.\textsuperscript{183} The round was running late, perhaps because, as Dr Sands suggested, he was slower than an experienced consultant.\textsuperscript{184}

3.61 Claire’s parents arrived at approximately 09:30.\textsuperscript{185} Although Staff Nurse McRandal’s assessment at 07:00 was reasonably positive, Mr and Mrs Roberts were worried by Claire’s appearance.\textsuperscript{186} They found her lethargic

\begin{footnotesize}
\begin{enumerate}
\item Dr Steen T-16-10-12 p.49
\item 310-003-002
\item 310-003-003 & WS-141-2 p.2
\item 310-003-003 & WS-139-1 p.10
\item 310-003-006
\item WS-148-1 p.11
\item Dr Sands T-19-10-12 p.70 lines 4-10
\item WS-253-1 p.6
\item WS-253-1 p.6
\end{enumerate}
\end{footnotesize}
and vacant\textsuperscript{187} and did not think her anything like her usual self. The improvement they had hoped for was not apparent. They expressed their concern to Staff Nurse Jordan who brought it to the attention of Staff Nurse Linskey.\textsuperscript{188}

3.62 There are differing accounts of the events which then unfolded. Given the passage of time, that is not surprising. On many points, variance in the evidence is not important, but as will appear, there are areas where the differences are of significance.

3.63 The ward round note made by Dr Stevenson (and added to by Dr Sands) is as follows:

"W/R Dr Sands

Admitted ? Viral illness.

Usually very active, has not spoken to parents as per mother.

Wretching. No vomiting.

Vagueness /vacant (apparent to parents).

No seizure activity observed.

Attends Dr Gaston (UHD).

6 mths old seizures and Ix for this – NAD

U+E- Na+ 132. FBC- WCC ↑ 16.4 Gluc 6.6

O/E Aprexic on IV fluids

Pale colour. Little response compared to normal.

CNS Pupils sluggish to light.

Difficult to see fundi.

Bilat long tract signs.

Ears. Throat. Difficult to swallow. Full see.

\textsuperscript{187} WS-148-1 p.10
\textsuperscript{188} WS-148-1 p.17
Imp Non fitting status/ [encephalitis/ encephalopathy]

Plan Rectal Diazepam.

Dr Webb.

D/W Dr Gaston re PmHx."

3.64 Dr Sands’ impression was that Claire was suffering from “non-fitting status” and the nursing record of the ward round notes “Status epilepticus – non-fitting.”

Discussions between Dr Sands and Claire’s parents

3.65 Mr and Mrs Roberts do not think that the doctors spent very long with Claire, perhaps only ten minutes. They were unable to specifically recall Dr Sands, but do remember introductions being made by the doctors, a history being taken (with which they take no issue) and an examination of Claire which was “fairly quick.” They expressed concern to Dr Sands that Claire was unresponsive and not “herself”. They remember being told about some sort of internal fitting and that another doctor would be consulted. They could not recall any discussion about blood samples and were given no sense that the situation was serious. On the contrary, their perception was that Claire had a 24/48 hour stomach bug.

3.66 Dr Sands however maintains that the possibility of an infection in the brain or encephalitis was discussed on the ward round and was likely to have been discussed with the parents. Mr and Mrs Roberts do not believe that encephalitis was mentioned because the term sounded so serious to them and would have caused them such concern that they would remember.

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189 Words within square brackets were added to the record later. Please see section entitled “Encephalitis/encephalopathy” note” at page 31
190 090-022-052 to 053
191 090-022-053 - continuous epileptic activity in the brain without clinical effect - see glossary.
192 090-040-140
193 WS-253-1 p.6 & WS-257-1 p.7
194 Mr and Mrs Roberts T-31-10-12 p.43
195 091-004-006
196 WS-253-2 p.2
197 WS-253-1 p.8
198 Dr Sands T-19-10-12 p.116
199 Mr and Mrs Roberts T-31-10-12 p.48
Alternatively, Dr Sands suggested that not all discussions between doctors would necessarily have been within range of the family, perhaps deliberately, so as not to cause alarm.\textsuperscript{200}

3.67 Dr Sands recalled his examination of Claire and remembered Mr and Mrs Roberts telling him that there had been no improvement since the previous night. He said that in fact he was concerned that he had not been alerted earlier to her condition because he too considered that she was unwell.\textsuperscript{201} He believes that he spent upwards of 20 minutes with her\textsuperscript{202} and agreed with Mrs Roberts that something was \textit{"significantly wrong."}\textsuperscript{203} Indeed, he thought it necessary to consult the Consultant Paediatric Neurologist, Dr David Webb and did so immediately. In such circumstances, Dr Sands does not appear to have adequately communicated his level of concern to Mr and Mrs Roberts.

\textit{Electrolyte testing}

3.68 Dr Sands gave evidence about the timing of Claire’s blood test and the results. He said that he was aware that both the test and the results related to the night before\textsuperscript{204} and properly accepted that he should have repeated the blood tests on the morning of 22\textsuperscript{nd} October.\textsuperscript{205} Further, and with the benefit of hindsight, he said it would have been appropriate at the time of the ward round to reconsider Claire’s fluid regime.\textsuperscript{206} He wondered whether there might not have been a separate ‘to do’ list which included further blood tests\textsuperscript{207} but I am not persuaded that there was and Dr Stevenson, who wrote the note, says there was not.\textsuperscript{208} Dr Sands was only one of a number of clinicians given the opportunity on 22\textsuperscript{nd} October to repeat the U&E tests. Failure to do so was both individual and collective.
**Diagnosis at ward round**

3.69 Dr Sands said that his ward round impression of “non-fitting status” was informed by Dr Savage’s referral note, Mrs Roberts’ description of a history of seizures and Dr O’Hare’s direction to administer diazepam in the event of seizures. That is understandable but seems to respond to only one of the previously suggested explanations for Claire’s presentation. However, Dr Sands’ said that a viral infection, specifically encephalitis, was considered and most probably discussed during the ward round although this may not be reflected in Dr Stevenson’s note.

3.70 Dr Stevenson was unable to assist. He had no recall of the events of 22nd October or of Claire or her parents. He had a limited role on the ward round and had only been a SHO in paediatrics for two months. Dr Stewart was however quite sure that not only was status epilepticus discussed but encephalitis was also advanced at that time as a working diagnosis.

**Actions taken after the ward round**

3.71 The plan at ward round was to administer rectal diazepam, consult Dr Webb and discuss Claire’s previous medical history with Dr Colin Gaston. Dr Sands gave direction for hourly neurological observations to commence at 13:00 and then went to find Dr Webb. Critically it is to be noted that at that stage, the blood tests were not repeated, the fluid regime was left unchanged and there was no further investigation by CT scan or Electroencephalography (‘EEG’). Whilst the doctors did not know what was wrong with Claire, they agree that she was a cause for increasing concern.
Her condition had not improved since Monday evening, her parents were worried and now so too it would appear was Dr Sands.

3.72 Dr Sands said that he was concerned by her level of consciousness indicating that whilst not totally unresponsive\textsuperscript{217} she was certainly not “bright.”\textsuperscript{218} He confirmed that even though he did not know how ill she was, he felt that she was more than just a patient of concern.\textsuperscript{219} He hoped and expected that Dr Webb would see her sooner rather than later.\textsuperscript{220} In fact, he went so far as to say that had he known that her parents intended to leave at lunchtime he would have advised them not to\textsuperscript{221} because she was “very unwell.”\textsuperscript{222}

3.73 I find it difficult to reconcile this evidence with Dr Sands’ failure to warn Mr and Mrs Roberts about how ill Claire was and his subsequent departure from the hospital at 17:00 without alerting them to his concerns. Dr Sands should have ensured that Mr and Mrs Roberts were properly informed as to Claire’s condition.

\textit{Decision to seek neurological opinion}

3.74 Dr Sands explained that “what I saw was outside my experience and I then contacted Dr Webb”.\textsuperscript{223} There is some uncertainty about when they spoke. Dr Sands believed it was about midday\textsuperscript{224} because he had wanted to ask Dr Webb\textsuperscript{225} about the diazepam and he noted that this was not administered until 12:15.\textsuperscript{226} Alternatively, he speculated that he may have spoken initially to Dr Webb to get his approval for the diazepam and then spoken to him again later and in more detail.\textsuperscript{227}

\begin{itemize}
\item \textsuperscript{217} Dr Sands T-19-10-12 p.137
\item \textsuperscript{218} Dr Sands T-19-10-12 p.138
\item \textsuperscript{219} Dr Sands T-19-10-12 p.132
\item \textsuperscript{220} Dr Sands T-19-10-12 p.35
\item \textsuperscript{221} Dr Sands T-19-10-12 p.138
\item \textsuperscript{222} 091-009-056
\item \textsuperscript{223} 091-009-059
\item \textsuperscript{224} Dr Sands T-19-10-12 p.33
\item \textsuperscript{225} Dr Sands T-19-10-12 p.34
\item \textsuperscript{226} 090-026-075 & 090-040-141
\item \textsuperscript{227} Dr Sands T-19-10-12 p.33-34
\end{itemize}
3.75 Dr Webb believed that, in all probability, he did not speak to Dr Sands until after he had given a pre-arranged talk between 12:45 and 13:30.\textsuperscript{228} Then, having spoken to him and with the understanding that there was a real problem, he went quickly to Claire and saw her around 14:00. I am unable to resolve this uncertainty but the point is that they did speak and Dr Webb became involved in Claire’s care.

3.76 There is no record of their discussion. Dr Webb’s thinks he was asked to advise on the possibility of non-convulsive seizures associated with a fluctuating level of consciousness against a background of seizures in infancy and a learning disability.\textsuperscript{229} He believes that he was told about both the sodium reading of 132 Mmol/L and the high white cell count but understood that these were results from that same morning rather than the night before.\textsuperscript{230} He was asked about medication and getting a CT scan. He believes that the differential diagnoses occurring to him at that time included the possibility of epilepsy, encephalopathy and encephalitis.\textsuperscript{231}

3.77 Dr Sands did not seemingly remember the discussion beyond the fact that it happened and may have been repeated and that they discussed why a CT scan might help.\textsuperscript{232} He also said that whilst he suggested encephalitis, it would have been Dr Webb who proposed encephalopathy because he did not himself understand the condition.\textsuperscript{233} He could not actually recall being present when Dr Webb attended with Claire.

3.78 Dr Webb regarded his role as confined to assessment and the formulation of diagnosis and management plan for the assistance of the paediatric medical team.\textsuperscript{234} Dr Webb said that Dr Sands did not request that he take over Claire’s case.

\textsuperscript{228} Dr Webb T-30-11-12 p.169
\textsuperscript{229} Dr Webb T-30-11-12 p.172
\textsuperscript{230} Dr Webb T-30-11-12 p.175-176
\textsuperscript{231} Dr Webb T-30-11-12 p.173
\textsuperscript{232} Dr Sands T-19-10-12 p.34
\textsuperscript{233} Dr Sands T-19-10-12 p.167-168; WS-138-1 p.4
3.79 Dr Sands said that although he sought guidance from Dr Webb, he did not attempt to specify the role Dr Webb was to have in Claire’s care, because that was something more usually discussed between consultants. He could recall no further communication with Dr Webb after their initial discussion. Nonetheless, he stated that Dr Webb’s assessment of Claire may have lessened some of his own concerns because he would then have expected Dr Webb to direct the further investigations and provide further information to Claire’s parents.

3.80 At that time, and as and between Dr Sands and Dr Webb, a decision should have been taken to investigate further. That would probably have meant a CT scan to diagnose haemorrhage, hydrocephalus or cerebral oedema, or in the event of that proving inconclusive, an MRI scan. Professor Neville advised that an EEG was the only way to confirm non-convulsive status epilepticus. Until such tests were done, doctors were treating a “very unwell” child without really knowing what was wrong or doing anything to confirm a diagnosis. In addition and critically, active fluid and electrolyte management was being ignored.

“Encephalitis/encephalopathy” note

3.81 Mr and Mrs Roberts have since expressed concern about changes made to the ward round notes. The words “encephalitis/encephalopathy” have been added at a later time and in a different hand so as to augment Dr Sands’ noted impression of “non-fitting status.” Dr Sands indicated that he added this to the notes after he had spoken to Dr Webb. Regrettably, he did not date or sign the addition.

3.82 Claire’s parents became increasingly suspicious about this evidence and questioned whether the words might not have been added as late as

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235 WS-137-1 p.17
236 WS-137-1 p.39
237 WS-137-1 p.51
238 WS-137-2 p.8
239 232-002-002
240 090-022-053. Please see paragraph 3.69
241 WS-137-1 p.10
2004/05 so as to place Dr Sands and the hospital in a better light.\footnote{242} This suggestion was strongly denied by Dr Sands.\footnote{243} One of the points made by Mr and Mrs Roberts was that Claire did not receive any treatment for encephalitis or encephalopathy until Dr Webb prescribed acyclovir at around 17:00 and accordingly to use these words at any earlier stage would be inconsistent with the logic of the record.\footnote{244}

3.83 The Inquiry engaged Dr Audrey Giles, a highly experienced forensic document analyst to examine this and other entries made by Dr Sands in order to determine when this controversial addition was made. Her findings were essentially inconclusive. She stated that “I am unable to determine when the questioned entry “encephalitis/encephalopathy” in the Medical Notes was made by Dr Sands, or the entry “4pm” was made by Dr Webb, either in absolute terms or in relation to other entries made by him on these documents.”\footnote{245}

3.84 I understand why Claire’s parents should question all that is said by the doctors who treated Claire. However, I do not accept this specific allegation against Dr Sands on the evidence before me. It is plausible that the additional words do indicate the differential diagnosis as suggested by Drs Sands, Stewart and Webb\footnote{246} and that Claire did not receive the relevant treatment at the time because it was hoped that she would respond to another regime. I do not accept it proved that the disputed entry was made dishonestly or to mislead. It was, however, a yet further example of substandard record keeping.

\footnotesize
\begin{itemize}
\item \footnote{242}{Mr and Mrs Roberts T-13-12-12 p.128}
\item \footnote{243}{Dr Sands T-18-12-12 p.130}
\item \footnote{244}{Mr and Mrs Roberts T-13-12-12 p.120}
\item \footnote{245}{241-001-008}
\item \footnote{246}{Dr Sands T-19-10-12 p.168-9, Dr Stewart T-06-11-12 p.31-32 & WS-138-1 p.6}
\end{itemize}
Dr Webb saw Claire at about 14:00. Dr Webb may have been accompanied by Dr Stevenson and a nurse. It is unfortunate that Dr Sands does not appear to have attended but he was engaged elsewhere.

The entry made by Dr Webb in the record was:

"Neurology – Thank you.

• 9 yr old girl with known learning difficulties – parents not available. Grandmothers Hx - vomiting + listless yesterday pm – followed by prolonged period of poor responsiveness. On no AED.

• Note appeared to improve following rectal diazepam 5mg at 12.30pm.


Imp - I don’t have a clear picture of prodrome + yesterday’s episodes. Her motor findings today are probably long standing but this needs to be checked with notes. The picture is of acute encephalopathy most probably restricted in nature. I note (N) biochemistry profile.

Suggest

i) starting iv phenytoin 18mg/kg stat followed by 2.5mg/kg 12hrly. Will need levels 6hrs after loading dose.
ii) *Hrly neurobs*

*iii) CT tomorrow if she doesn’t wake up. D. Webb.*

3.87 Dr Webb maintained that the most likely explanation for Claire’s presentation was a recurrence of seizures within a context of inter-current viral illness. He agreed with Dr Sands that she was probably suffering semi-continuous non-convulsive seizures, which were contributing to her altered level of consciousness. It was these he attempted to treat.

3.88 Dr Webb acknowledged his error in thinking that Claire’s serum sodium result of 132mmol/L was from a test undertaken that morning rather than the previous evening. Indeed, he admits that had he understood that the results were from the previous evening, he “would have requested an urgent repeat sample” because Claire was receiving IV fluids and he could not therefore be confident that the sodium level was not relevant to her presentation.

3.89 Dr Webb’s confusion about the timing of the blood tests is a matter of significance and concern. Whilst the results were untimed in the medical record (and that is a notable deficiency), the very fact that they were the only results for a patient admitted the previous day should have caused him to double check the timings. Furthermore, the presence of the downward pointing arrow beside the sodium reading should have attracted his particular attention. In the circumstances he should have interrogated the notes for the time of the blood test.

**EEG & CT Scan**

3.90 Professor Neville, being of the view that an EEG was the only means to confirm non-convulsive status epilepticus, stated quite simply that Claire should not have been treated for status epilepticus without an EEG because
anti-epilepsy medication can further reduce levels of consciousness. However, there was no EEG. Dr Webb said that he had intended an EEG for the following day should Claire still have been a cause for concern.

3.91 In addition, Professor Neville was of the opinion that an urgent CT scan was indicated because Claire was suffering from unexplained reduced consciousness and a scan could confirm or exclude cerebral oedema or haemorrhage. He said it should have been carried out on the evening of 21st October or at the latest, on the morning of 22nd October. In his view, the failure to do so was a “major omission.”

3.92 Dr Webb did not think that either CT scan or EEG would have been of much assistance. He thought the most likely diagnosis was non-fitting status and whilst that could have been confirmed by an EEG, resources were stretched. He believed that had he insisted on an EEG that afternoon, it could have been arranged but at the cost of the operator working extra hours. Accordingly, he decided to wait until the following morning, taking the view that Claire was probably experiencing seizures because of a viral illness. He accepted that his suggestion “CT tomorrow if she doesn’t wake up” was poorly phrased but was really meant to indicate that she should have a CT scan if she did not improve.

3.93 Is it fair to criticise Dr Webb for not directing an EEG or CT scan that afternoon? With hindsight, it is obvious that they were more urgently indicated than he thought and that they could have been arranged, however awkward that may have been. It is also acknowledged that Professor Neville, who was particularly critical in this regard, is rather more familiar with larger hospitals and their superior access to testing facilities. However,
it was repeatedly asserted in evidence that while children can recover very quickly from illness, they can also deteriorate very rapidly. Claire was clearly very unwell and at best, Dr Webb had an insecure primary diagnosis of non-fitting status. Accordingly, I believe that he should have done more. He started Claire on anti-convulsant medication with hourly neurological observations at a time when he could and should have reviewed her fluid and electrolyte management and pursued additional investigation.

**Phenytoin**

3.94 Phenytoin was the anti-convulsant drug which was then prescribed for Claire by Dr Stevenson on Dr Webb’s direction. It was administered intravenously from 14:45 onwards\(^{266}\) notwithstanding that there was some suggestion to Dr Webb that Claire might have improved.\(^ {267}\)

3.95 The treatment gave rise to the following specific concerns

(i) Claire was given an overdose of the phenytoin. Her loading dose was incorrectly calculated by Dr Stevenson at 632mg rather than 432mg.\(^ {268}\) His was an error in multiplication. Whilst there is confusion in the medical record about exactly how much phenytoin Claire was given and when, it is clear that an overdose was administered in keeping with Dr Stevenson’s miscalculation. Notwithstanding, the expert evidence was that, in all probability, this overdose had no material effect on what was to happen.\(^ {269}\)

(ii) The phenytoin given would have acted in conjunction with diazepam administered at 12:15. Each would have had a sedating effect and together could have further affected her levels of consciousness. This is a matter of importance because her consciousness was

\(^{266}\) 090-026-075  
\(^{267}\) Dr Webb T-30-11-12 p.214  
\(^{268}\) 090-026-075 & 090-022-054  
\(^{269}\) 232-002-009
already a cause for concern and was the subject of hourly Glasgow Coma Scale ('GCS') assessment.270

(iii) Accordingly, the combined effect of the phenytoin and diazepam would have made it more difficult for doctors to assess the extent to which Claire’s neurological impairment was due to her underlying illness. Furthermore, diazepam remains active for a prolonged period with the effects of a single dose persisting for up to two days. Claire’s GCS score may thus have been compromised on an ongoing basis.271

Seizures on 22nd October 1996

3.96 Mr Roberts left the hospital at 15:00 and Mrs Roberts remained with Claire. During the afternoon, Claire’s condition deteriorated and she suffered a number of seizures.272 These are noted on the ‘Claire Roberts Timeline’ in red.273

3.97 There is uncertainty about the precise number and timing of these events. Between 15:10 and approximately 15:25, seizures were noted in the ‘Record of Attacks Observed’. Mrs Roberts herself noted one at 15:25.274 She thought it had lasted 5 minutes. Dr Sands does not believe he was present on Allen Ward when this seizure occurred and does not recall being informed.275 At 16:30, a further entry notes “teeth tightened slightly.”276

Neurological observations during 22nd October 1996

3.98 Throughout Tuesday 22nd, the nursing observations relevant to Claire’s neurological condition were collated for GCS assessment of her levels of consciousness.277 In a patient with reduced consciousness painful stimulus

270 237-002-016
271 237-002-008
272 090-042-144
273 310-001-001
274 090-042-144
275 WS-137-1 p.49
276 090-042-144
277 310-007-003
is applied and the best visual, verbal and motor responses assessed and scored out of 15.\textsuperscript{278} The scale is modified for use in the very young by omitting one of the scores to give a total GCS score out of 14.\textsuperscript{279}

Claire’s GCS scores were recorded on an observation chart\textsuperscript{280} starting with a score of 9 at 13:00 and continuing at either a 6 or 7 for the next few hours. Whilst there is a subjective element to these scores, it remains clear that the lower they are the more worried a clinician should be. A score of 8 or less is consistent with the onset of coma.\textsuperscript{281} Generalised entries in the record at that time appear to confirm Claire’s loss of consciousness. Some entries are very telling, for example the clear contrast appearing between the record of “\textit{Eyes open to pain}” at 14:30 and the subsequent failure of all further attempts to repeat this response.\textsuperscript{282} In Professor Neville’s view, any score between 9 and 12 required investigation and all below 9 demanded urgent intervention.\textsuperscript{283} He also stated that any drop in the GCS score (as for example that occurring at 21:00) should have prompted the SHO to contact the registrar or consultant.\textsuperscript{284}

Ms Sally Ramsay considered that a GCS score of 8 in combination with complex IV therapy should have prompted discussion between nursing and medical staff about admission to PICU.\textsuperscript{285} However, the nursing notes do not suggest that these neurological observations were brought to the attention of the medical staff. In any event, and as Ms Ramsay pointed out, the charts would have been readily available for the doctors to check\textsuperscript{286} and because Claire was seen by doctors on at least seven occasions, they ought to have been aware of her vital signs and changed neurological status.\textsuperscript{287} These were warning signals.
Dr Webb’s second attendance with Claire

3.101 At about 15:15, two letters from Dr Colin Gaston were faxed to the Children’s Hospital in response to queries raised on the ward round. They were seen by Dr Stewart.\textsuperscript{288} Further information was provided about Claire’s medical history with particular reference to her behavioural problems. This does not however appear to have prompted any further discussion or enquiry.

3.102 At some point in mid-afternoon, Dr Webb returned to see Claire.\textsuperscript{289} This demonstrated both his interest and concern, even if he did not record his attendance. He believes that he would have reviewed the nursing observations and GCS scores.\textsuperscript{290} Whilst he knew she was ill, he did not then consider that a transfer to PICU was warranted\textsuperscript{291} but thought that she could be managed on the ward in accordance with his previous treatment plan.

Midazolam

3.103 Dr Webb did, however, direct that Claire be given another drug, midazolam. This was again on the basis that she was suffering from non-fitting status in the context of an “intercurrent viral infection.”\textsuperscript{292} Remarkably, Claire was then given another overdose, this time of midazolam and once again in error. The initial dose was given at “0.5mg/kg”\textsuperscript{293} rather than 0.12mg/kg, which was several times the recommended dosage.\textsuperscript{294}

3.104 Dr Webb’s evidence was that he had first encountered this drug during training in Canada but had not at that time previously prescribed it himself.\textsuperscript{295} Accordingly, he said he had to check the prescription with his Vancouver notes and then telephone the details to Dr Stevenson so that he

\footnotesize{\begin{itemize}
  \item 090-013-016 to 019
  \item 090-022-055
  \item WS-138-1 p.31
  \item WS-138-1 p.11
  \item 090-053-175
  \item WS-138-1 p.11
  \item 090-022-055
  \item WS-138-1 p.32
  \item WS-138-3 p.2
\end{itemize}}
could write it up. It transpired however, that Dr Webb had himself directed the same drug be given to another patient and only a few days before.\textsuperscript{296} His recollection was therefore clearly unreliable.

3.105 None of the expert witnesses suggested that this overdose would have been fatal but Dr Aronson, Clinical Pharmacologist, stated without contradiction that such an overdose would increase sedation in a patient with reduced consciousness.\textsuperscript{297}

3.106 I cannot determine definitively whether the error in prescription was Dr Webb’s or Dr Stevenson’s. It is possible that Dr Stevenson misunderstood the instructions given by telephone. However, Dr Webb had the opportunity to note the miscalculation of “0.5”\textsuperscript{298} in the record, both at 17:00 and again in the early hours of Wednesday morning. He raised no issue about it then or later at the inquest. Dr McFaul was of the opinion that the error should have “been noted at the review of death in the audit meeting and reported as a major medicines error.”\textsuperscript{299} It was not raised at all until May 2012 when Mr Roberts drew it to my attention. That it should have been noticed by a layperson is telling.\textsuperscript{300}

3.107 There was, however, a more fundamental problem with the administration of midazolam, which is whether it should have been prescribed at all. It was the third drug, after diazepam and phenytoin to be given Claire in the space of three to four hours on the basis that she had non-fitting status. That was the sole condition for which she was being treated despite the suspicion of encephalitis/encephalopathy and the absence of an EEG to confirm the diagnosis.

3.108 There was consensus of expert opinion that this approach was highly questionable and undertaken at a time when Dr Webb should have considered other diagnoses.\textsuperscript{301} His assessment of Claire’s condition would
very clearly have benefited from discussion with Dr Steen and/or Dr Sands but none such took place. That was a failure of all concerned. A joint discussion on 22nd October would have queried why Claire’s condition remained so poor despite the treatment administered and that would almost certainly have led to a re-appraisal of diagnosis and a review of treatment.

*Dr Webb’s examination at 17:00*

3.109 Dr Webb returned to see Claire for a third time at around 17:00. This was the only time he met Mrs Roberts on the ward. His note records that Claire flexed her left arm in response “to deep supra orbital pain” but she did not speak or respond to his voice.302

3.110 Dr Webb discussed Claire’s background history with Mrs Roberts recording that Claire had had contact with a cousin on 19th October, that she had gastro-intestinal upset and loose motions on the Sunday (20th) and vomiting on the Monday (21st). Mrs Roberts rejected his note of “loose motions on Sunday” maintaining “Claire had a smelly poo… on Friday…”303 and Mr Roberts agreed.304 Dr Webb’s note may not be reliable.

3.111 However, it was the suspected stomach upset that caused him to think that Claire might have a bowel infection, which had spread to her brain and caused meningo-encephalitis or encephalomyelitis.305 (Otherwise an Enteroviral infection306) Accordingly, he prescribed the anti-biotic cefotaxime and the anti-viral drug acyclovir.307 He directed blood, stool and urine checks and a throat swab for viral culture.308 However and on balance, he did not consider such a diagnosis very likely in the absence of fever, neck stiffness or photophobia.309

302 090-022-055
303 WS-257-1, p.10
304 WS-253-1, p.3 & WS-253-1, p.21: “Claire only had one small loose bowel motion on the Friday, with normal bowel motions on Saturday, Sunday and Monday.” See also 090-022-050 - Dr O’Hare’s admission note made at 20:00 on 21st October 1996 which records a history of “loose motion three days ago”
305 090-053-173 & WS-138-1 p.17
306 310-007-003 & 090-053-173
307 090-022-055 & 090-053-173
308 090-022-055
309 090-053-173
3.112 Notwithstanding, Dr Webb continued with the anti-convulsant medication.\(^{310}\) He maintained that he had obtained a history from Mrs Roberts of a seizure affecting Claire’s right side which had left him in no doubt that she had had a convulsive seizure on 21\(^{st}\) October. It was this history in combination with Claire’s ongoing altered awareness at 17:00 within a context of stable vital signs and intermittent mouthing movements that suggested to Dr Webb that she had ongoing sub-clinical seizure activity.\(^{311}\)

3.113 He interpreted her GCS and Central Nervous Observations from 14:00 to 17:00 as reflecting a combination of ongoing non-convulsive seizure activity, post-ictal effects and the possible consequences of the anti-convulsant therapy (midazolam).\(^{312}\) He did not think her condition was due to raised inter-cranial pressure because his evaluation included an assessment of those features usually expected to be abnormal in the presence of raised intracranial pressure, citing in particular the absence of significant change in heart rate or blood pressure, a cessation of vomiting since his last examination and the fact that her reactive pupils were not enlarged.\(^{313}\) He did not consider Claire’s respiratory rates to be a cause for concern. Overall, he felt that her state was similar to that found on examination at 14:00 notwithstanding that her GCS score was potentially depressed by midazolam.\(^{314}\) He stated that his diagnosis was predominantly that of an “epileptic encephalopathy”\(^{315}\) with the impression that Claire was suffering subtle non-convulsive seizure activity triggered by recent inter-current viral infection.\(^{316}\)

3.114 However, and notwithstanding that her sodium levels had not been checked since the previous night, Dr Webb still did not direct a repeat blood test. Dr Sands attended a few minutes later at 17:15 and likewise failed to direct

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\(^{310}\) WS-138-1 p.42-3
\(^{311}\) (Dr Webb defined ‘status epilepticus’ as seizure activity lasting for more than 30 minutes. 090-053-173 & WS-138-1 p.39)
\(^{312}\) WS-138-1 p.17 & p.74-75
\(^{313}\) WS-138-1, p.35
\(^{314}\) WS-138-1 p.74-75
\(^{315}\) WS-138-1 p.17
\(^{316}\) 090-053-173
another blood test. He claimed to have been under the impression that a full blood test had been performed and that the results were awaited.\textsuperscript{317} I cannot understand the basis for any such expectation from the entries in the record.

3.115 The experts agree\textsuperscript{318} that more should have been done at 17:15. Indeed Drs Sands and Webb both now recognise this.\textsuperscript{319} Each was then about to go off duty, even though Dr Webb remained the on-call paediatric neurologist. Notwithstanding and whilst the expert views do not entirely concur, I believe that the following should have been done:

(i) Mr and Mrs Roberts should have been told that Claire was very ill and that diagnosis was unclear.

(ii) The incoming nursing and medical staff should have been alerted to the seriousness of her condition and the uncertainty of diagnosis.

(iii) Dr Steen should have been contacted and asked to return to discuss and review.

(iv) Blood tests should have been carried out.

(v) Diagnosis should have been reconsidered afresh.

(vi) Claire’s overall treatment should have been reviewed, including her drug regime and fluid management.

(vii) A paediatric anaesthetist should have been asked to advise on admitting Claire to the PICU.

\textsuperscript{317} WS-137-1 p.29
\textsuperscript{318} 232-002-010 - Professor Neville believed that further assessment was required, including electrolyte testing, EEG, CT scan and drug review; and that any differential diagnosis should include causes of raised intracranial pressure.
234-002-007 - Dr Scott-Jupp considered that Dr Webb should have made it clear whether he had taken over Claire’s care completely or was available only for specialist advice and he should have spoken to Dr Bartholome, the on-call Consultant Paediatrician or Dr McKaigue.
\textsuperscript{319} Dr Sands T-19-10-12 p.203 line 21 & Dr Webb T-03-12-12 p.60 line 15
(viii) An EEG should have been arranged, preferably that day but certainly before the following morning.

(ix) A clear understanding should have been established as to who was responsible for Claire’s care – whether it was the paediatric team or the neurology team.

Responsibility for the failure to take these steps lies overwhelmingly with Dr Webb and Dr Sands.

**Discussions between Dr Steen and Dr Sands**

3.116 Evidence was given by both Dr Steen and Dr Sands that they probably spoke by telephone at some point during the afternoon of 22\textsuperscript{nd} October when Dr Steen was at the Cupar Street Clinic.\textsuperscript{320} I have some difficulty with such a proposition because although Dr Sands regarded Claire as the sickest child on the Ward\textsuperscript{321} he is not thought to have spoken with Dr Webb. So how would his conversation with Dr Steen have gone? One possibility is that Dr Sands informed Dr Steen of Claire’s condition and told her that he had obtained assistance from Dr Webb, but they agreed or Dr Steen decided that she did not need to return to see Claire. That does not seem likely in light of the detail he would necessarily have to have given about Claire’s condition.

3.117 What makes more sense is that if there was a conversation, and I am not at all persuaded that there was, Dr Steen was not alerted to the seriousness of Claire’s condition. This may have happened because even though Dr Sands recognised that Claire was “very unwell”\textsuperscript{322}, he was under the impression that he had effectively passed responsibility for Claire to Dr Webb and accordingly felt it was for Dr Webb to determine how to proceed and whether to recall Dr Steen. Meanwhile Dr Webb was unaware of Dr Sands’ assumption and remained confident that he had not assumed

\textsuperscript{320} Dr Steen T-17-10-12 p.10, Dr Sands T-19-10-12 p.37 & WS-137-1 p.16
\textsuperscript{321} Dr Sands T-19-10-12 p.233
\textsuperscript{322} 091-009-056
responsibility for Claire. This is a more compelling explanation because it fits with both Drs Webb and Sands leaving the hospital between 17:00 and 18:00, Dr Steen staying at Cupar Street, the failure to warn the incoming medical team about the seriousness of Claire’s condition, the failure to proceed to EEG or CT scan, the failure to make even preliminary contact with PICU and the extraordinary failure to communicate the gravity of the situation to Mr and Mrs Roberts.

3.118 I do not suggest that any one of these doctors was uncaring. Rather, I believe that the real danger of Claire’s situation was not recognised, so that despite Dr Webb’s repeated intervention, her condition was allowed to deteriorate. The doctors assumed that they could treat her the following day. I do not believe that it occurred to any of them that her life was in danger. Had it, then I am sure that they would all have done something very different. It is for these reasons that I conclude that if there was conversation between Dr Sands and Dr Steen, the reason it did not lead to the return of Dr Steen was that she was not given to understand that Claire was so seriously ill as to require her attendance.

**Consultant responsibility**

3.119 The issue arose as to who was primarily responsible for Claire’s care. Clarity as to leadership is important for all concerned in patient care. Was it the paediatric medical team under Dr Steen (even in her absence) or did Dr Webb take over primary responsibility in consequence of his having treated Claire on a number of occasions?

3.120 Claire was formally admitted into the care of Consultant Paediatrician Dr Steen. There was no recorded or formal transfer to the neurology team. Dr Webb denied taking over responsibility and there is no evidence that he did. I can only conclude that Claire remained under the care of the paediatric team despite Dr Webb’s active and specialist involvement.

3.121 Dr Sands may have been uncertain as to who the lead consultant was after Dr Webb had become involved, but such confusion does not appear to have
affected others. This issue was examined in detail at public hearings. Whilst Dr Sands might have made greater efforts to secure the attendance of Dr Steen, it would not appear that any particular nursing or medical failure resulted from confusion as to primary responsibility.

Nursing care during 22nd October 1996

Review of the ‘Nursing Care Plan’

3.122 The Nursing Care Plan was to have been subject to daily review. However, it was neither reviewed nor amended after the ward round on the morning of 22nd, nor seemingly at any time thereafter. The ‘Nursing Care Plan’ does not plan for Claire’s deterioration and remained therefore self-evidently unrevised.

3.123 Ms Ramsay stated that it was conventional practice to evaluate care on a regular basis. She said this should be done at the end of each shift at the very least and prior to handing over to another nurse. On this analysis, Claire’s ‘Nursing Care Plan’ should have been reviewed at 08:00, 14:00 and 20:00 on 22nd October. Ms Ramsay further stated that the plan ought to have been revised in response to changes in Claire’s care needs, such as those prompted by ongoing IV therapy, nursing observations and falling GCS scores.

3.124 That the ‘Nursing Care Plan’ was not updated was an oversight in care. It is impossible to determine what difference, if any, regular updates of the ‘Nursing Care Plan’ might have made. It is however clear that the discipline of making regular written revisions to a plan, might draw attention to necessary nursing action. The nursing staff are to be criticised for failing to adhere to the necessary standards of their own ‘Nursing Care Plan’.

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323 090-043-145
324 231-002-012
325 231-002-012
Care and treatment during the evening of 22\textsuperscript{nd} October 1996

3.125 There is no evidence that there was any meaningful handover to the incoming nursing or medical teams between 17:00 and 18:00; meaningful in the sense that any single nurse or doctor was actually alerted to the seriousness of Claire’s condition. There was a handover to Dr Joanne Hughes who attended to administer drugs,\textsuperscript{326} but no indication was given her as to the seriousness of Claire’s condition. This further confirms the extraordinary failure to recognise just how sick and at risk Claire was.

3.126 Frustratingly, it has not been possible to identify the on-call consultant paediatrician for the night of Tuesday/Wednesday.\textsuperscript{327} This is a further and particular failure in the record keeping. The unidentified and unidentifiable consultant should have been the first point of contact for paediatric medical problems. There is no evidence to indicate whether the unknown paediatrician was informed of Claire’s illness, or her deteriorating condition or whether there was any attempt to make contact when Claire’s condition became critical. If there was a rota of on-call consultant paediatricians, it does not appear to have been used.\textsuperscript{328}

3.127 The role of registrar on duty for Tuesday night was now the almost impossible task of Dr Brigitte Bartholome. She had the assistance of two SHOs, Dr Joanne Hughes and the same Dr Neill Stewart who had accompanied Dr Sands on the morning ward round.

3.128 Mr Roberts returned to be with Claire at 18:30. Between 18:30 and 21:15, Claire was reviewed by the nurses on duty but no concern was communicated to the family.\textsuperscript{329}

\textsuperscript{326} 310-003-003
\textsuperscript{327} 302-068a-001
\textsuperscript{328} 302-068a-001
\textsuperscript{329} 089-012-035
Involvement of Dr Joanne Hughes

3.129 From 17:00 to 22:00 on Tuesday, 22nd October Dr Joanne Hughes was the sole SHO on the Paediatric medical wards. The only registrar available to her was Dr Bartholome. Dr Hughes was thus responsible for the 40-50 children who were already on the wards together with additional patients admitted through A&E. She had at that time one years' experience in paediatrics. She said that she has no recall of the Tuesday night or of her role in Claire’s care. Whilst there had been a handover to her at around 17:00, that handover cannot have alerted her to the real seriousness of Claire’s condition.

3.130 Dr Hughes administered anti-biotics to Claire at 17:15 and anti-viral medication at 21:30. Significantly, no other doctor saw Claire during that critical period between 17:30 and 23:00 when effective intervention might still have saved her life. That she failed to effectively intervene was not the fault of the then relatively inexperienced Dr Hughes. Opportunities had been missed throughout the day to direct Claire’s treatment. It would be unfair to criticise an over-stretched SHO like Dr Hughes for failing to remedy the mistakes of more senior and experienced colleagues.

Further deterioration in Claire’s condition and nursing care

3.131 Signs were however apparent that not only was Claire failing to respond positively to Dr Webb’s drug treatment but she was in fact deteriorating. At 19:15, an entry was made in the ‘Record of Attacks Observed’ noting that Claire had “teeth clenched and groaned.” Dr Webb stated that he was unaware of this attack but would have expected to have been informed.
Indeed the ‘Nursing Care Plan’ specified that nurses were to inform medical staff of seizures. 336

3.132 A further attack was noted at 21:00 as an “Episode of screaming and drawing up of arms. Pulse rate ↑ 165 bpm. Pupils large but reacting to light. Dr informed.337 However, Dr Hughes could not recall being informed338 and Dr Webb stated that once again he did not know of the seizure but once again would have expected to be told.339

3.133 Whilst Claire’s temperature was noted at 20:30 and 22:30,340 respiratory observations were not recorded at 17:00, 18:00, 19:00, 20:00, 22:00 or 23:00. Ms Ramsay considered that they should have been noted and at least once every 30 minutes during intravenous infusion.341 Furthermore, Ms Ramsay regarded the failure to record blood pressure at 22:00, 23:00 and midnight as “serious omissions” in the record keeping.342

3.134 Furthermore Ms Ramsay was clear that the nurses were under an ongoing duty to inform doctors about changes in Claire’s condition, and in particular:

(i) The seizure lasting 5 minutes at 15:10.343

(ii) The failure to pass urine for six hours by 17:00.344

(iii) The blood pressure reading of 130/70 at 19:00.345

(iv) The teeth clenching and groaning incident at 19:15.346

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336 090-043-145  
337 090-042-144  
338 WS-140-1 p.28  
339 090-042-144 & WS-138-1 p.43  
340 090-039-137  
341 231-002-026  
342 231-002-02  
343 231-002-024 & 090-042-144  
344 231-002-030 & 090-039-135  
345 231-002-030 & 090-039-137  
346 231-002-025 & 090-042-144
The episode of screaming, the GCS score of 6 and the raised pulse rate at 21:00.\textsuperscript{347} (Whilst the nursing record does indicate, “Dr informed”\textsuperscript{348} this is not confirmed by the medical record).

Additionally Ms Ramsay believed that the episode of screaming at 21:00\textsuperscript{349} should have been documented. This was, she said, a significant error and represented a further failure in record keeping.\textsuperscript{350}

Even allowing for subjective variation, the GCS numbers that evening were consistently low. They fell further at 21:00 to 6/7. Each GCS assessment presented clear warning. Dr Steen,\textsuperscript{351} Dr Webb,\textsuperscript{352} and Professor Neville\textsuperscript{353} all agreed that Claire’s management should have been discussed with a consultant when the GCS scores dropped at 21:00.

It was wholly improper that with a GCS score as low as 6 that Claire should have been left on the ward without urgent reappraisal. She had already received treatment for 24 hours and was not improving. Even if her levels of consciousness had been depressed by medication, there was no positive indication of progress and urgent action was imperative.

Whilst the nurses did not completely ignore Claire, it cannot be said that they responded to her clinical signs or recognised her danger. Any nurse who was in any doubt about what to do could always have sought advice from the night sister.\textsuperscript{354} The individual nurses charged with her care are to be criticised for their failure to make necessary observations with appropriate frequency, to respond to Claire’s very low GCS scores or to keep medical staff informed of her condition.
Claire's parents leave for the night

3.139 Claire’s family had been at her bedside since the morning. They were constantly available for consultation, reassurance or warning. At some time between 21:15 to 22:30 on the Tuesday night, Mr and Mrs Roberts decided to go home and informed the nurses that they were leaving. Neither doctor, nurse nor any other member of staff told Mr and Mrs Roberts that Claire was seriously ill and in danger.\textsuperscript{355} One of the saddest and most frustrating aspects of all is that they were allowed to leave expecting to find improvement the next morning.

3.140 In his witness statement to the Inquiry, Mr Roberts explained that they did not know that Claire had a neurological illness and were unaware of concern about her condition.\textsuperscript{356} Indeed, he felt so comfortable that night that he was able to watch ‘A Question of Sport’ on television with his son.\textsuperscript{357}

3.141 I am satisfied that the nurses no more recognised the danger of Claire’s deteriorating condition than the doctors did and because the doctors did not inform the nurses of the seriousness of her illness, it would be unfair to criticise the nurses alone in this regard. As Staff Nurse Lorraine McCann,\textsuperscript{358} who was on duty at that time acknowledged, the failure to inform Mr and Mrs Roberts was a collective failure.\textsuperscript{359}

3.142 However, as a matter of course and at the very least Mr and Mrs Roberts should have been told that:

(i) Claire was very unwell.

(ii) Diagnoses was unclear.

(iii) Further investigations were necessary, and

\textsuperscript{355} 091-004-006 & WS-253-1 p.11-12
\textsuperscript{356} WS-253-1 p.11
\textsuperscript{357} WS-253-1 p.11
\textsuperscript{358} 310-003-005
\textsuperscript{359} Staff Nurse McCann T-30-10-12 p.90 line 2
(iv) Transfer to PICU might be necessary.

3.143 That no one even so much as suggested concern, let alone danger to Mr and Mrs Roberts is profoundly unsettling. Claire’s death must have been made even harder to bear by the thought that they could have stayed with Claire. Fundamental failures in communication with families was one of the most repeated, basic, depressing and serious deficiencies encountered by this Inquiry.

**Attendance of Dr Hughes at 21:30**

3.144 Dr Hughes saw Claire again at about 21:30 when she gave her anti-viral medication.\(^{360}\) She also took blood for general testing and to assess levels of phenytoin.\(^{361}\) These had to be checked before additional phenytoin could be given. She did not make a record of her examination. Whilst this was an omission on her part, it was of little consequence. Nonetheless, she did have time to re-write the prescription sheet detailing the drug regime.\(^{362}\) With more experience, time and support she might have pieced together the record of attacks, GCS scores, observations and general presentation to appreciate that something was seriously wrong and to make contact with Dr Bartholome.

3.145 The nursing notes record that at 23:00 Claire was given an additional dose of phenytoin\(^{363}\) to add to the bolus overdose already given by Dr Stevenson. This was administered before the results of the blood tests were received at 23:30. These revealed a phenytoin level of 23.4 mg/l which was in excess of the therapeutic range of 10-20 mg/l.\(^{364}\) In other words, Claire had already received too much of a drug, experts suggest she should not have been given in the first place and then she was given some more.

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\(^{360}\) 090-026-077  
\(^{361}\) Dr Hughes T-05-11-12 p.155 line 21  
\(^{362}\) 090-026-077  
\(^{363}\) 090-040-138  
\(^{364}\) 090-022-056
3.146 More importantly, the blood test results revealed that her sodium levels had fallen and were now dangerously low at 121mmol/L. Claire was suffering severe hyponatraemia.

**Attendance by Dr Stewart at 23:30**

3.147 Dr Stewart saw Claire at about 23:30. He was by then the only doctor covering the Children’s Hospital at SHO level outside A&E and PICU. His record of examination reads:

“Na 121 K 3.3 Urea 2.9 Creat 33 Phenytoin 23.4mg/l (10-20)

Hyponatraemia - ? Fluid overload low Na fluids

? SIADH

Imp - ? Need for ↑ Na content in fluids

D/W Reg - ↓ Fluids to 2/3 of present value – 41mls/hr

Send urine for osmolality”

3.148 This was an impressive analysis, particularly from an SHO with Dr Stewart’s experience. Recognising that Claire was hyponatraemic, he suggested two causative mechanisms; one the type and volume of fluids under infusion and the other the Syndrome of Inappropriate Anti-Diuretic Hormone secretion (‘SIADH’). His proposed response was first, to switch from Solution No. 18 to a fluid with a higher sodium content and secondly, to reduce the volume by a third.

3.149 He telephoned Dr Bartholome who directed him to reduce the fluids by a third but to continue with Solution No. 18. She also told him to give the next dose of phenytoin but to reduce the rate.

3.150 It was thus that between 23:00 and 02:00, Claire received a further 56mls of Solution No.18 at about 18.5mls per hour, together with 7.6mls of 0.9% saline in conjunction with her midazolam infusion. In addition, she was

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365 090-022-056
366 Dr Stewart T-06-11-12 p.67
given 110mls of an unknown diluant with the phenytoin infusion. Dr Scott-Jupp thought that the diluant was probably 0.9% saline. These fluids amounted to a total of 173.5mls. Dr Scott-Jupp calculated that this was considerably more than the 41ml/hr intended and only slightly less than the rate as originally infused. He added that Claire also received about 133mls more than intended between 20:00 and 02:00 but considered it unlikely that this comparatively small excess would have made any significant difference.

3.151 Dr Stewart believes that he informed Dr Bartholome about the drop in Claire’s sodium levels, her GCS readings and the anti-convulsants administered. He fully expected her to come as soon as possible and to assume responsibility. Dr Stewart says that they did however discuss moving Claire to PICU and then his duties called him elsewhere.

**Involvement of Dr Bartholome**

3.152 Dr Stewart did not re-visit Claire between 23:30 and 03:00 and Dr Bartholome did not go to Claire until about 03:00. How can it possibly have been that Claire was not seen by a doctor during those critical 3½ hours? In part, it was due to chronic medical under-staffing at night and in part because Dr Bartholome could have done more. Her belief is that she must have been managing another emergency, most probably in A&E. That might very well have been the case but the expert consensus is that by 23:30 the time had most definitely come to call consultants and to contact PICU. Claire had been suffering sporadic attacks and her GCS scores and sodium levels were dangerously low. If Dr Bartholome was unable to see Claire then she should have called for consultant help or got Dr Stewart to make the call. Alternatively, she could have asked him to go...
back and check on Claire’s condition or contact PICU. She did none of those things.

3.153 Dr Bartholome’s failure to respond after 23:30 would be almost impossible to comprehend if she had been informed at the 17:00 handover as to exactly how ill Claire was. She cannot now recall the events of that night but I consider it most unlikely that she was informed about the seriousness of Claire’s condition. Had she known how critical Claire was, she would have given priority to her care, most especially when she received Dr Stewart’s report of deterioration.

3.154 The unavoidable truth is that Claire was deteriorating in plain sight of the doctors and nurses on Allen Ward. The signs were unambiguous but went unrecognised. I conclude that this arose, in part, from the failure of any single clinician to take primary responsibility for Claire’s case. Dr Steen was not there and neither Dr Webb nor Dr Sands assumed overall charge or sought to secure Dr Steen’s attendance or talk with Dr Bartholome. To make matters worse it would appear that there was no on-call paediatric consultant.

3.155 Leadership was absent from Claire’s case and had been from the outset. No single experienced overview was brought to bear to correct, co-ordinate or make connections. None of the doctors treating Claire had individual ‘ownership’ of her case, none was motivated to push for EEG, CT or PICU and none imposed personal control over her care so as to ensure appropriate record keeping, regular observations or proper communication with Mr and Mrs Roberts.

3.156 There was no firm consensus about whether Claire could still have been saved at 23:30. However, and at the very least, the fall in her sodium levels could have been arrested by switching from Solution No. 18 and reducing the rate. Dr Stewart’s plan to change the fluid and reduce the

374 234-002-008 & 091-011-067
volume was preferable to Dr Bartholome’s direction to continue with Solution No. 18 but at a lesser rate.

**Respiratory arrest: 23rd October 1996**

3.157 At 02:30, a nurse recorded that “Slight tremor of right hand noted lasting few seconds. Breathing became laboured and grunting. Respiratory rate 20 per minute. O2 saturations 97% - Claire stopped breathing.”

Dr Bartholome was contacted and attended with Claire at 03:00. She made her sole entry in the medical chart:

“3AM Called to see. Had been stable when suddenly she had a respiratory arrest and developed fixed dilated pupils. When I saw her she was Cheyne-Stoking and requiring O2 via face mask. Saturation with bagging in high 90s. Good volume pulse. I attempted to intubate – not successful. Anaesthetic colleague came and intubated her orally with 6.5 tube. Transferred to PICU.”

3.158 Dr Bartholome explained that her entry is to be understood as being a part of what she would have told staff in PICU. They would also have seen Dr Stewart’s entry at 23:30 together with the earlier entries. Her use of the word “stable” to describe Claire’s condition prior to collapse make no sense whatsoever.

3.159 Dr Bartholome telephoned Mr and Mrs Roberts to tell them that Claire had breathing difficulties and to come to the hospital as quickly as possible. She did this at about 03:45 and it was her last input into Claire’s case.

3.160 The expert consensus is that Claire could not have been saved after her collapse and confirms that there can be no criticism of how Claire was treated in PICU.

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375 090-040-138
376 090-022-056
377 Dr Bartholome T-18-10-12 p.88-89
Transfer to PICU and Dr Steen’s examination of Claire

3.161 Claire was transferred to PICU at 03:25 on Wednesday 23\textsuperscript{rd} October.\textsuperscript{378}

3.162 Dr Steen was contacted. She responded immediately and was with Claire shortly before 04:00. This was the first time she had seen Claire. I also believe that it was probably the first time she knew anything about Claire. She made the following entry in the records at 04:00 :

“9\frac{1}{2}-year-old girl c learning difficulties admitted 32 hours ago c ↓ level of consciousness.

SB Dr Webb ∆ acute encephalopathy ? aetiology. Covered c acyclovir + cefotaxime. Loaded c phenytoin + valproate added in @ 17:00 hrs.

11pm – phenytoin level = 23.4. Na+ 121. K+ 3.3. Fluids restricted to 2/3\textsuperscript{rd} maintenance. Obs otherwise stable.

@3am Reg asked to see because of resp difficulties. Cheyne-Stoke breathing – intubated + transferred to ICU.

At present intubated + ventilated. Has had some Midazolam but it is no longer running. Pupils fixed + dilated. Bilateral papilloedema L>R. No response to painful stimuli. BP- 90/65 HR = 100/min.

Plan-Mannitol stat.

Dopamine infusion.

Urgent CT scan.”\textsuperscript{379}

3.163 Dr Steen explained that she compiled this entry from the notes, from what she was told by the doctors and nurses and her examination.\textsuperscript{380} It is a significant entry but not an exhaustive re-listing of every issue and concern. There is specific reference to the “acute encephalopathy” as noted by Dr Webb but none to the encephalitis included in Dr Sands’ earlier entry (and about which I have already expressed my view). Importantly she refers to

\textsuperscript{378} 090-040-138-139
\textsuperscript{379} 090-022-057
\textsuperscript{380} Dr Steen T-16-10-12 p.28
the low sodium levels and the restriction of fluids as noted by Dr Stewart.\footnote{090-022-057} She examined Claire for raised intra-cranial pressure.

**Dr Webb’s attendance at 04:40, 23rd October**

3.164 It would appear that, in consequence of a call from Dr Steen, Dr Webb came to the hospital as well. His entry in the notes, made at 04:40 and immediately after Dr Steen’s, records:

“Neurology

SIADH – hyponatraemia, hypoosmolarity, cerebral oedema + coning following prolonged epileptic seizures

Pupils fixed + dilated following mannitol diuresis

No eye movements.

→ For CT scan”\footnote{090-022-057}

3.165 Dr Peter Kennedy,\footnote{310-003-004} Registrar in Radiology, reported on the CT scan, which was performed at approximately 05:30.\footnote{WS-167-1 p.2} He noted severe cerebral oedema.\footnote{090-022-059} Dr Webb recalled that at that point it was “clear that Claire had sustained severe brain injury and was not going to survive.”\footnote{090-053-168}

3.166 Claire did not recover. With the consent of her parents, ventilation was discontinued at 18:45 on 23rd October 1996\footnote{090-022-061} and she died in PICU.

**Brain stem death tests**

3.167 As in Adam’s case, there is an issue about the brain stem death tests. They were performed in Claire’s case at 06:00 and 18:25 on 23rd October by Drs
Steen and Webb and recorded on the standard ‘Diagnosis of Brain Death’ form. Dr Simon Haynes, Consultant Paediatric Anaesthetist, commented on the brain stem testing. He said, “There has to be a certainty that there is no residual effect of any neuromuscular or sedative drugs or other intoxicating agents” and “then there has to be the exclusion of metabolic and biochemical causes of coma. And that exclusion has to be made before doctors making the test can go on and do the test.”

Dr Aronson considered that several of the anti-convulsant drugs administered to Claire could still have been having an effect even after 24 hours. In the circumstances, it was necessary for both Drs Steen and Webb to carefully review Claire’s recorded drug history and only to proceed to the brain stem death test when it was appropriate so to do. Additionally, even though Claire’s sodium reading had risen to 129mmol/L by the time of the first test, it was still outside the normal range. Metabolic causes of coma could not therefore be completely excluded.

Notwithstanding, Dr Webb and Dr Steen determined that Claire fulfilled the criteria for brain stem death and signed the ‘Diagnosis of Brain Death’ form. In particular, question 1(c) “Could other drugs affecting ventilation or level of consciousness been responsible for her condition?” was answered by them both in the negative. I think it is unlikely that these doctors could have been so confused by the slightly odd wording of this question to fail to understand it or its purpose. Dr Aronson was of the opinion that given that the phenytoin probably remained in Claire’s system, question 1(c) could not properly have been answered in the negative. Question 1(f) then posed the question: “Could patient’s condition be due to
a metabolic/endocrine disorder?” This was also answered in the negative. The doctors made no reference to Claire’s hyponatraemia.

3.171 The protocol for certifying brain stem death requires strict adherence. Just as the protocol was not followed in Adam’s case, so too was there failure to comply in Claire’s case. I believe that it was inappropriate to start the tests before the effect of the phenytoin could be disregarded and incorrect to answer the questions as they did. It was not suggested that anything could have been done differently so as to affect the outcome but it was quite wrong for Dr Webb to record in his entry at 06:00 that Claire was “under no sedating/paralysing medication” when in all probability the drugs which he had prescribed the previous day were still in her system.

3.172 Dr Webb maintained that at the time of the tests he was unaware that Claire had been erroneously prescribed 120g of midazolam. I conclude therefore, that just as he may have failed to review Adam’s medical notes for his brain stem death test, so too did he fail to review Claire’s drug history. That such an error in prescription remained un-noted for so long further confirms that the drug record cannot have been subject to further or adequate review.

3.173 The ‘Diagnosis of Brain Death’ form concludes with the final question “Is this a Coroner’s case” which was answered in the negative and by Dr Steen alone.

Discussions with Claire’s parents

3.174 Shortly after the CT scan confirmed Claire’s cerebral oedema, Drs Steen and Webb met with Claire’s parents. Mr Roberts recalled that Dr Steen informed him that Claire was brain dead and that “everything possible had been done for Claire and nothing more could have been done.” He remembered Dr Steen explaining that “the virus from Claire’s stomach had
spread and travelled into Claire’s brain and caused a build-up of fluid.”

The Roberts family are emphatic that there was no mention of low sodium.

3.175 Mr and Mrs Roberts’ evidence is supported by the Hospital Relative Counselling Record which noted that “following CT scan Dr Steen and Dr Webb explained that Claire had swelling of the brain and could possibly be brain dead” and when “asked why her brain had swollen, it was explained it was probably caused by a virus.”

3.176 However, Dr Webb considered that this was wrong and did not accurately reflect their conversation. He stated that “… if a “virus” was discussed it was probably on the basis of a theory that a virus may have triggered Claire’s seizures and her brain oedema.” Although he could not recall the detail of what was actually said about hyponatraemia and cerebral oedema, he believed that he “would have indicated that the brain swelling was due to hyponatraemia” and that he communicated his opinion as he had set it out in the medical notes, namely “SIADH- hyponatraemia, hypoosmolarity; cerebral oedema + coning following prolonged epileptic seizure.”

3.177 Given the passage of time since 1996 and the traumatic events endured in the interim by Mr and Mrs Roberts, including the 2004 TV broadcast, the inquest and the police investigation, I do not assume that their evidence is necessarily always accurate. Dr Steen has suggested that she would have mentioned low sodium and that this might explain how Mr and Mrs Roberts identified a connection when they watched the documentary in 2004. Dr Steen believed furthermore that she would have mentioned low sodium in the context of SIADH rather than by reference to Solution No.18 because that was still a commonly used fluid at that time. However, neither Dr Steen nor Dr Webb made any note as to the advices given and the detail cannot now be recovered.

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399 WS-253-1 p.14
400 090-028-088
401 090-028-088 & WS-138-1 p.50-51 & p.55
402 090-002-057
3.178 Mr and Mrs Roberts were, as a matter of course, entitled to a straightforward explanation from Dr Steen as to the known causes of Claire’s cerebral oedema. At that time all that was understood with any confidence was that hyponatraemia had probably contributed to the swelling of the brain. There is no good evidence that Dr Steen advised Claire’s parents as to the role of hyponatraemia at that or indeed any other time. In the light of Dr Steen’s subsequent failure to advise them as to the role of hyponatraemia, I conclude, on the balance of probabilities, that Mr and Mrs Roberts were not given an adequate or proper explanation as to what was known about the causes of Claire’s death on 23rd October.

**Involvement of the Coroner's Office**

**The legal duty to report**

3.179 Claire’s death was not referred to the Coroner. The Coroner’s office was not notified of Claire’s death until 2005. The relevant legislation in Northern Ireland, both then and now, is section 7 of the Coroner’s Act (Northern Ireland) 1959 which provides that:

“Every medical practitioner... who has reason to believe that the deceased person died, either directly or indirectly, as a result of violence or misadventure or by unfair means, or as a result of negligence or misconduct or malpractice on the part of others, or from any cause other than natural illness or disease for which he had been seen and treated by a registered medical practitioner within twenty eight days prior to his death, or in such circumstances as may require investigation (including death as the result of the administration of an anaesthetic) shall immediately notify the coroner within whose district the body of such deceased person is of the facts and circumstances of the death.”

3.180 The following points emerge from that provision:

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(i) The duty to notify the Coroner is imposed on every medical practitioner and not just the named consultant. Accordingly, in Claire’s case, it extended at the very least to Drs Steen and Webb.

(ii) The death need only relate indirectly to any of the circumstances identified.

(iii) The context for reporting a death includes not only negligence, misconduct or malpractice but also “such circumstances as may require investigation.”

(iv) It is not only the death that is to be reported – but also “the facts and circumstances” of the death.

(v) The report is to be made immediately.

**Decision not to notify Coroner**

3.181 It is necessary to set out the events which seemingly led to the decision not to report Claire’s death to the Coroner.

3.182 By 04:00 on 23rd October, Claire was in reality, already dead. Quite apart from her family, this must have come as a shock to the doctors and nurses who were responsible for her care. It seems to have been completely unexpected – after all Claire had been at school on Monday and was dead by Wednesday. At 14:00 on Tuesday, Dr Webb had considered the option of a CT scan for the following day but had not felt the need to arrange it or an EEG more urgently. Both he and Dr Sands finished their duties by 18:00 and left the hospital in no doubt that Claire would be on Allen Ward the following morning. When Dr Steen and Dr Webb came into PICU in the early hours of 23rd October, they must have been asking how this could possibly have happened, whether there were matters to be investigated and whether or not her death raised questions about the care she had received on Allen Ward.
Instead, Dr Steen’s evidence was that she was able to form so clear and confident a view as to the cause of Claire’s death that she did not think it appropriate to contact the Coroner’s office. Both she and Dr Webb conceded in their oral evidence that with hindsight they should have called the Coroner. I entirely agree that they should have but I do not accept that this is only apparent with the benefit of hindsight. There was not a single witness to the Inquiry who supported their decision not to contact the Coroner about Claire’s death.

The decision is so questionable that it raises issues about the bona fides of Dr Steen in particular, but also of Dr Webb and others, because of their responsibility under Section 7. The Roberts family has come to believe that Claire’s death was not notified to the Coroner in order to conceal the inadequacy of her treatment and the responsibility of the Trust for her death. If they are wrong, what was it in 1996, which allowed the doctors to think it unnecessary to contact the Coroner?

Dr Steen’s evidence is that, in October 1996, she knew nothing about the death of Adam Strain in 1995 or anything about the outcome of his inquest four months before. Whilst this is very hard to believe, the shocking possibility remains that it may be true. If it is, it confirms that what happened in Adam’s case was largely ignored in the Children’s Hospital with the result that lessons were not learned beyond an extremely small group of people. Whilst it is to be recognised that there are obvious differences between Adam’s case and Claire’s, there were nonetheless sufficient lessons to be drawn in relation to the causation and early treatment of hyponatraemia in children to make it relevant for those caring for Claire.

On the morning of October 23rd, Dr Steen knew that Claire had suffered acute hyponatraemia and that this had been a contributory factor in the fatal cerebral oedema. Subsequently and with the benefit of hindsight,
consultants and experts have expressed a range of opinion about what else may have been wrong with Claire but it is beyond dispute that hyponatraemia was identifiable and indeed identified on 23rd October as a factor in her death. The record contains Dr Stewart’s query at 23:30, 22nd October about “Hyponatraemia - ?Fluid overload [with] low Na fluids. ?SIADH,” and Dr Steen noted Claire’s hyponatraemia and fluid therapy at 04:00 on 23rd October as “na + 121; fluids restricted to 2/3rd maintenance.”

3.187 Whilst Dr Steen was alert to the possibility of an excess infusion of hypotonic fluids, she could not then have formed any definite opinion in this regard. Indeed, the debate about the volume of fluid actually given Claire became very protracted and intense at the public hearings. I consider, that the conclusion to be drawn from the evidence is that there was indeed an excess of fluid, which on its own may not have been significant, but which became dangerous because Claire may have had SIADH causing retention of the fluids given intravenously.

3.188 SIADH was in the circumstances a matter for Dr Steen’s consideration. It was a well-recognised medical complication arising when particular conditions affect the normal release of ADH. Such conditions include, amongst other things, infection, pain, stress and nausea. In such cases, a syndrome of inappropriate ADH can develop causing the kidneys to stop releasing fluids as normal resulting in a retention of fluids. In such a situation the infusion of low sodium IV fluids can only add to the volume of fluids retained and reduce the levels of sodium by dilution.

3.189 The consequence of not monitoring Claire’s serum sodium levels, not understanding her fluid balance and not re-assessing her fluid regime was to permit the development of dilutional hyponatraemia. Even if Dr Steen did not arrive at such a conclusion at that time, she knew enough about the cerebral oedema and sodium levels and sufficient of the uncertainties and

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408 090-022-056 (for accuracy of transcription see WS-141-1 p.3)
409 090-022-057
possibilities to understand that further investigation was most certainly indicated.

3.190 Further, and even if it is correct that Dr Steen was entirely unaware of Adam’s death, Dr Webb was not. He had formally confirmed brain stem death in Adam on two occasions and clearly understood the connection between dilutional hyponatraemia and cerebral oedema. He had read Adam’s notes and provided the Coroner with a statement for inquest. Whilst he claimed to have “no knowledge of the inquest findings in the case of Adam Strain.” I found it hard to believe him. He appeared intent on distancing himself from Adam’s case. He said that he doubted that he had received Dr George Murnaghan’s letter asking him for his statement about Adam or that he received a written request to attend the pre-inquest consultation or that a copy of Adam’s post-mortem report was sent him or that he was asked for additional comment in relation to the ongoing medical negligence claim. I found this implausible.

3.191 Accordingly, I believe Claire’s death must have come as a clear reminder to him of dilutional hyponatraemia, even if the cause was different. In his evidence, he suggested that in 1996 he did not realise that Claire had received excessive fluid. However, he had read the notes querying fluid overload and his own entry in the notes reveals a clear understanding of the underlying processes, namely “SIADH, hyponatraemia, hypoosmolarity; cerebral oedema+coning following prolonged epileptic seizure.”

3.192 Just as Dr Webb sought to distance himself from any knowledge of Adam’s case, he distanced himself from the decision not to refer Claire’s death to the Coroner. On these issues, his evidence was likewise unconvincing.
He had made repeated efforts on Tuesday 22nd October to help Claire and had performed both brain stem death tests. Accordingly, it is most improbable that he should avoid discussion about whether the Coroner should be contacted.

3.193 Dr Webb’s treatment of Claire was mostly for status epilepticus. He did not investigate other possibilities and without an EEG could not have been sure about his diagnosis of status epilepticus. By the time he left the hospital on Tuesday evening, he knew that Claire’s response to the drug treatment was negligible. She then died overnight. In such circumstances, Dr Steen’s conclusion that his unconfirmed diagnosis of status epilepticus was sufficiently evidenced as to leave nothing to raise with the Coroner is extraordinary and Dr Webb’s failure to question it remarkable.

3.194 Neither Dr Webb nor Dr Steen addressed Claire’s wholly unexpected deterioration from admission to collapse and both ignored the need to fully understand the mechanism whereby hyponatraemia might have developed. Neither seem to have questioned why there was no response to the treatment given and whether this might not indicate that the diagnosis was wrong. They seemingly failed to note or perhaps ignored the failings in the fluid therapy and the failing to repeat the blood test, either of which should have prompted referral to the Coroner. They also completely ignored, or failed to recognise, the lack of consultant input after Dr Webb’s departure, the lack of medical attendance after Dr Stewart’s intervention and the drug overdoses.

3.195 Dr Webb knew enough about Claire’s case at that time to recognise that there may have been a problem in relation to her fluid and electrolyte management and to have appreciated that he could not explain with any confidence the cause of her SIADH. His failure in these circumstances, to notify the Coroner is hard to explain in professional terms. He was familiar with the process of a Coroner’s inquest and had a duty under the legislation. On the balance of probabilities, I am forced to the conclusion

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420 WS-138-1 p.47
that he did not refer Claire’s death to the Coroner because of a reluctance to draw attention to possible failings in her treatment.

3.196 Drs Steen and Webb were wrong not to refer the death to the Coroner. Their decision was a breach of both statutory obligation and professional duty. It was, even by the standards of 1996, a gross error of judgement. Their reasons were hopelessly inadequate, their decision reached without proper reflection, and their evidence unconvincing.

**Involvement of Dr McKaigue**

3.197 One of those who treated Claire in PICU was Dr James McKaigue. On the night of 22\textsuperscript{nd}/23\textsuperscript{rd} October, he was the on-call consultant paediatric anaesthetist and was contacted about Claire’s condition. He examined Claire and reviewed her history. He noted at 07:10 that Claire’s serum sodium was 121mmol/L “presumably on basis of SIADH” and that the “CT scan shows severe cerebral oedema.”

3.198 Dr McKaigue claimed to have initiated a discussion about whether the Coroner should be informed or whether a death certificate could issue. It is to be recalled that he had an understanding of hyponatraemia, having been involved in Adam’s case. However, Claire’s case was different because she was thought to have encephalitis and status epilepticus in addition to hyponatraemia. These were indeed matters to be discussed and I accept that these conditions should have featured in any debate, but I do not accept that these diagnoses could have been accepted with any confidence at that time. In such circumstances, he should have ensured that Claire’s death was reported to the Coroner.

3.199 However, Dr McKaigue concluded that the cause of Claire’s death was known and had occurred naturally. He believed that she had status

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421 310-003-003
422 090-022-058-060
423 He was also one of the joint authors of the RGHT statement submitted to the coroner at Adam Strain’s inquest and made “having regard to the information in the paper by Arieff et al (BMJ 1992)” (011-014-107a & 060-014-025)
epilepticus and encephalitis and explained that Dr Steen had told him that these could bring on SIADH which could in turn cause cerebral oedema.\textsuperscript{424} For that reason he sensed no "red flags" indicating any necessity to notify Claire’s death to the Coroner. His approach ignored both the uncertainties and the very much more obvious conclusion that the cerebral oedema was caused by the hyponatraemia in the presence of SIADH and the administration of hypotonic solution and was therefore a death which could have been prevented.

3.200 Dr McKaigue’s position was further undermined by his own entry in the ‘PICU Coding Form’. There he made reference to hyponatraemia but not to status epilepticus or encephalitis.\textsuperscript{425} In all the circumstances, I consider that Dr McKaigue failed in his duty to ensure that Claire’s death was reported to the Coroner.

\textbf{Involvement of Dr Robert Taylor}

3.201 Dr Robert Taylor\textsuperscript{426} saw Claire in PICU at approximately 10:00 on 23\textsuperscript{rd} October. He had more cause than most to be alert to the issues of dilutional hyponatraemia. Only four months had passed since the Coroner had conducted the inquest into the death of Adam Strain and Dr Taylor had signed a statement on behalf of the Trust “having regard to the information in the paper by Arieff et al (BMJ 1992).”\textsuperscript{427}

3.202 He noted that Claire “appears BS Dead informally. But only 7 hours post arrest. Na+129 (from 121).”\textsuperscript{428} He may therefore be taken to have read the preceding entries in Claire’s medical notes and understood that hyponatraemia was probably responsible for the cerebral oedema and that issues of SIADH, fluid overload and fluid therapy were referenced. I find it hard to understand how he could not have wondered whether fluid and

\textsuperscript{424} Dr McKaigue T-17-10-12 p.220
\textsuperscript{425} 090-055-203
\textsuperscript{426} 310-003-004
\textsuperscript{427} 011-014-107a
\textsuperscript{428} 090-022-061
electrolyte therapy had been correctly managed and whether notification to the Coroner was appropriate. Dr Taylor had no explanation beyond saying that it “... didn’t strike a chord.” I find that he too failed in his duty to notify the Coroner.

**Certifying the cause of death**

3.203 Dr Steen indicated that “Once the serum sodium result of 121 was known, hyponatraemia would have been considered as a contributory factor in the cerebral oedema.” However, when she completed the Medical Certificate of Cause of Death on 23rd October she certified that death was due to cerebral oedema secondary to status epilepticus. This was despite the fact that the diagnosis of status epilepticus was unconfirmed in the absence of an EEG test. Furthermore, Dr Steen’s evidence that she did not include viral encephalitis in the death certificate because it was unconfirmed only serves to emphasise the illogicality of her citing status epilepticus as a cause of death when it too was unconfirmed. The only confirmed diagnosis at that time was hyponatraemia but that, she specifically omitted from the death certificate.

3.204 Furthermore, and even if it had been appropriate to issue a Medical Certificate of Cause of Death, which it was not, Dr Steen may not have been qualified to sign it because she had not been directly involved in Claire’s care and accordingly lacked the necessary credentials.

3.205 Mr and Mrs Roberts were thus denied timely coronial investigation into Claire’s death and their suspicion of cover-up cannot be regarded as unreasonable. This made matters even worse for them.

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429 Dr Taylor T-11-12-12p.77 line16
430 WS-143-1 p.79
431 090-022-061
432 Dr Steen T-17-10-12 p.225 line 6
433 Article 25 of the Births and Deaths, Registration (Northern Ireland) Order 1976.
Brain only autopsy

Consent

3.206 On the evening of 23rd October, after the ‘Diagnosis of Brain Death’ form was completed but before Claire’s ventilation was discontinued, Dr Steen met with Mr and Mrs Roberts. She obtained their consent for a limited hospital post-mortem examination of Claire. The consent was signed by Mr Roberts and authorised a post-mortem examination restricted to the brain alone. This confirmed, in effect, that Claire’s death was not to be referred to the Coroner. Mr and Mrs Roberts are confident that Dr Steen told them at that time that a virus had caused a build-up of fluid on the brain and that the autopsy might identify the virus responsible. There was no mention of hyponatraemia.

3.207 The process of giving and taking a consent for post-mortem must be heart-rending and difficult but it was important that Mr and Mrs Roberts were given enough information to understand why the autopsy and its limitation were necessary and why the death did not need to be referred to the Coroner.

3.208 Mr Roberts recalls that he did not request any limitation to the post-mortem but that this was recommended by Dr Steen, who “stated that there would be no need for an Inquest but the Hospital needed to carry out a brain only post-mortem.” He described his “understanding at that time was that doctors were aware of the reasons for Claire’s death, Dr Steen had explained that a virus had caused the fluid build-up around Claire’s brain. If I had been informed that there was any unknown or uncertainty regarding the cause of death then I would have consented to an Inquest.” He said there were no discussions regarding the option of a full post-mortem.

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434 090-022-061
435 090-054-185
436 WS-253-1 p.15
437 WS-253-1 p.15
438 WS-253-1 p.15
439 WS-253-1 p.15
3.209 Dr Steen stated that she has “no recollection of events but would assume I hoped to... determine if encephalitis was present... determine an underlying cause for seizures and developmental delay...”\textsuperscript{440} Again, she made no record of the conversation or the reasons given.

3.210 Mr and Mrs Roberts were very clear in their evidence that nothing was said about the possibility of the post-mortem providing an explanation for Claire’s developmental delay. They stated that they would have wanted to know and it was definitely not raised.\textsuperscript{441}

3.211 Dr Steen advised that a limited post-mortem is most usually indicated when particular organs only are involved in the disease process and additional information as to cause of death, or underlying disorders, is to be obtained by examining those organs.\textsuperscript{442} Accordingly, she said a post-mortem of the brain alone was appropriate in this case because the only additional benefit of a full post-mortem might have been the identification of an enterovirus\textsuperscript{443} from the content of the gut.\textsuperscript{444}

3.212 I consider that a full post-mortem must not only allow positive identification of some factors but also the positive exclusion of others. Additionally, it might from the perspective of Dr Steen, have identified other non-brain related factors implicated in the suspected SIADH. A restriction of examination is a restriction of the potential for information. It seems that the Pathology Service was not consulted as to the limitation imposed upon the post-mortem.\textsuperscript{445} It was to subsequently note the consequence of limitation, stating that because “as this was a brain only autopsy it is not possible to comment on other systemic pathology”\textsuperscript{446}

3.213 Dr Webb was unable to recall his input into the decision to limit the autopsy but stated that “I believe I would have expected her post-mortem to have
been a full post-mortem." I share this view in light of the lack of certainty surrounding Claire’s diagnoses at that time and the necessity to understand the reasons for her rapid and unexpected deterioration.

3.214 The advices given to Mr and Mrs Roberts were not recorded and the justification for pursuing a restricted hospital post-mortem was not documented. There was however no guidance to assist in this very important process. It is far from certain that Mr and Mrs Roberts were given sufficient information to allow them to give a fully considered consent to the post-mortem. That is regrettable.

3.215 That Dr Webb did not engage more in this process is surprising given both his involvement and his expectation that a full post-mortem might have been necessary. Yet again, he distanced himself and allowed Dr Steen to pursue her own course.

‘Autopsy Request Form’

3.216 Dr Steen completed and signed the ‘Autopsy Request Form’ to be sent to the pathologist. It names the consultant as “Dr Webb/Dr Steen” and cites a clinical diagnosis of “cerebral oedema 2 to status epilepticus ? underlying encephalitis.” Dr Steen listed the clinical problems in order of importance as:

“1 Cerebral oedema.
2 Status epilepticus.
3 Inappropriate ADH secretion.
4 ? viral encephalitis.”

3.217 Under “history of present illness”, Dr Steen wrote:

“Well until 72 hours before admission. Cousin had vomiting and diarrhoea. She had a few loose stools and then 24 hours prior to admission started to vomit. Speech became slurred and she became increasingly drowsy. Felt

3.218 In the “past medical history” section she stated:

“Mental handicap
Seizures from 6 months – 4 years.”

3.219 There was some criticism as to the accuracy of this undated form as completed by Dr Steen. It omits all reference to the treatment with midazolam (whether miscalculated or not) and remains silent as to the clinical diagnosis of hyponatraemia which was then thought a contributory factor to the cerebral oedema. Whilst the form does refer to sodium levels, suspected secretion of inappropriate ADH and restriction of fluids it fails to list hyponatraemia as a clinical problem or diagnosis. This is odd given the entries in the record made by Drs Stewart and Webb which both clearly cite hyponatraemia and the ‘Case Note Discharge Summary’ issued by PICU which recorded Claire’s death with a diagnosis including hyponatraemia.

3.220 My greater concern is that I believe that the form actually betrays the uncertainty that the consultants must have shared about the cause of death. Not only does it differ from the Death Certificate by including the clinical diagnosis of “? Underlying encephalitis” but it expresses it in terms of a query. This uncertainty should have led to something more substantial than a request for a brain-only autopsy. It should, as a matter of course, have led to the Coroner. Again Dr Webb’s failure to involve himself in this
administrative process is as striking as Dr Steen’s single-handed control of it.

**Autopsy**

3.221 The autopsy of the brain alone was carried out on 24th October by Dr Brian Herron\(^{453}\) who was then a senior registrar in neuropathology. The brain was cut on 28th November 1996 and the slides examined in January 1997. The final autopsy report was completed on 11th February 1997.\(^{454}\) In relation to matters arising from the autopsy, the expert evidence of Dr Waney Squier, Professor Brian Harding and Professor Sebastian Lucas was received.

3.222 In October 1996, the Neuropathology Service in Belfast comprised a team of three. It was headed by Dame Professor Ingrid Allen who was a leading figure in neuropathology within the United Kingdom and in addition to Dr Brian Herron, included at consultant level Dr Meenakshi Mirakhur.\(^{455}\) The service provided by these three specialists had been accredited in February 1996,\(^{456}\) a process which involved review of the Neuropathology Service to ensure that it met the standards of the time.

3.223 As the evidence unfolded from Drs Herron and Mirakhur and the three Inquiry experts, it became clear that the differences between them were limited. It is fair to acknowledge that the independent experts had significantly more time and opportunity to explore the issues in Claire’s case than Drs Herron and Mirakhur had in 1996/7 when they were working in a hard-pressed service.

3.224 At the outset, they agreed that the purpose of an autopsy is to identify the cause of death. To that end, new cases are conventionally discussed by the neuropathology team who both welcome and expect discussion with the

\(^{453}\) 310-003-004  
\(^{454}\) 090-003-003 (there is some question about this being the final report – it is neither signed or dated but for present purposes I will regard it as the final report).  
\(^{455}\) 310-003-004  
\(^{456}\) Dr Mirakhur T-30-11-12 p.24 line 9
clinical team. This can be useful before and after a post-mortem in order to help formulate opinion. In some cases, a draft autopsy report will be issued for discussion, to be finalised after clinical input.457

3.225 After a final report, there were then two further opportunities to discuss the case, namely:

(i) The grand round which focussed on the learning and training issues emerging from cases such as Claire’s. This would have been attended by the core neuroscience group including the pathologists and radiologists.458

(ii) The audit/mortality meeting conducted by the paediatricians but which the pathologists might also attend. At such meetings, a number of cases were discussed. In the mid-1990s, such meetings were un-minuted at the behest of medical insurers who did not wish discussions to be recorded lest their insured be compromised.459

The significance of such discussions was the opportunity for those involved to question and probe how a disease or condition had developed, how a child was treated, how a death occurred and how things might be done better or differently in the future.

3.226 As outlined above, Dr Steen’s ‘Autopsy Request Form’ identified four clinical problems.460 The evidence indicated the following in relation to each:

(i) Cerebral oedema – this was clear to Drs Herron and Mirakhur and was confirmed by the Inquiry experts.461
(ii) Status epilepticus - the pathologists could make no finding because there was no EEG confirmation. The identification of status epilepticus was a matter for clinicians and not pathologists.

(iii) Inappropriate ADH secretion – it was agreed in evidence that this could neither be proved or disproved at post-mortem even if it is a plausible diagnosis in the light of the cerebral oedema and hyponatraemia.462

(iv) Viral encephalitis - Drs Herron and Mirakhur thought that there was mild inflammation of the brain perhaps justifying a 1 - 2 on a notional scale of 1 - 10.463 Such would indicate that there was some evidence of encephalitis, but only that. On looking at the same slides, Dr Squier and Professor Harding could not see this evidence at all. In any event, Drs Herron and Mirakhur agreed that for encephalitis to be identified as a factor contributing in any way to Claire’s death, it would have to reach a minimum of 5 on such a scale.464 Since it did not do so, the effective result of the post-mortem was that encephalitis could not be confirmed as a cause of Claire’s death.

3.227 In short, the only certain finding after the post-mortem was that Claire had cerebral oedema and hyponatraemia but this was already known. None of the three other clinical issues suggested by Dr Steen was established. In effect, the importance of the post-mortem was to exclude encephalitis as a cause of Claire’s cerebral oedema. Unfortunately, the autopsy report as it was eventually drafted did not exclude encephalitis but allowed it as a possible diagnosis.

**Autopsy report**

3.228 Regrettably, the autopsy report465 repeats some of the factual error originating from Dr Steen’s ‘Autopsy Request Form’, illustrating how easy it...
is for a wrongly stated ‘fact’ to become validated by the process of repetition. It also introduced fresh error. Mr Roberts has indicated that the summary in Claire’s autopsy report is inaccurate in that:

(i) It was wrong to state Claire was well until 72 hours before admission because she was well when she went to school on 21st October and it was only thereafter that she was noted to be unwell.  

(ii) Claire’s cousin had a slight tummy upset, not the vomiting and diarrhoea as stated.  

(iii) Claire did not have the same symptoms as her cousin nor the history of recent diarrhoea as noted. She did have one loose bowel movement but that was on the Friday.  

(iv) Claire did not start to vomit 24 hours before admission; in fact, she did not start to vomit until 21st October.  

(v) Claire did not have any seizures on 20th October.  

Nor, it should be emphasised, did Claire have the “h/o epileptic seizures since 10 months of age” as stated. Dr Squier was concerned with the comment that Claire had “iatrogenic epilepsy since 10 months” as there was no evidence that the she suffered any convulsions after the age of four (and her convulsions began at six months, not ten). In addition, obvious error appears in the autopsy report revealing how little attention can have been paid to Claire’s medical chart. For example, the dates of admission and time of death are both incorrectly stated and no reference is made to Claire’s medication with midazolam.
3.230 Given that the autopsy was performed, in Dr Herron’s words - “to address the presence or absence of status epilepticus and encephalitis”\textsuperscript{474} the erroneous introduction of an incorrect clinical history of diarrhoea and epilepsy is of concern. There can have been no check of the medical records against the ‘Autopsy Report Form’ and no discussion with the clinicians. It must be the responsibility of pathologists to gain familiarity with the case, satisfy themselves as to the information supplied and to seek assistance if necessary. Further, it should be the duty of the person preparing the report to sign it in order to confirm finality and authorship.\textsuperscript{475}

3.231 The important part of the report is headed “comment” and states “In summary, the features here are those of cerebral oedema with neuronal migrational defect and a low grade subacute meninoencephalitis [sic]. No other discrete lesion has been identified to explain epileptic seizures. The reaction in the meninges and cortex is suggestive of a viral aetiology, though some viral studies were negative during life and on post-mortem CSF. With the clinical history of diarrhoea and vomiting, this is a possibility though a metabolic cause cannot be entirely excluded. As this was a brain only autopsy, it is not possible to comment on other systemic pathology in the general organs. No other structural lesion in the brain like corpus callosal or other malformations were identified.”\textsuperscript{476}

3.232 In the absence of any meaningful discussion between pathologist and clinician, the reference to “low grade subacute menin[g]oencephalitis” is susceptible to misinterpretation. Drs Herron and Mirakhur were clear in their evidence that even on their interpretation of the results; they could not say that Claire had encephalitis, much less that it contributed to her death.\textsuperscript{477} The Inquiry experts queried whether there was any evidence of encephalitis at all and are firm in their view that it definitely did not contribute

\textsuperscript{474} WS-224-1 p.7
\textsuperscript{475} 236-007-056
\textsuperscript{476} 090-003-005
\textsuperscript{477} Dr Mirakhur T-30-11-12 p.138 line 18 & Dr Heron T-29-11-12 p.146 line 3
to death. Professor Lucas’s interpretation of “low grade” was that it meant that it was not at all clear that encephalitis was present in Claire’s brain.478

3.233 The question has arisen as to whether Drs Herron and Mirakhur drafted their autopsy report to obscure rather than inform. It would appear that:

(i) They introduced erroneous clinical information into their Report suggesting a possible viral aetiology.

(ii) They produced a potentially misleading conclusion by way of comment suggestive of encephalitis.

(iii) They do not appear to have carried out the usual tests for the diagnosis of encephalitis.

(iv) They did not attempt to explain the causation of the cerebral oedema or to have sought specialist opinion in that regard.

(v) They do not appear to have read the medical chart or taken any steps to satisfy themselves as to the information they were given.

(vi) They do not appear to have asked for discussion or clarification at any time to ensure that a full and accurate account had been obtained.

(vii) They failed to take any steps to review the case with the clinicians in the light of their examination.

(viii) They were slow to produce the Report, denying it the topicality which might have made audit more likely.

(ix) They failed to sign the Report.

(x) They experienced difficulty in attributing authorship of the report as and between themselves.

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478 239-002-012
(xi) They failed to send a copy of the Report to the family GP.

(xii) Notwithstanding their uncertainty as to the cause of an unexpected child death, they did not refer the matter to the Coroner.

3.234 Whilst their report does not compare favourably with that produced by Dr Armour in Adam Strain’s rather more complex case, it must be acknowledged that none of the Experts doubted their motivation. Whilst mild criticism was expressed about shortcomings in the autopsy report, Professor Lucas considered that the report broadly followed the 1993 Royal College of Pathologists Guidelines for Post-Mortem Reports. He did however; identify the lack of clinico-pathological correlation as a major shortcoming and the one which would have allowed the further discussion and review which was so very necessary.

**Clinico-pathological discussion and audit presentation**

3.235 All the pathology witnesses agreed that after the preparation of a preliminary report, it is important for the pathologist and the clinicians to meet, especially in a case such as Claire’s where only limited insight has been gained into the cause of death. Unless and until there is such a meeting, it is unlikely that there can be any satisfactory explanation as to causation such as might be given the parents.

3.236 The consensus of expert opinion was, that at that time and on the basis of what was known and the low sodium reading, the only conclusion that could have been reached with any confidence was that Claire had suffered hyponatraemia and that had caused her cerebral oedema. Beyond that there was no clear explanation as to the cause of death, save to say that it was not encephalitis. Nor could the pathologists confirm that the cause was SIADH, although that was a plausible cause of the hyponatraemia.

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479 303-001-001
480 306-072-001
481 Dr Herron T-29-11-12 p.17 line 2 & Dr Mirakhur T-30-11-12 p.44 line 7
Professor Harding also believed that one could suggest some form of encephalopathy but not much more.482

3.237 In such circumstances, it is striking that the clinicians do not appear to have made any response whatsoever in follow-up to the autopsy report. I was told that the report was sent to both Drs Steen and Webb but neither pathologist could remember any contact from these doctors afterwards. What happened instead was that Dr Steen wrote to the family GP and Dr Webb wrote to Mr and Mrs Roberts. The autopsy report was sent to neither.

3.238 In this context it should be stated that Dr McKaigue recalled Dr Steen presenting Claire’s case for discussion at an audit meeting but could not remember any lessons being learned. Nor could he recall who was there or whether the autopsy report was available.483 Whilst this may be accurate, it may also be quite mistaken because Drs O’Hare,484 Webb,485 Sands,486 and Bartholome487 could not remember and Dr Steen could not help on the issue.488 If such a meeting was held, it cannot possibly have been with either Dr Mirakhur or Dr Herron in attendance, because either of them could have corrected the impression given by their autopsy report that encephalitis had contributed to Claire’s death. If Dr Steen did make an audit presentation and nothing was learned, one has to question the value of such a meeting. There is no other evidence that Claire’s case was subject to audit or review and correspondence from the Directorate of Legal Services (‘DLS’) suggests that no such meeting took place.489

3.239 I can only conclude that these responses to Claire’s death reveal, even on the most charitable interpretation, a want of curiosity about why Claire died

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482 Professor Harding T-05-12-12 p.167 line 8
483 Dr McKaigue T-12-12-12 p.40 line 4
484 Dr O’Hare T-18-10-12 p.184 line 19
485 Dr Webb T-03-12-12 p.273 line 23
486 Dr Sands T-18-12-12 p.151 line 1
487 Dr Bartholome T-18-10-12 p.97 line 23
488 Dr Steen T-17-12-12 p.15 line 4
489 302-075b-001. Dr McKaigue’s claim echoes his “vague memory that Dr Hanrahan presented Lucy Crawford’s case at an audit meeting” (WS-302-3 p.3) which proved unfounded. (Dr Hanrahan T-05-06-13 p.225 line 13 et seq)
and a lack of determination to identify the cause of her death and discover if things could be improved for the future.

**Correspondence relating to autopsy report**

3.240 Dr Steen wrote on 6th March 1997 to the Roberts family GP as follows:

“Claire’s post-mortem results are now available. The cerebral tissue showed abnormal neuronal migration, a problem which occurs usually during the second trimester of pregnancy and would explain Claire’s learning difficulties. Other changes were in keeping with a viral encephalomyelitis meningitis. Doctor Webb and myself have since seen Claire’s parents and discussed the post-mortem findings with them. They are obviously both finding this an extremely difficult and traumatic time but do not want any further professional counselling at present, however they know our doors [are] open and we will be happy to see them if they want to discuss things further with ourselves. Mr Roberts wanted a short summary of the post-mortem report which Dr Webb will send to him shortly. If there are any concerns at all please do not hesitate to contact us.”

3.241 Dr Webb wrote on 21st March 1997 to Mr and Mrs Roberts as follows:

“My sincere condolences after the loss of your daughter Claire. In summary the findings were of swelling of the brain with evidence of a developmental brain abnormality (neuronal migration defect) and a low grade infection (meningoencephalitis). The reaction in the covering of the brain (meninges) and the brain itself (cortex) is suggestive of a viral cause. The clinical history of diarrhoea and vomiting would be in keeping with that. As this was a brain only autopsy it is not possible to comment on other abnormalities in the general organs. No other structural abnormality in the brain has been identified.”

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490 090-002-002
491 090-001-001
3.242 Both letters suggest that Claire’s death was caused by encephalitis. Such a suggestion is a misleading interpretation of the autopsy report and on the evidence before me is clearly wrong. Any discussion between the doctors and the pathologists would have confirmed that. Furthermore, status epilepticus, which is the only entry apart from cerebral oedema on the death certificate issued by Dr Steen, is entirely omitted from these explanations given to the family and their GP. This suggests that, rather than add their clinical expertise and assessment to the information provided by the pathologists, Drs Steen and Webb decided to abandon their previous analysis in order to rely solely on a highly suspect interpretation of the post-mortem report. Their letters make absolutely no reference to hyponatraemia nor how it may have played a part in Claire’s death. In addition, for Drs Steen and Webb to so pointedly omit all reference to those expressions of uncertainty contained in the autopsy report suggests that they were keenly aware of those issues. Again, this was an opportunity to report Claire’s death to the Coroner and for that very reason. Again, these doctors failed in their duty.

Meeting with Mr and Mrs Roberts

3.243 Drs Steen and Webb met Mr and Mrs Roberts in March 1997 after the autopsy report had been released. The report was not shared with them. Mr Roberts recalled being told that Claire’s death had been caused by a virus but that it could not be said which.\textsuperscript{492} Mrs Roberts recalls leaving the meeting deflated because they still knew so little and could not understand how a virus could have taken Claire so quickly.\textsuperscript{493} It was, however, a source of comfort to her and her husband that Dr Steen had said that everything possible had been done for Claire.\textsuperscript{494} That was false comfort. No one could possibly look at what happened and say that everything possible had been done.

\textsuperscript{492} WS-253-1 p.17
\textsuperscript{493} Mr and Mrs Roberts T-13-12-12 p.86
\textsuperscript{494} WS-253-1 p.17
If Claire’s parents are correct, they were not properly informed as to the cause of death, the autopsy report was misrepresented and information about hyponatraemia was withheld. There was no record made of the meeting and Dr Steen cannot remember what was said but has stated “I think the low sodium was mentioned to Claire’s family. We didn’t use the word ‘hyponatraemia’ and we don’t particularly now.” I prefer the account given by Mr and Mrs Roberts because it appears consistent with the letters written by Dr Steen and Dr Webb. Mr and Mrs Roberts were denied that which was their right, namely basic information about the reasons for their daughter’s death. Dr Steen and Dr Webb failed in their duty to inform.

**Dr Steen**

The evidence relating to the procedural steps taken after Claire’s death by the doctors in the hospital reveals how Dr Steen in particular appeared to take the lead at each stage. She acted without apparent interference from colleagues or management control. That a lone doctor was able to administratively process an unexpected and problematic death without supervision or second opinion and so shield it from proper inquiry must be a matter for concern.

Dr Steen was able to:

(i) Decide against referring Claire’s death to the Coroner and to enter this decision in the ‘Diagnosis of Brain Death’ form without the formal collaboration of Dr Webb, her co-signatory, or opposition from Drs Webb, McKaigue or Taylor.

(ii) Enter a cause of death in the ‘Medical Certificate of Cause of Death’ without reference to hyponatraemia, which was a known and probable factor in the death and to cite instead the unproven status epilepticus.

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495 Dr Steen T-17-10-12 p.122 line 22
496 090-045-148
(iii) Inform Mr and Mrs Roberts that a virus was the likely cause of Claire's brain swelling, without reference to hyponatraemia or the other matters, which might properly have described the problems in treatment. 497

(iv) Complete the ‘Autopsy Request Form’ so as to communicate an incorrect history of illness, give emphasis to an inaccurate background of viral infection, minimise the period of hospitalisation, omit reference to the overdose of midazolam and fail to list the known hyponatraemia as one of the four main clinical problems. 498

(v) Fail to make any report of the death or the circumstances of death to the paediatric clinical lead, the medical director, the director of nursing or any other governance representative of the Trust.

(vi) Fail to liaise with the pathologists in relation to the autopsy report, whether to correct known error or to clarify opinion.

(vii) Fail to investigate, review or, in all probability, present or discuss Claire's case at a mortality meeting, grand round or other opportunity.

(viii) Fail to review her decision not to refer to the Coroner in the light of the autopsy report and the continuing lack of certainty in relation to cause of death.

(ix) Meet with Mr and Mrs Roberts (with Dr Webb) and fail to explain the true import of the autopsy report and to once again propose a viral cause for death. 499

(x) Write to Mr and Mrs Roberts in similar terms so as to mislead and yet again deny them the information to which they were entitled. 500

497 WS-253-1 p.15
498 090-054-183 to 184
499 WS-253-1 p.17
500 090-004-006
(xi) Fail to keep any note or record detailing what was said to Mr and Mrs Roberts.

3.247 Such singular response to Claire’s death is very hard to explain on any other basis than that Dr Steen set out to conceal what she knew about the likely cause of Claire’s death.

3.248 To that extent, I am persuaded that a ‘cover up’ was attempted by Dr Steen and to the extent indicated above, by Dr Webb. However, I do not consider that the Trust was complicit in any such attempt. Indeed, it is to be noted that Claire’s discharge from PICU was documented as being a death from, amongst other causes, hyponatraemia. That was communicated within days to Claire’s own family GP. Her condition, correctly diagnosed as including hyponatraemia, was clinically coded and recorded by the Trust and made available for reference and research. None of the directors of the Trust had any knowledge of her death. Such circumstances cannot be said to reflect a ‘cover up’ by the Trust.

Events in 2004

Mr and Mrs Roberts seek a meeting

3.249 In 2004, the UTV documentary rekindled Mr and Mrs Roberts’ anguish and their memories of events in the Children’s Hospital. They watched the programme on 21st October. It focussed on hyponatraemia and the deaths of Adam, Lucy and Raychel. They were prompted to ring the Children’s Hospital the next day. They received a return call from Dr Nicola Rooney501 with whom they met on 25th October.

3.250 Dr (now Professor) Rooney is a clinical psychologist who was, in 2004, the Psychology Service Manager in the Royal Group of Hospitals. It had been decided in advance of the broadcast that she would take the lead in responding to any enquiries generated by the programme. This was a helpful and well-conceived plan. It ensured that families who made contact

501 310-023-003
had an experienced and senior professional available to them. She, in turn, had the standing within the Trust to help families gain the information they needed. She also had significant experience in working with bereaved parents.502

3.251 Dr Rooney made a note of their meeting on 25th October which, it has been agreed, is accurate.503 It records that Mr and Mrs Roberts outlined the circumstances of Claire’s admission to the hospital and her death. Dr Rooney was struck by their description of how they had gone home on the Tuesday evening, thinking that Claire’s worst day was over, only to receive the completely unexpected call from the hospital at about 03:30 on Wednesday morning.504

3.252 She said, “alarm bells rang for me when they said that they had left” because she recognised that Mr and Mrs Roberts were not parents who would have left their daughter had they known how serious her condition was.505

3.253 Dr Rooney’s plan to follow up on the meeting was set out in her contemporaneous note:

“? Deterioration - ? Misdiagnosed

? Role of fluid management in her deterioration

Action: I will order Medical Notes✓

Discuss with M.McBride and H.Steen✓

Do PT journey✓

? Fluid mgt

Will liaise with Mr & Mrs Roberts.”506

502 WS-177-1 p.5
503 WS-177-1 p.14-17
504 Dr Rooney T-13-12-12 p.15 line 21
505 Dr Rooney T-13-12-12 p.15 line 21
506 WS-177-1 p.17
Involvement of Professor Young

3.254 Dr Rooney proceeded to brief Dr Michael McBride, the Medical Director. He in turn emailed Dr Steen and asked her to review the notes with the proviso that “If there is any reason to suggest that fluid and electrolyte management may have been a factor in this case, then I would suggest that you ask Peter Crean as the Clinical Governance Lead, Prof Ian Young, Elaine and Brenda Creaney to carry out a case note review to determine whether this case needs to be referred to the Coroner.”

3.255 Dr McBride’s suggestion that a multi-disciplinary group perform a case note review was both sensible and timely. In the event, it seems Dr Steen did not involve those individuals but enlisted Dr Sands to assist. Dr McBride did not pursue his proposal for more formalised review but requested that Professor Ian Young, Consultant in Clinical Biochemistry, review the records and advise as to whether hyponatraemia and fluid balance could have played a part in Claire’s death. Professor Young held joint appointments as an academic at Queen’s University, Belfast and as a clinician with the Royal Group of Hospitals Trust (‘RGHT’). He was eminently well-qualified to advise on this issue having significant expertise in hyponatraemia.

3.256 An issue arose about Professor Young’s independence because he was described to Mr and Mrs Roberts as being independent of the Trust. That was not correct in the sense that a person who is employed by a Trust cannot be regarded as being independent of that Trust. However, Professor Young was independent in the sense that he had no engagement with the Children’s Hospital, had not been involved in Claire’s care and had no previous involvement with the clinical team.
More importantly, he demonstrated his independence at that stage by advising Dr McBride that hyponatraemia may have made a significant contribution to Claire’s death.\textsuperscript{513} He said that it did not take him long, maybe not even an hour, to reach this conclusion having reviewed the notes.\textsuperscript{514}

On 6\textsuperscript{th} December 2004, there was an 08:30 meeting between Dr McBride, Professor Young and Dr Rooney to discuss the role of fluid management in Claire’s death.\textsuperscript{515} By that stage, Dr McBride had read Claire’s medical records.\textsuperscript{516} Later, at 14:00, Professor Young and Dr Rooney met Dr Steen. Professor Young gave Dr Steen his opinion. He reported that her views on fluid management were rather different to his and that she would only acknowledge as a possibility the relevance of hyponatraemia. She maintained that status epilepticus and viral encephalitis were more likely to have been the significant causes.\textsuperscript{517} At that point, the only option was to finally notify the Coroner of Claire’s death. That step was however, delayed until they could speak with Mr and Mrs Roberts.

\textit{Meeting with Mr and Mrs Roberts}

On 7\textsuperscript{th} December, a meeting was arranged for Mr and Mrs Roberts with Drs Steen, Sands and Rooney, and Professor Young. I make the following points about that meeting:

(i) Professor Young said that he would have preferred to have met the Roberts family alone. That was because his role was limited to the issues of fluid management and the question of whether hyponatraemia was a factor in Claire’s death. He was to have no input into discussions about Claire’s “clinical journey.”\textsuperscript{518}

(ii) It appears that a view was taken, that on balance, it might be better for Claire’s parents to have a single stressful meeting with Professor
Young and the treating clinicians rather than separate stressful meetings.\textsuperscript{519} I accept the legitimacy of that view.

(iii) There is no reference in the minute of the meeting to the drug overdoses or the content of the medical record or autopsy report.\textsuperscript{520} Nor was any reference made to the inconsistency between Dr Steen’s ‘Medical Certificate of Cause of Death’ citing status epilepticus and the letters from Drs Steen and Webb suggesting a viral cause for the death.

(iv) There was no governance representation by or on behalf of Dr McBride or Dr Peter Crean,\textsuperscript{521} the Clinical Governance Lead.

However, my main concern about the meeting is that there was no acknowledgement of any of the very many failings in care. In advance of the meeting, Dr Steen had taken time to prepare a document detailing Claire’s treatment. That suggests that she had reviewed Claire’s case and looked at it afresh. Any analysis of Claire’s treatment would have revealed that she was not seen by a doctor between 23:30 on 22\textsuperscript{nd} October and 03:00 on 23\textsuperscript{rd} October. That was not mentioned to Mr and Mrs Roberts on 7\textsuperscript{th} December 2004 any more than it was mentioned to them on 23\textsuperscript{rd} October 1996. Moreover, whilst Dr Steen was able to tell this Inquiry that “the minute we looked back at the case in 2004, in light of what we knew by 2004, it became very obvious that fluid mismanagement was a contributory factor to her underlying condition,”\textsuperscript{522} there was no acknowledgment at the meeting that Claire should have had a repeat blood test on the morning of 23\textsuperscript{rd} October, even though Professor Young was already of the opinion that the “monitoring of serum electrolytes did not occur with sufficient frequency given the severity of Claire’s clinical condition.”\textsuperscript{523} Dr Steen persisted with her explanation that “viruses known as enterovirus can enter the body via

\textsuperscript{519} Professor Young T-10-12-12 p.71 line 15
\textsuperscript{520} 089-002-002
\textsuperscript{521} 310-023-002
\textsuperscript{522} Dr Steen T-17-10-12 p.143 line 15
\textsuperscript{523} WS-178-1 p.6
the stomach and then cause swelling of the brain.” Furthermore, it was not even conceded (as queried by Claire’s parents) that they should have been alerted to the seriousness of her condition before they left the hospital on Tuesday night. There are more examples but they all illustrate a lack of openness, especially on the part of Dr Steen.

3.261 That this was a very serious breach of duty and good faith becomes even more obvious when one considers that at that point Claire’s death was about to be referred to the Coroner and Mr and Mrs Roberts had already indicated that they wished it referred to this Inquiry (which had been started some weeks before).

3.262 The Roberts’ response to the meeting was a request for more information and answers to 10 specific questions. Their queries included issues such as:

(i) The identity of the doctor co-ordinating Claire’s treatment after 23:00.
(ii) Why Claire’s death was not reported to the Coroner.
(iii) Why they were not told how ill Claire was.

They also raised detailed queries about fluid management, which showed how alert they were to this aspect of care. (In his evidence, Professor Young commented that when he saw this list he was amazed at how much they had taken in at the meeting). Their letter confirmed that they wished both the Coroner and this Inquiry to investigate Claire’s death.

3.263 Formal notification of Claire’s death was made to the Coroner on 16th December 2004. On 17th December 2004, Dr McBride wrote to Mr and Mrs Roberts “Our medical case note review has suggested that there may have been a care management problem in relation to hyponatraemia and this may have significantly contributed to Claire’s deterioration and
death.\textsuperscript{528} (In this context “care management problem” is defined as “actions or omissions by staff in the process of care.”)\textsuperscript{529}

3.264 Dr Rooney then circulated the questions posed by Mr and Mrs Roberts to Professor Young, Mr Peter Walby\textsuperscript{530} of the Trust Litigation Office and Drs Steen, Sands and McBride.\textsuperscript{531} On 12\textsuperscript{th} January 2005, the Trust wrote to make its formal response to Mr and Mrs Roberts.\textsuperscript{532} Although the letter was issued in Dr Rooney’s name, it must largely have been the work of Dr Steen with contributions from Professor Young.\textsuperscript{533} Unfortunately, some of the content is highly questionable:

(i) It states that the death was not referred to the Coroner in 1994 because the death was believed to be from viral encephalitis whereas and in fact the death certificate issued cited cerebral oedema secondary to status epilepticus.

(ii) It wrongly claims that a diagnosis of encephalitis was confirmed at post-mortem.

(iii) It asserts that Dr Bartholome co-ordinated Claire’s treatment after 23:00 whereas she did not actually attend upon her until 03:00 by which time it was too late.

(iv) It ignores other matters completely e.g. it simply did not address the question as to why Mr and Mrs Roberts had not been told how ill Claire was on the Tuesday evening in consequence of which they left her.

3.265 The letter was inaccurate, evasive and unreliable. To make matters worse, it was not only sent to Mr and Mrs Roberts but was also forwarded to the Coroner\textsuperscript{534} who must have assumed that it represented the Trust’s

\textsuperscript{528} 089-005-010
\textsuperscript{529} WS-061-1 p.4
\textsuperscript{530} 310-023-003
\textsuperscript{531} WS-177-1 p.45
\textsuperscript{532} 089-006-012
\textsuperscript{533} 139-139-001
\textsuperscript{534} 090-048-152
considered assessment of the issues he was to investigate. Whilst Dr Rooney was well qualified to liaise with the Roberts family, she was not at all qualified to sign the 12th January letter. It should have been the work of an informed clinician. In this context, Dr Steen had responsibility in relation to the ‘care management problem’ and could not therefore have been the author of the letter, Professor Young was supposed to be independent of the hospital and it would have been inappropriate for the letter to come from the Litigation Management Office. Accordingly, more thought should have been given to the identity of the hospital representative taking responsibility for the content of this important letter and indeed, because of his personal involvement and earlier correspondence, Dr McBride should have signed the letter himself.

**Other Trust responses**

3.266 I think it relevant to make the following further observations about what was and what was not done in the Trust in 2004/5:

(i) The initial responses of Dr McBride and Dr Rooney were in my view, both appropriate and effective for handling enquiries from the public. My criticism about what the family was told or not told is largely directed at Dr Steen. I am entirely satisfied that not only did she know more than she was prepared to disclose but that she actively misrepresented matters to the family.

(ii) Furthermore, Dr Steen was permitted to make the initial case note review and influence the format of subsequent review, notwithstanding that Dr McBride recognised the possibility that the acts and omissions of clinicians contributed to Claire’s death. His failure to insist upon his initial suggestion of multi-professional involvement was regrettable. The consequent case review, meeting with family, and letter of explanation were all undermined by a narrowness of focus and the views of Dr Steen. Had Dr McBride directed a broader review then Claire’s parents might have received
better answers to their questions and the Coroner might have been more accurately informed as to the issues.

(iii) DHSSPS guidance was available to Dr McBride in ‘Reporting and Follow-Up on Serious Adverse Incidents’, 535 which very clearly advised that “In those situations where a body considers that an independent review is appropriate, it is important that those who will be conducting it are seen to be completely independent. In addition such reviews should normally be conducted by a multi-professional team, rather than by one individual. It is also important that the Department is made aware of the review at the outset.”536

(iv) The question arises as to whether the Trust should have instigated its own belated review of what had happened by activating its recently introduced procedures for the investigation of adverse clinical incidents by root-cause analysis?537 In normal circumstances, the clear answer to this question would be yes. However, Mr and Mrs Roberts were anxious for this Inquiry to investigate Claire’s death in the same way that it was intended it should investigate the deaths of other children. Dr McBride’s evidence was that he decided against an adverse incident review within the Trust because of the likelihood of this Inquiry investigating Claire’s case.538 Notwithstanding that he might otherwise have become better informed as to the issues, I do not think that it is fair to criticise that decision, any more than it is fair to criticise the Trust for a delay in formally reporting Claire’s case to the Department when the Coroner and this Inquiry had already become involved.

Inquest preliminaries

3.267 Claire’s inquest was held in May 2006. The Trust had 17 months from the date of referral to prepare for it. There are aspects of the preparation which

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535 314-009-001 - Circular HSS (PPM) 06/04
536 314-009-004
537 302-096-004
538 WS-061-2 p.422
concern me. Witness statements were gathered by Mr Walby who had become an associate medical director in the Litigation Management Office of the Trust in 1998 upon the retirement of Dr George Murnaghan. He was a consultant ENT surgeon who assumed the hospital litigation management work in addition to his full-time clinical duties. The witness statements obtained by him were intended to form the basis of the formal inquest depositions. They were transcribed by Mr Walby’s office onto Police Service of Northern Ireland (‘PSNI’) pro-forma witness statement sheets and then forwarded to the Coroner. The impression thus given was that the PSNI had been involved in obtaining them. Not only had the Police not been involved but the Trust was actually opposed to the closer involvement of the police in hospital inquests.539 It is for the Coronial Service to decide how to take this issue forward but I note that in autumn 2003, a person described by HM Coroner Mr John Leckey as a senior detective had expressed concern about the very limited role of the police in the investigation of hospital deaths.540 I share that concern.

3.268 This leads to a second issue. One of the witness statements came from Dr Webb who was, at that time, working in Dublin. Dr Webb made the following concession in the statement he sent to Mr Walby: “I made the mistake of not seeking an Intensive Care placement for Claire before I left the hospital on the evening of October 22nd…”541 In response Mr Walby deleted that part of the statement which referred to the “mistake” and returned it to Dr Webb542 with the suggestion that it should read as follows: “Although I did not seek an intensive care placement for Claire before I left the hospital on the evening of October 22 …”543

3.269 Mr Walby’s suggested alternate wording was accepted by Dr Webb and became part of his formal deposition which was transcribed onto police paper and presented to the Coroner, who did not see the original

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539 129-006-001
540 129-007-001
541 139-098-021
542 139-096-001
543 139-098-021
statement. Mr Walby explained that he advanced his alternative to Dr Webb (who did not have to accept it) because, in his opinion, a witness statement should be factual and should not contain opinion or comment. This appears to me to be a difficult position to adopt. Dr Webb was not just an incidental witness to the death – he was both expert and the consultant paediatric neurologist who had been involved in the failed care of Claire.

3.270 Mr Walby said furthermore that he thought Dr Webb was being too harsh on himself. I do not share that opinion and do not think it for Mr Walby to judge. Since part of the purpose of an inquest is to identify things which have gone wrong so as to prevent recurrence, the Coroner is positively helped if an expert clinician suggests that treatment might have been better had he acted differently. I conclude that Mr Walby’s intervention on this occasion was intended more to protect the Trust than to assist Dr Webb. It could not be said to have assisted the Coroner.

3.271 Mr Walby also provided the means whereby misleading information was supplied to the Coroner, namely Dr Rooney’s letter. In addition, he forwarded a copy of the autopsy report to the Coroner, which also contained factual error originating from Dr Steen. Notwithstanding that Dr McBride took the view that a “care management problem” may have been implicated in Claire’s death and that Dr Steen did not agree with this, Dr Steen was permitted to influence the information submitted to the Coroner and to edit and indeed approve Mr Walby’s correspondence with the Coroner.

3.272 There was potential for conflict between Mr Walby’s job requirement, to “assist H.M. Coroner with enquiries and the preparation of statements prior to inquests” and at the same time to “give advice and support to staff involved in... Coroner’s cases.” Mr Walby was in the unusually influential position where he could decide whether some witnesses provided

544 139-095-001
545 Mr Walby T-12-12-12 p.133 line 2
546 Mr Walby T-12-12-12 p.134 line 12
547 090-048-152
548 089-004-008
549 WS-176-1 p.4 & 090-049-152 &139-148-001
550 WS-176-1 p.14
statements to the Coroner or not and furthermore where he could and did, edit, correct and partially redraft their statements.\textsuperscript{551} He was so placed that he could protect the interests of the Trust at a time when his duty was first and foremost to assist the Coroner. The Trust should not have allowed the potential for such conflict to arise.

3.273 My general view on this issue was shared by the Coroner, Mr Leckey, who helpfully gave evidence. It was very clear from what he said, as it is from any analysis of the coronial process, that the public interest is protected if evidence is given frankly. He said that all clinical staff \textit{“have to be totally transparent... not only for me exercising a judicial function, but for the bereaved family.”}\textsuperscript{552} It is only in this way that a Coroner can properly analyse and understand a death such as Claire’s, help answer the questions of the bereaved and assist in the process of learning from experience. It is therefore a matter of critical importance that all proper assistance be given the Coroner with the utmost candour and that all hospital staff engaged in this process regard that as their paramount objective.

\textit{Inquest}

3.274 Unfortunately, there is no formal transcript of the oral evidence given at inquest. However, such notes and minutes as do exist, strongly suggest that neither Professor Young, nor Drs Webb, Sands or Steen explained to the Coroner that Claire’s hyponatraemia was related to fluid or electrolyte mismanagement.\textsuperscript{553}

3.275 The failure to repeat the initial blood test was an issue of mismanagement, which had to be addressed by the Trust. This was apparent during preparation for inquest. When the Litigation Management office sent witness statements to Professor Young (on 7\textsuperscript{th} April 2006) for comment,\textsuperscript{554} he drew attention to what he termed \textit{“substantial issues”} in Dr Webb’s...
statement – namely his recognition that there had been a failure to take a routine electrolyte sample on the morning after admission and that it was indeed the hyponatraemia which had led to the cerebral oedema. Professor Young indicated that these issues “could certainly become significant at the inquest”\textsuperscript{555}

3.276 In this connection, Dr Webb had specifically conceded in his statement to the Coroner that he had misunderstood the Monday night blood test as being a blood test from the Tuesday morning\textsuperscript{556} and that had he not so misunderstood it, he would have directed an urgent repeat blood test at about 14:00 on Tuesday. Professor Young agreed that this is indeed what should have been done\textsuperscript{557} and even Drs Steen and Sands were both to agree that the blood test should have been repeated long before Tuesday night.\textsuperscript{558}

3.277 However, I find little evidence that Professor Young brought this matter to the attention of the Coroner. Instead and having agreed that Claire had the potential for electrolyte imbalance, he advised the Coroner that “a blood sample every 24 hours would be good clinical practice.”\textsuperscript{559}

3.278 I consider that it was misleading to suggest to the Coroner that a blood sample once a day in such circumstances would have been good clinical practice.\textsuperscript{560} Notwithstanding the practice in other cases, it was not good clinical practice in the case of a child on low sodium intravenous fluids, with a neurological history, a low level of consciousness, a low sodium reading, an unknown fluid balance, and in circumstances where she was not responding to treatment.

3.279 Although Professor Young understood that his role was “to assist on the key issues being drawn out at the Inquest.”\textsuperscript{561} there appear nonetheless to

\textsuperscript{555} 139-042-001  
\textsuperscript{556} 139-098-020  
\textsuperscript{557} Professor Young T-10-12-12 p.208 line 13  
\textsuperscript{558} Dr Sands T-19-10-12 p.110 line 21 & Dr Steen T-17-12-12 p.11 line 5  
\textsuperscript{559} 091-010-060  
\textsuperscript{560} 140-043-007  
\textsuperscript{561} Professor Young T-10-12-12 p.205 line 25
be other examples where Professor Young failed to draw key issues to the attention of the Coroner. While the Medical Director, Dr McBride, informed Mr and Mrs Roberts that Professor Young’s “review has suggested that there may have been a care management problem in relation to hyponatraemia and that this may have significantly contributed to Claire’s deterioration and death” Professor Young flatly denied contributing to this particular assertion and advised the Coroner that the death was not one which necessarily would have had to have been reported to the Coroner in 1996 because of a lack of awareness of hyponatraemia at that time. He told the inquest that he did not believe that there were lessons to be learned from Claire’s case and gave further reassurance that Claire’s fluid management was in keeping with the recommendations of 1996.

3.280 In the light of this evidence, I am of the view that Professor Young shifted from his initial independent role advising Dr McBride to one of protecting the hospital and its doctors.

Inquest verdict

3.281 Claire’s condition, diagnosis and treatment were not straightforward matters in October 1996. She had a history from earliest childhood of seizures and developmental delay. The cause of these has never been established. When she was admitted to hospital on 21st October her sodium level was only a little low at 132mmol/L. Hospital induced hyponatraemia from excessive administration of low sodium fluids was not the cause of that reading and as various experts, including Professor Neville pointed out, low sodium levels are a feature of neurological conditions. It was entirely reasonable for the admitting doctors to suspect status epilepticus and/or an encephalopathy such as encephalitis. The expert view was that these were perfectly rational differential diagnoses.

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562 139-145-001
563 097-012-113
564 140-043-004 & 097-012-112
565 097-012-112 & 140-045-004
566 097-012-113
567 140-043-003 et seq, 097-012-111 et seq & 091-010-060 et seq
568 Professor Neville T- 01-11-12 p.163

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However, on the basis of the very much fuller evidence now available, I conclude that the only definite, known and proven causes of Claire’s death were cerebral oedema due to hyponatraemia.

3.282 The inquest finding as to the cause of death was made in the following terms:

“1 (a) Cerebral oedema

Due to

(b) meningo-encephalitis, hyponatraemia due to excess ADH production and status epilepticus.”569

On the evidence before me, I believe that finding is wrong.

3.283 It is certainly possible, if not probable, that Claire suffered from some form of encephalopathy but it does not appear to have been encephalitis and that cause of death cannot be advanced any further. It is noted that the Coroner’s final formulation does not refer to encephalopathy but rather to meningoencephalitis. It is also possible that she suffered from status epilepticus but that likewise remains unproven.

3.284 In reaching this view, I have taken into consideration the evidence which the Coroner received from two additional experts; Dr Robert Bingham, Consultant Paediatric Anaesthetist at the Hospital for Sick Children, Great Ormond Street, London,570 and Dr Ian Maconochie, Consultant in Paediatric A&E medicine at St Mary’s Hospital, London.571 They both agreed to frame Claire’s death in the following terms:

“I (a) cerebral oedema

(b) encephalitis/encephalopathy and hyponatraemia…

II status epilepticus.”572
3.285 However, analysis of their evidence to the Coroner reveals uncertainty about what happened. It indicates that they were attempting to explain what might have happened as opposed to stating what was known to have happened. I understand that it is not so unusual for autopsies or inquests to end with only partial identification of the cause of death. This may be unwelcome and unsettling for the family, and that is unfortunate, but in Claire’s case nothing further can be confirmed.

*Internal response to inquest verdict*

3.286 A further disturbing feature of this matter is that even after the inquest was completed and the Coroner had delivered his verdict and circulated his written finding, Mr Walby appeared keen to emphasise that there had been no criticism of the Trust’s care of Claire. In an e-mail of 5th May 2006, he wrote:

“This inquest ended on 4 May 2006 with no criticism of the Trust’s care of this patient.”

On 16th June 2006, he wrote to the Trust’s then solicitor to state:

“Evidence given at the inquest was not critical of the fluid management.”

3.287 I do not believe that all of the many mistakes revealed to this Inquiry could possibly have come as a surprise to Drs Steen, Webb or Sands at the time of the inquest. Against such a background, Mr Walby’s comments about the absence of criticism have a jarring note of satisfaction when he should have been deeply troubled by what had happened. Indeed, by that time he had already decided that the electrolyte management had been so mishandled that he would have to try to settle any claim brought against the Trust in negligence. He appears to have been more concerned with the interests and reputation of the Trust than with the lessons to be learned.

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573 139-163-001
574 140-013-001
575 Mr Walby T-11-12-12 p.168 line 7
Governance: reporting Claire’s death within the Trust

3.288 Dr Elaine Hicks\textsuperscript{576} had been appointed Paediatric Clinical Lead in the Children’s Hospital on 1\textsuperscript{st} October 1996.\textsuperscript{577} Her evidence was that she was not informed about Claire’s death in 1996.\textsuperscript{578} Nor was the death reported to the Director of Nursing\textsuperscript{579} Miss Elizabeth Duffin\textsuperscript{580} or to the Director of Medical Administration Dr George Murnaghan, who then had charge of risk management.\textsuperscript{581} Dr Ian Carson,\textsuperscript{582} who was the Medical Director of the Trust in 1996, was similarly unaware of Claire’s death.\textsuperscript{583} In his evidence to the Inquiry, he agreed that there was “sufficient happening in Claire’s case”\textsuperscript{584} to mean that it should have been brought to the attention of the clinical director as a starting point. He agreed that the system “did not do justice to Claire”\textsuperscript{585} and that “more could have been done and more should have been done.”\textsuperscript{586} If it is correct, as I believe it to be, that few children die in the Children’s Hospital, apart from those with terminal conditions, the failure to report Claire’s death to Dr Hicks in particular, is impossible to comprehend unless there was a recognition that mistakes had been made and attention should not be drawn to them.

3.289 I am compelled to the view that clinicians did not admit to error for the obvious reasons of self-protection and that this defensiveness amounted to concealment and deceit. Such can have no place in the Health Service but appear nonetheless to have become established in this the regional paediatric training hospital.

3.290 The failure to report repeats in part what happened in Adam’s case. The Director of Medical Administration, Dr Murnaghan, was aware of Adam’s case and of the Coroner’s damning conclusion delivered only months...
before. Just as he took no steps to extract lessons from Adam’s death, he took no steps to ensure that subsequent unexpected and unexplained deaths in the Children’s Hospital were reported within the Trust.

3.291 Mr William McKee, who was, at the relevant time the Chief Executive of the Trust, acknowledged failings in Claire’s case. Notwithstanding that he was unable to describe the duty of a clinician to report the sudden and unexpected death of a child patient at that time; he believed “that it should have gone up the chain as far as the Medical Director.” He confirmed that no notification of her death was made to him but said that this did not surprise “because of the predominance of clinical independence justified through the heavy, or almost entire, reliance on professional self-regulation. That was the dominant paramount culture at the time.”

3.292 However, it appears that Mr McKee did little to lead clinicians away from their paramount culture of self-regulation, even so far as to ensure reporting to the Medical Director, or to encourage their acceptance of the structures of accountability around which the Trust purported to operate. In Claire’s case, the clinicians were left to determine amongst themselves whether there had been mismanagement and if so, what they might do about it. In practical terms the lack of effective risk management controls meant that the Trust Board did not know what was happening in the Children’s Hospital and had accordingly no effective means of satisfying itself that its patients were safe. I find that this was a failure in both leadership and governance.

3.293 The inclination not to draw attention to the shortcomings in Claire’s case was encouraged by underdeveloped internal controls, poor leadership and the complicity of medical colleagues. This meant that lessons were not learned, poor standards were tolerated, the coronial system was undermined and grieving parents were misled.

587 310-023-004
588 Mr McKee T-17-01-13 p.107 line 8
589 Mr McKee T-17-01-13 p.119 line 23
590 Mr McKee T-17-01-13 p.120 line 12
Mr and Mrs Roberts were initially alerted to the possibility that Claire had been the victim of fluid mismanagement by the UTV investigative revelation of the similarities between the other deaths. Evidence has now revealed other similarities not then suspected.

Both Claire and Adam died in the same ward of the Children’s Hospital within 11 months of each other. Some of the same doctors were on duty for each. Dr Taylor had involvement with both and Dr Webb carried out the final brain stem death tests. Trust risk management systems remained unchanged and the same individuals were responsible for ‘governance’ within the Trust.

Claire’s admission to the hospital was only 4 months after Adam’s inquest and at a time when the medical negligence claim relating to his treatment and death was ongoing. It might be supposed that Adam’s death and the Coroner’s very critical finding would have prompted reflection and debate about how to respond. Seemingly it did not. Even though the consultant paediatric anaesthetists now understood Professor Arieff’s guidance and, possibly, as Dr Bartholome explained “the events surrounding this inquest had been known to me and to most of the doctors in the Children’s Hospital” there was no formal response by the doctors. Their inactivity went unnoticed by a Trust Board uninterested in learning from mistakes.

The failure of Drs Murnaghan and Carson to exploit the opportunity for learning, obvious from the tragic circumstances of Adam’s death, had consequences not only for fluid therapy but also for the response of ‘governance’, which was allowed to repeat its earlier failings. In Claire’s case, as in Adam’s, there was significant failure to report, investigate or review. Those who should have been informed and involved were bypassed. Parents were not informed about the part played by sodium in the avoidable hospital deaths of their children. The performance of clinicians...
was not assessed, referrals were not made to the General Medical Council (‘GMC’) and patient safety was potentially jeopardised.

3.298 The question must be asked, how could hospital ‘governance’ within the Trust be so weak as to allow this to happen?

**Governance 1995-96**

3.299 It is to be emphasised that the failure of those doctors involved in the care of Claire and Adam to properly report, review or candidly advise the parents, was both individual and collective. Such basic aspects of professional practice were matters of common sense and well known to doctors. They were enshrined in the GMC code and the long-standing obligations of membership of professional bodies. The duty to refer a death to the Coroner was a matter of statute and the requirement to audit was often a contractual obligation.

3.300 Professional guidelines at that time gave clear advice on many of the key areas of deficiency highlighted in Claire’s case e.g. audit, record keeping, retention of medical records, communication between the clinician, nurse, parent, and pathologist, drug prescription checking, consultant responsibility, the organisation of cover for patients, inter-consultant handover arrangements and supervision of junior doctors, nursing accountability, honesty in professional practice, reporting clinical performance jeopardising patient safety to employer or regulatory authority etc. Similarly and at the time of Adam’s case extant guidance

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592 WS-129-1 p.39
593 314-001-004 ‘Good Medical Practice Guidelines for Doctors’ General Medical Council, October 1995
594 202-002-052 ‘Standards for Records and Record-Keeping’ UKCC, April 1993
595 314-001-004 ‘Good Medical Practice Guidelines for Doctors’ General Medical Council, October 1995
596 WS-251-1p.9 ‘Retention of Medical Records’ Circular HSS (083) 1/83
597 314-003-001 ‘Guidelines for Professional Practice’ UKCC, 1996
598 239-002-014 ‘Guidelines for Post-Mortem Reports’ Royal College of Pathologists, August 1993
599 214-005-001 ‘Standards for the Administration of Medicines’ UKCC, 1992
600 314-001-001 et seq ‘Good Medical Practice Guidelines for Doctors’ General Medical Council, October 1995
602 314-001-012 ‘Good Medical Practice Guidelines for Doctors’ General Medical Council, October 1995
603 314-001-009 ‘Good Medical Practice Guidelines for Doctors’ General Medical Council, October 1995
was available to prompt the reporting\textsuperscript{602} and investigation\textsuperscript{603} of his most unexpected death.

3.301 The failure to follow applicable guidance in Adam’s case and in Claire’s was a professional failure. Failure to regulate compliance with guidelines was a failure of both the clinician and the systems of internal control.

\textit{Weakness in systems of clinical risk management and internal control}

3.302 The early 1990s was a period of significant restructuring of hospital management. A new beginning was intended and guidance became available promoting clinical risk management and quality control procedures to support the previously self-regulating clinician.\textsuperscript{604} Hospital governance was not therefore a new concept in 1996. However, it took longer for the Trust to engage with it than might have been expected and financial constraint slowed its introduction. Despite knowledge of what should be done\textsuperscript{605} and the introduction of formalised management structures, the development of functioning governance systems proved difficult. It was not seemingly a developed part of the control of services within the Children’s Hospital at the time of Adam’s admission. Although formal Trust publications and annual reports boasted of systems of governance control and quality assurance, the evidence before the Inquiry confirmed that the opposite was often the case.\textsuperscript{606} The Children’s Hospital was subject to very weak governance control.

\begin{itemize}
\item \textsuperscript{602} 306-117-013
\item \textsuperscript{603} 314-016-010
\item \textsuperscript{605} Dr Carson T-15-01-13 p.126
\item \textsuperscript{606} Dr Murnaghan T-25-06-12 p.17-18 & Dr Murnaghan T-25-06-12 p.71 line 12
\end{itemize}
3.303 It is hard upon initial examination to understand how this could have been so, given that structures of responsibility and accountability were apparently in place, with governance committees and coordinators assigned to act within directorates led by clinical leads reporting to a medical director in turn accountable to the Trust Board and Chief Executive. The Board was committed to act within its ‘Code of Conduct and Accountability’\textsuperscript{607} to “provide active leadership of the organisation within a framework of prudent and effective controls to enable risk to be assessed and managed” and its Chief Executive, Mr McKee was the principal accountable officer.

3.304 The Trust appeared outwardly confident at that time about its systems of quality control. The Royal Hospitals Annual Report 1993-1994 recorded the development of “an effective organisational framework for medical audit which supports and encourages changes in clinical practice as a natural part of organisation-wide quality assurance.”\textsuperscript{608} The Trust mission statement proclaimed the “fundamental purpose in the Royal Trusts [is] to provide the highest quality cost-effective healthcare... through exceptional service to our patients...”\textsuperscript{609}

3.305 The Trust even produced a Health and Safety Policy\textsuperscript{610} in 1993 purporting to create a Medical Risk Management Group under the Chairmanship of the Medical Director. It was to have assumed specific responsibility for untoward incident reporting (clinical), clinical audit, complaints and medical negligence issues\textsuperscript{611} and to have been accountable to the Chief Executive and the Trust Board. Dr Murnaghan however, described the policy as “aspirational.”\textsuperscript{612} In fact, the Group simply did not exist. Mr McKee wrote in his introduction to the policy that “This Policy has my commitment and I expect all employees to give their commitment too.”\textsuperscript{613} However, the evidence was that in this regard Mr McKee not only failed to give his...
commitment but failed also to encourage or ensure the commitment of others.

3.306 In 1995-96, the Trust made application to the Kings Fund Organisational Audit (‘KFOA’) for accreditation. This allowed an opportunity to compare standards and systems with independent criteria. The Chief Executive personally oversaw the application and the Director of Nursing personally managed it. All concerned must thus have become familiar with the Kings Fund criteria, which covered a range of best practice from communication with patients and record keeping to adverse incident recording and audit.

3.307 The application to the Kings Fund did not succeed in 1995. This does not surprise. Evidence was given that up-to-date governance guidance published in England was not felt to apply because it wasn’t local, the Northern Ireland patient consent guidance failed to ‘cascade’ to clinicians as directed, the introduction of clinical guidelines in the Children’s Hospital lagged behind that in England undermining attempts to audit by reason of a lack of agreed standards. There was no obligation to report adverse clinical incidents beyond choosing to make an entry in a book and no mechanism to ensure serious matters were reported to the Medical Director or Chief Executive in line with extant recommendation. This was in a context where no obligation was felt by the newly created Trust to report any adverse clinical incident to the Department. The Trust Board dealt with administrative issues almost to the exclusion of patient matters. The Board minutes for November 1995 - December 1996 contain only two

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614 305-001-001
615 305-008-560
616 WS-061-2 p.8
617 211-003-024
618 305-001-001
619 WS-061-2 p.7&14 & Mr McKee T-17-01-13 p.44 line 7 & p.51 line 5
620 306-058-002
621 Professor Savage - 18-04-12 p.65 to 66
622 WS-061-2 p.168
623 210-003-038: EL(94)16 ‘Report of the Independent Inquiry into Deaths on the Childrens’ Ward at Grantham & Kesteven General Hospital’ NHS Executive 1994 (the ‘Allitt Inquiry’) - “There must be quick route to ensure that serious matters... are reported in writing to the Chief Executive of the hospital... NHS Trust Boards should take steps immediately to ensure such arrangements are in place.”
624 WS-061-1 p.2
references to specific clinical cases. Most disturbingly, the Chief Executive stated that he operated at that time on the basis that neither he nor the Trust Board had any responsibility for the quality of healthcare given to patients in the hospital.

3.308 In this regard, evidence was received as to the responsibility of Trusts for the quality of hospital care at that time. The almost unanimous view, which I accept, is that Trusts were responsible for the quality of clinical care prior to the creation of a statutory duty of care under the Health and Personal Social Services Quality Improvement and Regulation (Northern Ireland) Order 2003. Indeed it is hard to understand how there could have been any confusion given the explicit advice provided to Trusts by the Management Executive that “the primary accountability of Trusts” to their commissioning Health Boards is for the “… quality and efficiency of the service they provide.”

3.309 Financial constraint, a lack of appetite for change, the failure of political engagement and time limitations were all suggested as explanations for the failure to progress governance in the Trust. It must ultimately have been a matter of leadership. The primary focus of the Chief Executive’s leadership of the Trust was on financial and administrative issues. The clinical leadership on the Board, comprising the Medical Director, Dr Carson and the Director of Nursing and Patient Services, Miss Duffin failed to champion clinical issues and the primary obligation to the patient was left largely to the clinician to discharge. The care provided was not however properly audited and the outcomes were not reviewed. The situation therefore prevailed that those accountable for the provision of appropriate standards of care were often ignorant as to the quality of care actually

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625 305-016-012 & 305-016-084
626 Mr McKee T-17-01-13 p.48 line 7
628 WS-062-1 p.528
629 WS-077-2 p.8
630 Dr Carson T-15-01-13 p.127 line 25
provided. Unscrutinised, some doctors and nurses became defensive to criticism, protective of reputation and tolerant of less-than-best practice.

3.310 The failure to enforce prevailing guidance in 1996 suggests an institutional complacency. That recommendations on hospital risk management were not adopted earlier or brought to bear on hospital performance can be attributed to a failure within Trust leadership.

3.311 That failing was not however, limited to the 1990’s. DHSSPSNI serious adverse incident investigation and reporting guidance was inadequately followed in 2004 when Claire’s case was brought to the Trust’s attention. This suggests that clinical governance had not even then become fully operational. Notwithstanding, the Annual Report 2004-05 claimed: “*In line with good governance and our commitment to openness and transparency, the Royal Hospitals acknowledges to patients and the public when things go wrong and systematically ascertains what happened, how it happened and why, so that we can do all that is possible to ensure lessons are learned to prevent a re-occurrence.*” Trust practice had yet to honour Trust claims.

### Aftermath

#### Litigation

3.312 This Inquiry heard evidence relating to Claire's treatment and death between 24th September 2012 and 19th December 2012. As the evidence unfolded, the full extent of what had gone wrong emerged. When Mr and Mrs Roberts gave evidence on 13th December, they confirmed that they had not intended bringing a claim for medical negligence against the Trust. All they wanted, they said, was for the doctors to admit that they had made mistakes. In the words of Mrs Roberts:

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631 302-096-004
632 Mr and Mrs Roberts T-13-12-12 p.143 line 2
“...everyone makes mistakes but all you have to do is hold your hands up.”

3.313 It is difficult to appreciate the depth of dismay that the Roberts family must have felt by the end of the oral hearings. The revelation of the full scope of error and everything associated with those errors must have left them bewildered and suspicious about how so many clinicians and experts could have missed so much in 1995/96, during the 2004/05 investigation, at inquest and during the police investigation that followed.

3.314 I assume that there must then have been a re-appraisal by Mr and Mrs Roberts of their attitude towards litigation, because on 26th September 2013, their solicitors sent a letter of claim to the Trust. On 16th October, the Trust replied through the DLS to indicate that while the Trust could mount a defence on unspecified legal grounds, it did not intend to do so. Instead, the Trust’s position was stated as follows:

“...We have obtained specific instructions from the Trust not to contest your clients’ claim. The reason why this approach is being adopted is that the Trust acknowledges that there were shortcomings in the management of this patient and the Trust does not wish to in any way add to the distress of your clients by availing of any legitimate defences open to it in this action... Please also note that any offer of compensation in this case will be made in open correspondence as a means of demonstrating that the Trust is keen to deal with this matter in a wholly open and transparent manner.”

3.315 This development was referred to at the public hearing the next day. On behalf of the Roberts family, Mr Stephen Quinn QC welcomed this public acknowledgement of failing and implied admission of liability together with the apology offered by the doctors and staff who had treated Claire.

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633 Mr and Mrs Roberts T-13-12-12 p.142 line 12
634 302-185-003
635 302-185-001
636 T-17-10-13 p.4 line 19
I consider that this was entirely the correct position for the Trust to adopt. I have to note however, that the preliminary remarks in the letter of 16th October contain the following unnecessary observations:

“We note that the Roberts family now wish to make a claim for damages arising out of the death of their daughter. We note that the initiation of such a claim somewhat contradicts the earlier assertions of the family that they were not interested in claiming compensation but were only interested in getting at the truth.”637

The inclusion of such insinuation is regrettable. In all the circumstances of Claire’s treatment and death and all that had ensued in the following years, those unnecessary observations were inappropriate and insensitive. On 12th November 2013, Mr Colm Donaghy, Chief Executive and Dr Anthony Stevens, Medical Director on behalf of the Belfast Health and Social Care Trust, (which incorporates the former RGHT), addressed the public hearings. Mr Donaghy commenced his opening statement by saying:

“Let me begin by categorically stating that the Belfast Trust, on behalf of the former Royal Hospitals Trust, regrets most sincerely the pain and suffering experienced by the families of Adam Strain, Claire Roberts, Lucy Crawford, Raychel Ferguson and Conor Mitchell and apologises for all the shortcomings in care at the Royal Hospitals that have been identified either prior to this inquiry or during the hearings... The abject sorrow and grief felt by the families, I know, has not lessened with the passing of time. In fact, I fully accept that it is as raw today as it was then, exacerbated by the actions of the three Trusts involved.”638

Mr Donaghy then proceeded to acknowledge individual failings on the part of the Trust including the way in which the litigation had been handled. He said “it is clear that... fluid management was poor... communication with the families was not sufficiently transparent, our medical and nursing staff missed the opportunity to reflect on what may have gone wrong... record
keeping was incomplete and our governance was not sufficiently developed or robust. I also accept that reflective clinical practice and candour... was clearly missing.”

He further accepted that he was “... aware through this Inquiry that how litigation has been handled by the Belfast Trust has added to the hurt and grief felt by the families... I wish to apologise unreservedly to the families for the unacceptable delay in the Belfast Trust accepting liability.” After making his statement, Mr Donaghy and others from the Trust agreed to meet the families. As a result of those meetings, Mr Donaghy wrote to Mr and Mrs Roberts on 21st November 2013 to state that:

“In relation to the letter from the Directorate of Legal Services, as I indicated to you on Friday, 15 November 2013, I believe that some of the wording in the letter is insensitive. I accept that your reason for pursuing Claire’s case is to, as far as possible, ascertain the truth.”

3.319 Mr and Mrs Roberts were more than fully justified in that pursuit.

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639 Mr Donaghy T-12-11-13 p.5 line 22 et seq
640 Mr Donaghy T-12-11-13 p.5, line 15
641 314-018-001
EVENTS FOLLOWING LUCY CRAWFORD’S DEATH

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Introduction and background

4.1 Lucy Crawford was born on 5th November 1998, the youngest of a family of three. She was admitted to the Erne Hospital Enniskillen on 12th April 2000, transferred the next day to the Royal Belfast Hospital for Sick Children (‘RBHSC’) and died on 14th April 2000.

4.2 Lucy’s death was examined in the October 2004 UTV documentary ‘When Hospitals Kill’. It implicated hyponatraemia in her death and alleged a ‘cover up.’ Accordingly, Lucy’s case fell within the original remit for consideration by this Inquiry.¹

4.3 The work of the Inquiry was stayed in 2005 to permit an investigation of her case by the Police Service of Northern Ireland (‘PSNI’). Ultimately, the Public Prosecutions Service for Northern Ireland determined that there should be no prosecution. I was then contacted by Lucy’s parents who informed me that for personal reasons they no longer wished Lucy’s death to be investigated by the Inquiry. I reported the matter to the Minister who acceded to their wishes.

4.4 It was then urged upon me that any contemporaneous failure to acknowledge the relevance of hyponatraemia in Lucy’s death could have influenced the lessons drawn from her death and might have contributed to the tragedy of Raychel’s death 14 months later. After engaging in extensive consultation I decided in February 2010 that the terms of reference still required investigation into the aftermath of Lucy’s death.

4.5 In this context, I considered the revised terms of reference required:

“an investigation into the events which followed Lucy’s death such as the failure to identify the correct cause of death and the alleged Sperrin Lakeland cover up because they contributed, arguably, to the death of Raychel in Altnagelvin. This reflects the contention that had the circumstances of Lucy’s death been identified correctly, and had lessons been learned from the way in which fluids were administered to her,

¹ 021-010-024 as published on 1st November 2004
defective fluid management would not have occurred so soon afterwards (only 14 months later) in Altnagelvin, a hospital within the same Western Health and Social Services Board area.”

4.6 Arising from this, the principal questions are whether the cause of Lucy’s death was clear at the outset; whether any of the participants knew or suspected that Lucy’s death was caused by mismanagement and if so, why this was not made known at the time. Further and in this context, whether there was a failure to ensure that the death was properly investigated and if so, why so?

**Expert reports**

4.7 In order to assist and advise, the Inquiry retained a number of experts. The experts were:

(i) Dr Roderick MacFaul² (Consultant Paediatrician, retired) who provided expert comment on clinical and governance matters.³

(ii) Professor Gabriel Scally⁴ (Director of WHO Collaborating Centre of Healthy Urban Environments) who reported on the responsibilities of the Trusts and the Boards and the DHSSPS in Northern Ireland at the time of Lucy’s death.⁵

(iii) Professor Sebastian Lucas⁶ (Department of Histopathology, St. Thomas’ Hospital, London) who advised on issues arising from the autopsy.⁷

(iv) Dr Simon Haynes⁸ (Consultant in Paediatric Cardiac Anaesthesia & Intensive Care, Freeman Hospital, Newcastle upon Tyne) who provided his opinion on Lucy’s fluid management.⁹

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² 325-002-013  
³ File 250  
⁴ 325-002-013  
⁵ File 251  
⁶ 325-002-013  
⁷ File 252  
⁸ 306-081-009  
⁹ File 253
4.8 The Inquiry and its experts also reviewed reports commissioned by the Crawford family, the Sperrin Lakeland Trust (‘SLT’) and the Coroner. These were provided by:

(i) Dr Dewi Evans\(^{10}\) (Consultant Paediatrician, Singleton Hospital, Swansea), who was engaged by Lucy’s parents in connection with the prosecution of a clinical negligence claim.

(ii) Dr John Jenkins\(^{11}\) (Senior Lecturer in Child Health and Consultant Paediatrician at Antrim Hospital), who reported to the Directorate of Legal Services on behalf of Sperrin Lakeland Trust (‘SLT’) in connection with defending the claim brought by Lucy’s parents.

(iii) Dr Edward Sumner\(^{12}\) (Consultant Paediatric Anaesthetist at Great Ormond Street Children’s Hospital), who provided the Coroner with an opinion for the purposes of inquest.

Schedules compiled by the Inquiry

4.9 To marshal and summarise the large volume of information received, a number of schedules, lists and chronologies were compiled:

(i) List of persons involved, cross-referencing statements and summarising roles.\(^{13}\)

(ii) Schedule detailing Nomenclature & Grading of Doctors 1948 to 2012.\(^{14}\)

(iii) Schedule detailing Nomenclature & Grading of Nurses 1989 to 2012.\(^{15}\)

(iv) Chronology of clinical events.\(^{16}\)
Cause of Death

4.10 The inquest into Lucy’s death did not take place until February 2004, almost four years after her death. The verdict at inquest found that her death had been due to,

"I (a) Cerebral oedema (b) acute dilutional hyponatraemia (c) excess dilute fluid
II. gastroenteritis."19

4.11 Mr John Leckey, the Coroner for Greater Belfast found that:

"On 12 April 2000, the deceased, who was aged 17 months, was admitted to the Erne Hospital, Enniskillen with a history of poor oral intake, fever and vomiting. The vomiting was sufficient to have caused a degree of dehydration and she required intravenous fluid replacement therapy. It was believed she was suffering from gastroenteritis. Her condition did not improve and she collapsed at about 3.00 am on 13 April, developing thereafter decreased respiratory effort and fixed and dilated pupils. Whilst in a moribund state she was transferred by ambulance shortly after 6.00 am to the Royal Belfast Hospital for Sick Children. Her condition remained unchanged and after two sets of brain-stem tests were performed showing no signs of life, she was pronounced dead at 13.15 hours on 14 April. She had become dehydrated from the effects of vomiting and the development of diarrhhea whilst in the Erne Hospital and she had been given an excess volume of intravenous fluid to replace losses of electrolytes. The collapse which led to her death was a direct consequence of an inappropriate fluid
replacement therapy in that the use of 0.18% saline to make up deficits from vomiting and diarrhoea was wrong, too much of it was given and there had been a failure to regulate the rate of infusion. This led to the development of dilutional hyponatraemia which in turn caused acute brain swelling and death. The errors in relation to the fluid replacement therapy were compounded by poor quality medical record keeping and confusion by the nursing staff as to the fluid regime prescribed.”

4.12 The findings of the Coroner were uncontroversial. Clinicians from the hospitals treating Lucy gave evidence at the inquest and accepted that the cause of the death was cerebral oedema due to hyponatraemia brought about in consequence of the infusion of excessive quantities of hypotonic fluid.20 Why then did this consensus not emerge four years earlier and before Raychel was given inappropriate fluid therapy involving the same Solution No. 18, causing her to develop the same dilutional hyponatraemia within the same Western Health and Social Services Board (‘WHSSB’) area?

Lucy’s admission to Erne Hospital on 12th April 2000

4.13 Lucy was admitted to the Erne Hospital in Enniskillen on Wednesday 12th April 2000 at 19:30. She presented with a history of drowsiness and vomiting and was placed under the care of Consultant Paediatrician Dr Jarlath O’Donohoe.21 She was seen initially by the Senior House Officer (‘SHO’) in Paediatrics Dr Amer Ullah Malik.22 Dr Malik could not be contacted by the Inquiry after he provided an initial response to a request for a statement.23

20 Namely Dr Peter Crean (Consultant in Paediatric Anaesthesia and Intensive Care at the RBHS, Dr Thomas Auterson (Consultant Anaesthetist at the Erne Hospital), Dr Donncha Hanrahan (Consultant Paediatric Neurologist at the RBHSC and Dr John Jenkins (on behalf of the Sperrin Lakeland Trust).
21 325-002-001
22 325-002-001
23 WS-285-1 p.1
**Admitted by Dr Malik**

4.14 Lucy’s parents explained to Dr Malik that she had not been feeding well, had had fever and vomiting for 36 hours and been drowsy for 12 hours. Dr Malik admitted Lucy and arranged for blood and urine tests. He considered her dehydrated and decided to administer IV fluids.

4.15 Lucy had no medical history to complicate her care. She presented with symptoms consistent with gastroenteritis causing her dehydration. Her admission was for the purposes of rehydration. Hers should have been a straightforward and routine admission.

4.16 Clinicians grade dehydration as mild, moderate or severe. Severe dehydration carries the risk of shock. It is important to assess the dehydration to inform the fluid management. However, neither Dr Malik nor Dr O’Donohoe recorded their assessment. Indeed, it is unclear whether any formal assessment was made of Lucy’s dehydration even though Dr O’Donohoe recalled that she had presented with a moderate dehydration. Clearly, if an assessment was made it ought to have been recorded in her clinical notes. Dr MacFaul examined the records and concluded that Lucy had, at worst, moderate dehydration. The evidence given at inquest by Drs Sumner and Jenkins agreed that she was mildly dehydrated.

4.17 Lucy’s initial blood test sample was taken at 20:50 on 12th April 2000. It revealed an elevated urea of 9.9mmol/L (a sign of dehydration and/or established shock) and a normal sodium reading of 137 mmol/L.

**Attendance by Dr O’Donohoe and commencement on IV fluids**

4.18 Upon admission Lucy was taking fluids orally and not therefore dependent upon intravenous (‘IV’) fluids. Between 21:00 and 22:00, she drank 50ml
of juice and 100ml of Dioralyte. Dr O'Donohoe said she drank enthusiastically. She also passed a small amount of urine at 20:00.

4.19 Dr Malik was unable to insert the IV cannula and Dr O'Donohoe was called at about 21:00 (according to Dr Malik) or 21:30 (according to Dr O'Donohoe) to place the cannula in her arm. She was commenced on IV fluids between 22:30 and 23:00.

**Intravenous fluid therapy**

4.20 IV fluids are administered for various purposes:

(i) As maintenance fluids to replenish normal ongoing losses from urine and insensible losses such as sweat.

(ii) As replacement fluids to replace abnormal losses such as those suffered through vomiting or diarrhoea

(iii) As resuscitation fluids in the management of circulatory failure whether in shock or when trying to prevent evolving shock. This is commonly required when a patient is dehydrated.

**Fluids received**

4.21 Dr O'Donohoe claimed that he had intended that Lucy should receive a bolus of 100ml of normal saline in the first hour to be followed by Solution No.18 at 30ml per hour

4.22 However, it would appear that Lucy was given at least 400ml of Solution No.18 intravenously from 22:30/23:00 until she suffered a seizure at around 03:00. Her fluids were then changed to normal saline.
4.23 Whilst Dr MacFaul described Lucy’s fluid balance chart as “confusing” the following observations may be made with confidence:

(i) It was acceptable practice at that time to administer a bolus of 100ml of normal saline as a replacement fluid followed by 30ml per hour of half normal (0.45%) saline or even Solution No. 18 as maintenance fluids.

(ii) It was not appropriate to give Lucy a bolus of Solution No.18 as a replacement fluid for dehydration.

(iii) It was not appropriate to give Lucy 100ml of any fluid after the first hour, and most certainly not Solution No. 18.

(iv) If Dr O’Donohoe intended that Lucy should receive a bolus of 100ml of normal saline in the first hour to be followed by 30ml per hour of Solution No. 18 he ought to have communicated this in clear and certain terms to Dr Malik and the nursing staff and completed all the necessary documentation to that effect.

(v) All fluids actually administered should have been accurately recorded so that there could be no misunderstanding as to what was received.

4.24 Dr O’Donohoe accepted that mistakes had been made in both the choice of Solution No. 18 and the rate at which it was administered. He stated that he had not intended Lucy to receive Solution No. 18 at a rate of 100 ml/hr and accepted that it was “entirely inappropriate.” He also accepted that he failed to ensure that his directions for Lucy were adequately understood. His concessions are appropriate. However, there remained a dispute between him, the absent Dr Malik and Staff Nurse Brid Swift as to the specifics of his fluid regime. This confirms the serious failure in both communication and record-keeping. However, given the limitations

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41 250-003-034
42 250-003-030
43 Dr O’Donohoe T-06-06-13 p.20 line 12
44 Dr O’Donohoe T- 06-06-13 p.29 line 3
45 325-002-002
imposed by the terms of reference it is not appropriate for me to resolve this dispute between Dr O’Donohoe and his colleagues.

**Infusion of normal saline**

4.25 Having received an excessive volume of Solution No.18, Lucy suffered a seizure at approximately 02:55 on Thursday 13th April 2000. Mrs Crawford called for help. Nurses arrived and Dr Malik attended soon afterwards. At around 03:20 Lucy suffered respiratory arrest and Dr Malik provided artificial respiration.

4.26 At the suggestion of Staff Nurse Thecla Jones, Dr Malik changed the fluids from Solution No.18 to normal saline. It would appear that he directed that this should run freely. It is unclear how much normal saline was then given because the records are poor. Whereas Staff Nurse Siobhan MacNeill believed Lucy received 280mls, Dr Malik’s note suggests that 500 mls had been administered in one hour and the fluid balance chart indicates 810mls between 03:00 and 06:00.

4.27 Dr O’Donohoe was called and, if the records are correct, he arrived at 03:20. He told the PSNI that he reduced the normal saline to 30ml per hour. However, if he did, the change was not recorded and is contradicted by Staff Nurse MacNeill who stated that she administered the normal saline at 30 ml/hr from 04.50. Moreover, the PICU fluid balance chart notes the reduction to 30ml/hr after 04:00. To determine which, if any, of these accounts is accurate is academic because Lucy was already critically...
overloaded with fluid. Furthermore and in all probability, she continued to receive too much fluid at too fast a rate even after her respiratory arrest.

4.28 Dr Thomas Auterson\(^{59}\) (Consultant Anaesthetist) was contacted at 03:40 and arrived promptly to assist.\(^{60}\) He observed Lucy’s pupils to be fixed, dilated and unresponsive. He managed to intubate her but believes she was already beyond help. Nonetheless, he agreed with Dr O’Donohoe that she should be transferred to the Paediatric Intensive Care Unit (‘PICU’) at the RBHSC in case something more could be done for her. Lucy was then moved to intensive care for stabilisation and to await ambulance transfer to Belfast.

\textit{Sodium levels}

4.29 Dr O'Donohoe ordered a repeat blood test\(^{61}\) and the results received at 04:26 indicate that her sodium level had fallen from 137mmol/l to 127mmol/l.\(^{62}\) Lucy, who had not been hyponatraemic on admission was suffering marked hyponatraemia after eight hours of hospital care. Disconcertingly the clinicians do not appear to have been curious as to why a moderately dehydrated patient should suffer a significant decline in her sodium level after her treatment had begun.

4.30 Whilst a sodium reading of 127mmol/l does not indicate dangerous hyponatraemia it should be noted that the saline solution prescribed by Dr Malik after her seizure would have raised her sodium levels and accordingly 127mmol/l is unlikely to have been her lowest reading.\(^{63}\) Additionally, whilst a gradual decline from 137mmol/l to 127mmol/l over an extended period would probably have been manageable, the comparatively rapid decline suffered by Lucy was more dangerous.

\(^{59}\) 325-002-002
\(^{60}\) 013-007-020
\(^{61}\) 027-017-057
\(^{62}\) Result was timed at 04:26
\(^{63}\) WS-278-1 p.10 & WS-302-2 p.3
Transfer to the Children’s Hospital

4.31 Lucy was taken the 80 miles to the RBHSC and arrived soon after 08:00 on 13th April 2000. She was accompanied by Dr O’Donohoe and Staff Nurse MacNeill.

4.32 Upon arrival Dr O’Donohoe supplied the on-call Consultant Paediatric Anaesthetist Dr James McKaigue with a short transfer letter and a transfer form detailing observations recorded en route. However, the clinical records from the Erne Hospital together with her blood test results and x-rays were not provided.

4.33 Significantly, Dr O’Donohoe’s transfer letter failed to refer to the results of the serum electrolyte tests or to the type, rate and volume of the IV fluids administered. Such information was obviously relevant to the RBHSC clinicians who were taking over. Dr O’Donohoe explained that his was “a brief note, written under very difficult circumstances” and maintained that had circumstances been more favourable, his letter would have been more detailed.

4.34 I consider it regrettable that further detail was not given but do not take the view that this was an attempt to conceal medical error. Dr O’Donohoe was acting under stress in an emergency and in any event, the clinical notes were sent later by fax and Dr Auterson supplied the results of Lucy’s repeat urea and electrolyte test.

64 325-002-004  
65 061-014-038  
66 061-015-040  
67 061-016-041  
68 027-012-031-032 (laboratory results showing the serum sodium levels of 137mmol/l and 127mmol/l respectively).  
69 061-014-039 (Dr O’Donohoe’s transfer letter) and 033-102-317 (Dr Auterson’s statement to Mr Fee)  
70 250-003-102 - para 533, Dr MacFaul has noted that it is not evident that Dr O’Donohoe informed PICU staff of the low blood sodium.  
71 250-003-102 - para 532, Dr MacFaul has identified the limited attention paid to Lucy’s fluid management in the transfer letter.  
72 Dr O’Donohoe T- 06-06-13 p.79 line 16  
73 061-018-060 & 061-017-042
Admission to the Children’s Hospital

4.35 Lucy was admitted to PICU under Dr Peter Crean74 (Consultant in Paediatric Anaesthesia and Intensive Care). For reasons which are discussed in greater detail later in this chapter, this does not imply that Dr Crean was the lead clinician in respect of Lucy’s care. In fact it was Dr Anthony Chisakuta75 (Consultant in Paediatric Anaesthesia and Intensive Care) and Dr Donncha Hanrahan76 (Consultant Paediatric Neurologist) who became most directly involved in her care. Dr McKaigue began an assessment of Lucy at 08:00 which was completed by Dr Chisakuta. Neither made any reference in their notes to Lucy’s fluid regime at the Erne Hospital.

4.36 Lucy was then seen at 08:3077 by SHO Dr Louise McLoughlin78 and later on a ward round by Dr Caroline Stewart79 (Registrar), Dr Dara O’Donoghue80 (acting Registrar)81 and Dr Crean. Lucy’s sodium level was recorded at 140mmol/l. Dr Crean noted that he was “awaiting faxes of her notes from the Erne Hospital and she is to be reviewed by a Paediatric Neurologist this morning.”82

4.37 Dr Crean then made a telephone call to Dr O’Donohoe at the Erne Hospital to ask about Lucy’s fluid therapy because he understood it to have been Solution No. 18 at 100ml/hr and naturally wanted clarification. This conversation must have taken place after Dr Crean received Lucy’s Erne Hospital notes because they included the fluid balance chart. Dr O’Donohoe maintained that he told Dr Crean that he had directed “a bolus of 100mls over 1 hour followed by 0.18% NaCl/Dextrose 4% at 30ml/hour.”83 Dr Crean does not remember the conversation.

74 325-002-005
75 325-002-004
76 325-002-005
77 061-018-058
78 325-002-004
79 325-002-005
80 325-002-006
81 115-012-001
82 061-018-065
83 027-010-024
Dr Crean then arranged for Lucy to be seen by Dr Hanrahan who saw her at 10:30 and recorded his differential diagnosis which included infection, haemorrhagic shock encephalopathy, metabolic disease and unrelated cerebral oedema. He also noted that the “findings would suggest that she shows no sign now of brainstem function.” Dr Hanrahan did not identify hyponatraemia or fluid overload as contributory to the cerebral oedema but did express some uncertainty by noting “no cause clinically evident as yet.” He accepted that whilst he was aware of the fall in Lucy’s sodium levels from 137mmol/l to 127mmol/l, he did not regard this as either marked or significant.

Death

Dr Hanrahan directed neurological investigation to include a Computerised Tomography (‘CT’) scan and an Electroencephalography (‘EEG’). The scan revealed obliteration of the basal cisterns suggesting ‘coning’ and the EEG failed to register cerebral function. He noted at 17:45 that her “prognosis, in my opinion, is hopeless and indications are that she is brain dead.” He then recorded that Lucy’s parents were “agreeable to her not being actively resuscitated” should she deteriorate overnight. He made reference to the necessity to test for brain stem death and noted, “If she succumbs, a PM would be desirable – coroner will have to be informed.”

Dr Hanrahan expressed the opinion that Lucy was effectively “brain dead on arrival in Belfast” but that the ‘sentinel event’ had occurred at the Erne Hospital.
4.41 Formal brain stem testing permitted pronouncement of death at 13:15 on 14th April 2000. Mrs Crawford recalled that she and her husband were told by Dr Hanrahan that they “should seek answers from the Erne Hospital as to what happened to Lucy.” This conversation took place immediately after her death.

4.42 Dr Hanrahan then made contact with the Coroner’s Office. Significantly, it was decided that Lucy’s death did not require a Coroner’s post-mortem but that a hospital post-mortem would suffice to clarify the cause of death. A death certificate was subsequently issued, but before the final post-mortem report was available. This recorded Lucy’s death as having been caused by,

"(a). Cerebral oedema
(b). due to (or as a consequence of) dehydration
(c). due to (or as a consequence of) gastroenteritis."

4.43 The clear consensus of those from whom I received evidence was that the cause of Lucy’s death should not have been stated on the death certificate in these terms because it made no sense to certify that the cerebral oedema was due to or a consequence of dehydration.

**Opinions as to cause of death: Dr Auterson**

4.44 Dr Auterson stated that after Lucy’s death he reviewed the fluid balance chart and the sodium readings and concluded that “hyponatraemia played a significant part in Lucy’s deterioration and death.” Indeed, he said that even when he was attending Lucy he reached the conclusion that she had been given too much of the wrong fluid and that this was the most likely cause of her hyponatraemia. Dr Auterson confirmed that he had reached this view, which he characterised as a “strong suspicion,” on the morning
of Lucy’s deterioration and that he became more confident in this opinion in the days that followed.

4.45 Dr Auterson said that he discussed the case informally with his anaesthetic colleagues in the day or two after the death. He spoke to Dr Matt Cody who agreed with his suspicion “that probably it was a fluid-related problem” and he discussed the case with Dr William Holmes who “did not disagree with [his] presumptive diagnosis” implicating the fluid management.

4.46 Dr Auterson was carefully questioned about this account:

“Q. So… based on her neurological status, based upon the electrolyte results and taking into account the information you gleaned from the fluid balance chart, you recognised that fluids had caused the hyponatraemia and the hyponatraemia had caused the cerebral oedema?
A. Yes.
Q. That was your working diagnosis?
A. Yes.”

4.47 It is a matter for concern that Dr Auterson did not volunteer this opinion when he made his statement for the Erne Hospital Review into Lucy’s death. He recognises that his failure to report these concerns to the Medical Director reflects badly upon him and is something for which he may be legitimately criticised. He explained that he did not articulate his view that the IV fluids were the likely cause of the hyponatraemia because he regarded that as “an obvious conclusion.”

4.48 Dr Auterson said that he expected others to form the same view. Dr O’Donohoe attended with him after Lucy’s collapse and was also aware of

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101 Dr Auterson T-31-05-13 p.127 line 21
102 Dr Auterson T-31-05-13 p.136
103 WS-274-1 p.5
104 Dr Auterson T-31-05-13 p.156 line 23
105 Dr Auterson T-31-05-13 p.157 line 15
106 Dr Auterson T-31-05-13 p.124 line 10-25
107 033-102-316
108 Dr Auterson T-31-05-13 p.154
109 Dr Auterson T-31-05-13 p.163
110 WS-274-1 p.7
the repeat sodium results. According to Dr Auterson they had a brief discussion at that time acknowledging that Lucy may have received too much fluid.\(^{111}\) He believed that Dr O’Donohoe was aware of his suspicions\(^{112}\) and indeed recognised what had gone wrong at that time.\(^{113}\) He subsequently assumed that Dr O’Donohoe would address this at the Review\(^{114}\) and accordingly did not discuss the matter further. Dr Auterson said, “\textit{Without seeming flippant, it’s the elephant in the room. Why did nobody else come to this conclusion?}”\(^{115}\)

4.49 Dr O’Donohoe was dismissive of Dr Auterson’s evidence and in particular his claim to have understood so quickly that fluid mismanagement had triggered the sequence of events which led to the cerebral oedema.\(^{116}\) Dr O’Donohoe insisted that Dr Auterson had not raised this suggestion at the time and emphasised that if Dr Auterson believed that Lucy had collapsed due to hyponatraemia he might have tried to remedy the situation by administering concentrated hypertonic saline, which he did not.\(^{117}\) Dr O’Donohoe specifically rejected Dr Auterson’s account that they had discussed fluid mismanagement at the time of the resuscitation.\(^{118}\)

4.50 I accept that the evidence of Dr Auterson is unsatisfactory in some important respects. Why, if he had formed so strong a suspicion about what had gone wrong in Lucy’s case, did he not voice that suspicion to others outside his circle of colleagues in the Anaesthetics Department? However, it must be noted that in this, his approach is consistent with what was done by others. Dr O’Donohoe’s statement for the Review did not address the fluid mismanagement issues and Dr Malik did not address fluids at all.

4.51 Additionally, I consider that Dr Auterson was honest in describing how he formed his early suspicion that mismanagement was implicated in Lucy’s hyponatraemia. He has accepted, properly in my view, that it is not to his

\(^111\) Dr Auterson T-31-05-13 p.139 line 1
\(^112\) Dr Auterson T-31-05-13 p.165 line 12
\(^113\) Dr Auterson T-31-05-13 p.137 line 7
\(^114\) Dr Auterson T-31-05-13 p.136 line 21
\(^115\) Dr Auterson T-31-05-13 p.153 line 12
\(^116\) Dr O’Donohoe T-06-06-13 p.52-53
\(^117\) Dr O’Donohoe T-06-06-13 p.53
\(^118\) Dr O’Donohoe T-06-06-13 p.58
credit that he failed to communicate his suspicions at the time. This was a significant omission on his part because it acknowledged his failure to be straightforward and frank when that was his clear professional duty.119

4.52 I wish to emphasise that criticism is not confined to Dr Auterson alone. Whilst he, by his evidence, chose to expose himself to criticism, others have implausibly maintained that they had no misgivings about the fluid therapy. I conclude that there was a reluctance on the part of those responsible for Lucy’s care in the Erne Hospital to speak out about what may have caused her death most probably because there was a suspicion that fluid mismanagement was responsible.

4.53 I do not accept that the cause of death could not have been established promptly and accurately. It was entirely possible to reach the conclusion of mismanagement in the immediate aftermath of Lucy’s death. It could and should have been established almost immediately because Dr Auterson was not alone in forming this suspicion.

**Dr Asghar’s opinion**

4.54 Dr Mohammed Asghar120 was a paediatrician at the Erne Hospital who was not involved in Lucy’s care. Nonetheless, it would appear that he interested himself in Lucy’s clinical notes and may have spoken to others about the standard of care provided to her. He wrote to the Chief Executive of the SLT, Mr Hugh Mills121 on 5th June 2000 in the following terms:

“Lucy was admitted in the ward with a history of vomiting. The SHO could not put up the IV line so he called Dr O’Donohoe who was on call that night. Dr O’Donohoe examined the child and put up the IV line. The SHO then got busy with the other three admissions. Dr O’Donohoe told the nurse to give fluids at 100mls per hour. At three o’clock in the morning the child got a convolution and went into respiratory arrest. She was later transferred to Belfast where she died. A P.M. revealed cerebral oedema. This child might

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119 315-002-009
120 320-002-004
121 325-002-008
have been given excess of fluids. All through the night fluids were running at 100mls per hour. After the child died in Belfast he made alterations in the chart. He wrote that he had ordered the fluids should be given as a bolus of 100mls and then at 30mls per hour. In fact, neither the SHO nor any of the nurses were told to give the fluids at 30ml per hour.”

4.55 Dr Asghar had no difficulty in recognising mismanagement of the fluids and the possible link between excess fluid and the cerebral oedema. His curiosity and desire to do the right thing stand in commendable contrast to those of his colleagues.

Dr Chisakuta’s opinion

4.56 At the RBHSC Dr Chisakuta performed the brain stem death tests with Dr Hanrahan.123 He gave evidence that “throughout the course of [his] clinical involvement in Lucy’s care on 14th April 2000 [he] was giving consideration to the cause of her condition.”124

4.57 Dr Chisakuta could not say for certain that he was involved in discussion with Dr C Stewart prior to her entering her clinical diagnosis in the autopsy request form, namely “dehydration and hyponatraemia, cerebral oedema, acute coning and brain stem death.”125 Nevertheless, he said that he probably would have agreed with that diagnosis because, “From the medical clinical notes faxed to the PICU ... Lucy had clinical symptoms and signs of dehydration for which she was prescribed intravenous fluids.”126 He went on to explain:

“The serum sodium level was noted to have decreased from 137 mmol/l (measured at 8.30pm on 12/04/00)127 to 127 mmol/l (measured around 3.20am on 13/04/00)128 a condition referred to as hyponatraemia.
During the stress of illness, the body produces a chemical called Anti-diuretic hormone, which causes the kidneys to retain the water. This also might have contributed to an increase in body water. In this situation, water tends to move from outside the cells into the cells causing them to swell up, a condition called oedema. When this happens to the brain cells, it is referred to as cerebral oedema.

*Cerebral oedema can lead to coning and brain stem death.*

*This sequence of events seems to me to fit Lucy’s case so I speculate that if there was a discussion with Dr Stewart as has been suggested, that I would have been agreeing with her working pathogenesis.*

Dr Chisakuta accepted that the missing link in Dr C Stewart’s description was an account of how Lucy could have gone from a state of dehydration to one in which she was suffering from hyponatraemia. He said he would have wanted the fluid management problem to have been stated explicitly in the list of problems.

In his evidence Dr Chisakuta was asked specifically whether at the time of Lucy’s death he had any idea what the cause was. He told me that he knew that Lucy had died because her brain had coned due to the development of cerebral oedema and that while the cause of this “could have been a combination of things” he was aware that one of the possible factors was that “she had lots of fluids in the other hospital.”

Dr Chisakuta went on in his evidence to reiterate that he was “conscious of the possibility that a possible or probable cause of Lucy’s death was the volume of fluid that she had been given in the Erne.” He said that this concern about the standard of treatment Lucy received was in his mind from the 14th April 2000.
Dr Evans’ opinion

Dr Evans was retained by solicitors acting on behalf of the Crawford family and asked to examine and report on the events leading to Lucy’s death. He reported on 18th February 2001 that:

(i) A combination of errors by clinicians at the Erne Hospital contributed significantly to Lucy’s death.

(ii) There was a failure to calculate the fluid replacement required by Lucy and document the results.

(iii) There was a failure to give adequate instruction as to the type and volume of fluid indicated.

(iv) The decision to use 0.18% NaCl (‘Solution No. 18’) was wrong, given the nature of Lucy’s condition.

(v) The decision to infuse Solution No. 18 at a rate of 100ml per hour was wrong.

(vi) The decision to administer 500ml of 0.9% NaCl after her collapse was wrong.

(vii) It is probable that the very significant change in her electrolytes was caused by the infusion of an excessive volume of dilute fluid and further that it could not be explained on the basis of “some conjectural inappropriate ADH secretion.”

(viii) If Lucy had been managed according to the basic standards of district general hospital paediatric practice by deploying a bolus of isotonic intravenous solution (such as 0.9% NaCl or HAS) in a volume of 90ml-180ml, followed by 0.45% NaCl (with added potassium) at a rate of no more than 70ml/hr, she would not have developed cerebral oedema.\textsuperscript{136}
4.62 Dr Evans gave his opinion within a year of Lucy’s death and within a short time of receiving her hospital notes. His views mirrored the findings which the Coroner was to reach at inquest some three years later. Dr Evans did not claim any particular expertise in the field of fluid management.

**Dr Jenkins’ opinion**

4.63 The Directorate of Legal Services (‘DLS’), on behalf of the SLT, commissioned a report from Dr Jenkins. He concluded on 7th March 2002 that Lucy had been given the wrong fluids. Dr Jenkins was clear that she should have been given replacement fluid with higher sodium content than Solution No. 18. Ideally she should have been given normal saline. Acknowledging that “it is always very difficult to understand an episode of sudden collapse,” he expressed the opinion that the fall in Lucy’s serum sodium and potassium “raise[d] the question as to the fluid management in the period from insertion of the IV line at 2300 to the collapse at around 3.00am.”

4.64 In September 2000 the SLT requested the Royal College of Paediatrics and Child Health (‘RCPCH’) to conduct an external review into Dr O’Donohoe’s competence and conduct. The RCPCH nominated Consultant Paediatrician Dr Moira Stewart to undertake this task.

4.65 Dr M Stewart was asked to examine a number of cases in which Dr O’Donohoe had acted as Consultant. The focus of her review was the overall conduct and competence of Dr O’Donohoe. She was not asked to provide specific analysis of what had caused Lucy’s death notwithstanding that part of her remit necessarily included Lucy’s case. She was briefed...
with Lucy’s medical notes, post-mortem report and a report provided the Trust by Dr Murray Quinn\textsuperscript{142} in connection with the Trust’s internal Review.

4.66 Dr M Stewart’s report was received in April 2001.\textsuperscript{143} Whilst concern has been raised about possible delay by the RCPCH in presenting its report because it was published too late to be of assistance to those treating Raychel Ferguson in June 2001, I consider that Dr M Stewart is not to be faulted for the time she took to produce her report. This was difficult work and it was carried out with great diligence. She was asked to consider not only Dr O’Donohoe’s competence in the context of Lucy’s case but also in four other cases. She was obliged to devote appropriate time to each. There is no reasonable basis for suggesting that she ought to have produced a report prior to April 2001.

4.67 The report identified several possible explanations for Lucy’s death including:

“\textit{(ii) She had a seizure like episode due to underlying biochemical abnormality. Initial sodium was 137 mmol/L, and potassium 4.1 mmol/L at 10.30pm. At 3.00am, and after administration of 0.18\% NaCl, the repeat sodium was 127, and potassium 2.5. Biochemical changes are often well tolerated and easily corrected with appropriate fluid replacement, although these results do show a change over a relatively short period of time.}”\textsuperscript{144}

4.68 Dr M Stewart indicated that there were “\textit{deficiencies in the prescription and recording of volumes of fluids}”\textsuperscript{145} and emphasised that in cases of moderate or severe dehydration, the Advanced Paediatric Life Support (‘APLS’) guidelines specify the use of normal saline and not the low saline fluids given Lucy. In addition Dr M Stewart observed that even after collapse Lucy received 500mls of normal saline in one hour whereas the

\textsuperscript{142} 325-002-009
\textsuperscript{143} 036a-022-039
\textsuperscript{144} 036a-025-056
\textsuperscript{145} 036a-026-060
appropriate volume should have been 20mg/kg. In other words she considered that Lucy was also given an excessive volume of normal saline.

4.69 On 1st June 2001 Dr M Stewart met with Dr James Kelly, the Medical Director of the SLT to discuss the report. His memorandum of their meeting noted that

“Overall amount of fluids once started not a major problem but rate of change of electrolytes may have been responsible for the cerebral oedema. RVH ward guidelines would recommend N-Saline not 1/5th normal as the replacement fluid.”

4.70 For her part, Dr M Stewart gave evidence that by the end of the meeting she had left Dr Kelly in no doubt that the likely cause of Lucy’s collapse was the fall in sodium levels caused by fluid mismanagement. It was clear to me that Dr M. Stewart’s evidence was given with a confidence not apparent in her written report. As Dr Kelly maintained, at the meeting with him she only went so far as to say that fluid mismanagement leading to electrolyte derangement could have caused the terminal deterioration:

“I think my understanding of it was that Dr Stewart’s telling me that even in a child, you wouldn’t automatically expect a seizure, but the rate of change of electrolytes could have caused the seizure or likely caused the seizure. The issue for me was that did not go on to say, “This is clearly the cause of death or this is clearly the cause of very significant brain oedema.” That conversation didn’t follow from that...”

4.71 On balance I am prepared to accept Dr Kelly’s evidence that Dr M. Stewart expressed her opinions with a measure of equivocation during their meeting. It was properly conceded on Dr M. Stewart’s behalf that “she should have been more explicit as to how the hyponatraemia and the rate of change in electrolytes could have resulted from the high volume of

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146 036a-025-058
147 325-002-007
148 036a-027-067
149 Dr M Stewart T-18-06-13 p.76 line 9
150 Dr Kelly T-13-06-13 p.69 line 12
Nevertheless, and whilst it appears that she did not express a definitive conclusion about the process leading to the cerebral oedema either in her report or in her discussions with Dr Kelly, I am satisfied that she did condemn Lucy’s fluid regime.

4.72 Dr M. Stewart’s conclusions reinforce my finding that the probable causes of Lucy’s death were readily identifiable in the period immediately following her death. I conclude that not only could the Coroner’s findings of 2004 have been made in 2000 had an inquest been conducted but that they were in fact reached with one degree of precision or another by Drs Auterson, Asghar, Chisakuta, Evans and M. Stewart.

4.73 Therefore, the question which must be asked is, why did an accurate assessment of the cause of Lucy’s death not emerge at the outset whether at the Erne or at the RBHSC

*Initial concerns expressed at the Erne Hospital*

4.74 After Lucy had been transferred to the RBHSC Dr Crean made a telephone call to the Erne Hospital to clarify the detail of fluid management. He spoke to Dr O’Donohoe.152

4.75 Dr O’Donohoe cannot remember the specific details of the conversation but accepts that it caused him to question whether Lucy had received the fluids he had intended for her.153 He was prompted to check Lucy’s notes to see what was recorded about her fluid therapy.154 He discovered that Dr Crean was right to be concerned because the fluids given to Lucy before her collapse were recorded as having been infused at 100mls/hr.

4.76 It was in this context that he made the following retrospective entry in Lucy’s notes:

“Yesterday Dr Peter Crean rang from PICU RBHSC to enquire what fluid regime Lucy had been on. I told him a bolus of 100mls over 1 hour followed
by 0.18% NaCl/Dextrose 4% at 30 ml/hour. He said he thought that it had been NaCl 0.18% Dextrose 4% at 100ml/hr. My recollection was of having said a bolus over 1 hour and 30ml/hour as above.”

Dr O’Donohoe did not however make any contact with the RBHSC thereafter to confirm that Lucy had not been given the fluids intended or indeed to indicate any error. However, Dr Crean and others at RBHSC were already of the view that the fluids given were inappropriate.

Dr O’Donohoe did however report his concerns to his Medical Director Dr Kelly as a ‘critical incident reporting’ on the 13th/14th April 2000. He cannot now remember what he said to Dr Kelly but confirms that it related to the quantity of fluids given. Dr Kelly recalled that Dr O’Donohoe indicated uncertainty about what had happened and raised several possibilities, including misdiagnosis, drug error and adverse drug reaction. Dr Kelly said that Dr O’Donohoe made it very clear to him that there had indeed been confusion in respect of fluids.

Additionally, Sister Etain Traynor of the Erne Hospital, who had not been involved with Lucy’s care, tried to find out what had happened. She checked the nursing record and fluid balance sheets and notwithstanding the "minimal information recorded" approached the Clinical Services Manager Mrs Esther Millar to express her “concerns that the IV fluids administered had (although not recorded or prescribed) may (sic) have contributed to the child’s deterioration…”

Sister Traynor said that she told Mrs Millar that if Lucy was given 100ml per hour for a number of hours then that would have been too much and “may well have contributed to her collapse.” This was then reflected in the

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155 027-010-024
156 It is unclear from the evidence when precisely Dr O’Donohoe made his report to Dr Kelly. I note that in submissions on behalf of Dr Kelly the 13th April 2000 is put forward; submissions made on behalf of Dr O’Donohoe suggest the 14th April. In my view nothing of significance turns on this discrepancy.
157 WS-278-1 p.6
158 116-043-003
159 325-002-003
160 WS-310-1 p.3
161 325-002-008
162 WS-310-1p.4
163 Sister Traynor T-07-06-13 p.159 line 23
clinical incident report form compiled by Mrs Millar on 14 April 2000 which recorded, “concern expressed about fluids prescribed/administered...”

4.81 All of this confirms for me that very soon after Lucy’s death Dr O’Donohoe knew that there had been error with the fluids and that concerns were being expressed by others within the hospital.

**Discussion with Mr and Mrs Crawford at the Erne Hospital**

4.82 Mr and Mrs Crawford contacted Dr O’Donohoe and requested a meeting to discuss their daughter’s death. They must have hoped to find out what had happened and why she died. They met in May 2000. It is not suggested that Dr O’Donohoe or the Trust sought to avoid such a meeting but there is no indication that anyone from the Trust actively pursued one.

4.83 Whilst it should have been the first step to giving Mr and Mrs Crawford a proper understanding of what had happened to Lucy, it was in fact a most unproductive meeting. Dr O’Donohoe arrived without Lucy’s medical notes. Whilst acknowledging that this was a failing he said in explanation that he had “tried unsuccessfully to retrieve Lucy’s notes.”

4.84 Mrs Crawford recalled how disappointing the meeting had been:

“We asked him various questions surrounding Lucy’s death. He said ‘he did not know’ or ‘did not understand it.’ Dr O’Donohoe did not have Lucy’s notes with him. He said he had given them to Dr Kelly to check. We were left feeling totally deflated and in the dark surrounding the circumstances in which Lucy died.”

4.85 Dr O’Donohoe accepted that he was unable to answer their questions, making it, even on his own admission, an unsatisfactory meeting. He disputed the suggestion that he couldn’t answer the questions because he didn’t have access to the notes on the even more unsatisfactory basis that
4.86 Dr O’Donohoe’s most unprofessional approach to meeting Mr and Mrs Crawford is confirmed by his failure to inform them about any mismanagement of the fluids or his telephone conversation with Dr Crean. That did not require access to Lucy’s medical notes. Even if he did not then fully understand the part poor fluid management had played in Lucy’s deterioration, a position about which I have some doubt, I consider that he had a clear obligation to admit that mistakes had been made and to assist Mr and Mrs Crawford to an eventual understanding of their significance. Dr O’Donohoe conceded that he ought to have told Lucy’s parents about the fluids, if only to let them know that the intended Review process would have a focus as opposed to something that was “undirected.”

4.87 However, Mr and Mrs Crawford are very clear that Dr O’Donohoe did not tell them that there would be a Review. Dr O’Donohoe maintains that he told them that he had “asked Dr Kelly, as the Trust’s Medical Director to look into the matter.” However he did accept that his choice of words may have been “very unhelpful” in actually describing the process of review.

4.88 The meeting with Lucy’s parents was particularly unsatisfactory. Even, and perhaps most especially, at a first meeting they had the right to be told of the circumstances of their daughter’s death and of the mismanagement of her fluid therapy. Dr O’Donohoe had a duty to explain fully what he knew to have happened. They should furthermore have been advised explicitly about the Review of her case. That they were not so advised raises the concern that the issues were deliberately withheld so as to avoid blame and criticism.

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169 Dr O’Donohoe T-06-06-13 p.168 line 9-21
170 Dr O’Donohoe T-06-06-13 p.169 line 6
171 036c-017-042
172 Dr O’Donohoe T-06-06-13 p.168 line 16-17
173 Dr O’Donohoe T-06-06-13 p.169 line 19
4.89 Mr and Mrs Crawford then went to see Dr Hanrahan at the RBHSC on 9th June and he in turn contacted Dr O’Donohoe to ask him to meet with them again. Dr O’Donohoe said that whilst he would arrange a further meeting, he would prefer to await the post-mortem report.\(^{175}\)

4.90 I accept that that was a sensible thing to do, particularly after the unsatisfactory first meeting. A delayed meeting would allow Dr O’Donohoe time to review Lucy’s notes, consider the opinion of the pathologist and reflect upon the case in the light of his own direct involvement.

4.91 Regrettably, Dr O’Donohoe failed to make contact with the family to arrange a further meeting. He was unable to provide any explanation for this omission\(^{176}\) but acknowledged that it was a failing on his part.\(^{177}\) I consider that Dr O’Donohoe’s refusal to tell Mr and Mrs Crawford what he knew and what they were entitled to know was inexcusable.

4.92 I do not underestimate how difficult such meetings must be for doctors, especially in the case of child death where there is no definitive explanation for the death. It must be even more difficult where clinical shortcomings are suspected. Nonetheless it remains vitally important that such meetings take place. Paragraph 18 of the contemporaneous General Medical Council (‘GMC’) code ‘Good Medical Practice’ required that where “...a patient under 16 has died you must explain, to the best of your knowledge, the reasons for, and the circumstances of the death, to those with parental responsibility.”\(^{178}\)

4.93 A recurrent theme of this Inquiry has been the determination expressed by parents to ensure that lessons are learned so that the mistakes which led to the death of their child cannot be repeated. I have reached the view that once the possibility of error is openly acknowledged by clinicians there remains nothing to conceal and learning is incentivised. It is clear to me that one of the main obstacles to learning in these cases has been the

\(^{175}\) 061-018-069  
\(^{176}\) Dr O’Donohoe T-06-06-13 p.167  
\(^{177}\) 400-033-004 - Submissions made on behalf of Dr O’Donohoe  
\(^{178}\) 315-002-009
failure by clinicians and others to inform families of suspected mismanagement at the earliest opportunity.

**Review**

4.94 It was entirely appropriate that the SLT should establish a formal Review in order to examine what had happened to Lucy.

4.95 It is to be recognised that at that time governance arrangements in Northern Ireland hospitals were not well developed. Mr Eugene Fee\(^{179}\) (Acute Services Manager, SLT) explained that formal clinical and social care governance was not implemented until late 2000.\(^{180}\) Nonetheless, arrangements for adverse clinical incident reporting were in place and Dr Kelly lost no time in bringing the matter to the attention of the Trust Chief Executive Mr Mills, requesting that the case be investigated by a senior Review Team. The Review was to be co-ordinated by Mr Fee with the assistance of Dr Trevor Anderson\(^{181}\) (Clinical Director for Women and Children’s Directorate).

4.96 The stated object of the Review was:

“...to trace the progression of Lucy’s illness from her admission to the Erne Hospital and her treatment/interventions in order to try and establish whether:

*There is any connection between our activities and actions and the progression and outcome of Lucy’s condition*

*Whether or not there was any omission in our actions and treatments which may have influenced the progression and outcome of Lucy’s condition*

*Whether or not there are any features of our contribution to care in this case which may suggest the need for change in our approach to the care of patients within the Paediatric Department or wider hospital generally.*\(^{182}\)
Mr Mills noted on 20th April 2000 that, “Mr Fee advised that the patient’s notes recorded a comment from Dr O’Donoughoe (sic) that he was uncertain about the instructions he gave staff about the rate of flow of I.V. fluids. Child had been given 100mls per hour for 4 hours. He states he meant this to be 100mls per hour for the first hour and 30mls per hour thereafter. However, when child collapsed anaesthetic support had prescribed more fluids. Post mortem results indicated cerebral oedema. Mr Fee felt he required advice from a Paediatrician. I agreed I would arrange this…”

In order to secure expert Paediatric opinion, Mr Mills contacted Dr Murray Quinn (Consultant Paediatrician, Altnagelvin Area Hospital) who agreed to look at Lucy’s notes and to provide advice. Mr Fee then wrote to Dr Quinn on 21st April 2000 that:

“I would be grateful for your opinion on the range of issues discussed which would assist Dr Anderson and my initial review of events relating to Lucy’s care. These were:

(i) The significance of the type and volume of fluid administered
(ii) The likely cause of the cerebral oedema
(iii) The likely cause of the change in the electrolyte balance i.e. was it likely to be caused by the type of fluids, the volume of fluids used, the diarrhoea or other factors.

I would also welcome any other observations in relation to Lucy’s condition and care you may feel is relevant at this stage.”

Mr Fee informed Mr Mills that he had spoken with the medical and nursing staff and had requested written statements from six individuals. It was agreed that a health visitor would be asked to communicate with the Crawford family and inform them that the circumstances of Lucy’s death were being examined.
4.100 At that stage, the Review appeared well founded in that it was being led by a senior hospital manager with the assistance of the relevant Clinical Director, it had the support and interest of both the Trust’s Medical Director and Chief Executive, it was commencing its investigation promptly and within days of the adverse incident, it had the expertise of an external Consultant Paediatrician and had access to all relevant clinical and nursing staff. Furthermore, on the face of it a channel of communication had been established with Lucy’s parents.

4.101 Regrettably, the Review failed to establish that any error was implicated in the sequence of events leading to the death or even that there were any significant shortcomings in care. The Review report findings were remarkably inconclusive. They indicated that:

“Lucy Crawford was admitted to the Children’s Ward, Erne Hospital on 12 April 2000 at approximately 7.30pm having been referred by her General Practitioner. The history given was one of 2 days fever, vomiting and passing smelly urine. The General Practitioner’s impression was that Lucy was possibly suffering from a urinary tract infection. She was admitted for investigation and administration of IV fluids. Lucy was considered to be no more or less ill than many children admitted to this department. Neither the post-mortem result or the independent medical report on Lucy Crawford, provided by Dr Quinn, can give an absolute explanation as to why Lucy’s condition deteriorated rapidly, why she had an event described as a seizure at around 2.55am on 13 April 2000, or why cerebral oedema was present on examination at post-mortem.”

4.102 In assessing the quality of the Review I have taken into account the underdeveloped state of clinical governance, the lack of support for the role of Medical Director, the lack of training in the process of review and that the more developed investigation techniques of today were not then available.

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188 033-102-265
189 Dr R. MacFaul T-27-06-13 p.120 line 12
Method

4.103 The Review method was to consider Lucy’s case notes and post-mortem, obtain written statements from the relevant staff, engage Dr Quinn, discuss matters with the Ward Sister, Infection Control Nurse and Dr Quinn and consider his written report.190

4.104 There was, however, only limited commitment to gaining a detailed account of the facts of the case. Dr Quinn asked Dr Kelly and Mr Fee whether there “could there have been earlier seizures resulting in hypoxia for 15-20 minutes prior to catastrophic seizure event?”191 The reviewers did not engage with his questions. They blandly reported that “with the exception of Nurse McCaffrey’s report, little detailed descriptions of the event are recorded and no account appears to be in existence of the mother’s description, who was present and discovered Lucy in this state.”192 Seemingly no one sought more detailed descriptions or asked Lucy’s mother.

4.105 Dr Quinn received no further instructions and this may have hampered his ability to form necessary conclusions. He certainly expressed his uncertainty in relation to key issues:

“Did the child have a seizure or did she “cone” at 3.00am?

I feel it is very difficult to say what happened in and around this time. It is certainly possible that she had a seizure and may even have had a period of time when she was hypoxic before medical attention was drawn to the fact that she was unwell. However I cannot say that this is the case. It may be that mother informed the ward staff immediately she noted the problem but again this is not clear to me from the notes provided.”193

4.106 The obvious failure to identify and examine key aspects of the incident inhibited findings on fluid management issues. The Review catalogued much that was then unclear and required investigation, noting for example

190 033-102-265
191 036a-047-101
192 033-102-266
193 036a-048-105
that “There was no written prescription to define the intended volume. There was some confusion between the Consultant, Senior House Officer and Nurses concerned, in relation to the intended volume of fluid to be given intravenously. There is a discrepancy in the running total of the intravenous infusion of solution 18 for the last 2 hours. There is no record of the actual volume of normal saline given when commenced on a free flowing basis.”  

4.107 However, having raised these issues there appears to have been little attempt to address them. What was the confusion between the Consultant, the House Officer and the Nursing team? What was the discrepancy in the record of infusion of Solution No. 18, and how did this occur? How much normal saline was administered? What did the treating clinicians consider to be mistakes and what did they think were the implications? None of these questions was satisfactorily explored by the Review and I am bound to ask why, because there was every prospect of obtaining the answers had the reviewers pursued them.

4.108 Dr Anderson was keen to emphasise the distinction between ‘investigating’ and ‘reviewing’ a case just as Mr Fee insisted that he was conducting a ‘review’ rather than ‘investigating’ a death. Their evidence suggested that neither was determined to pursue critical questions.

4.109 Dr Quinn had asked how much normal saline had been administered because had Lucy received 500ml “this may have affected the level of cerebral oedema experienced at post mortem.” However, the information was not provided to the satisfaction of Dr Quinn, causing him to observe in his report that he was “not certain how much normal saline was run in...” This was a failure Mr Fee could not explain. That the Review should respond to Dr Quinn’s query about the administration of normal saline in such a casual manner is symptomatic of the general lack of thoroughness. Notwithstanding that the Review ought to have focussed on fluid management matters, Mr Fee and Dr Anderson allowed some
participants to avoid all mention of fluids. Extraordinarily, the Review was actually characterised by a general failure to describe fluid management error and the potential implications.

4.110 The Review had sought from each clinician a “factual account of the sequence of events from their perspective.” This was interpreted narrowly and the co-ordinators accepted what was submitted without demur or follow-up. There was an obvious absence of rigour and clinical curiosity. It is troubling that having knowingly commenced a review into the fluid and electrolyte management of a patient who had died, that they did not ask more questions about the management or appraise the evidence in order to identify the limited co-operation which they had received.

4.111 Clinicians should have been specifically requested to explain and justify the fluids given and to articulate any concerns. Dr Malik’s approach should have been challenged and Dr Auterson asked to address the issues more specifically. The clinicians should not have been permitted to avoid proper explanation. It is a matter of concern that the reviewers should tolerate rather than challenge Dr O’Donohoe’s avoidance of the issues. He was asked neither for detail nor explanation as to what had happened. This was unacceptable and illustrates how timidly Mr Fee and Dr Anderson approached the Review.

4.112 Mr Fee agreed that the failure of clinicians to engage with the Review “stares out at you” from their statements. However, it was their responsibility to ensure that the clinicians did not evade the issues. The clinicians should have been pursued and required to provide answers. Mr Fee could not account for this failure but insisted that it was not in consequence of any deliberate decision.

4.113 Mr Fee and Dr Anderson were responsible for a Review which was inadequate. This was a failure of the individuals and of governance. They

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198 Mr Fee T-13-06-13 p.145 line 7-8
199 Mr Fee T-13-06-13 p.145 line 7-8
200 Mr Fee T-13-06-13 p.146 line 7
201 Mr Fee T-14-06-13 p.37 line 17
were inexperienced and untrained in the conduct of reviews of this nature and they were not assisted by the clinicians involved. They were possibly deflected by the misleading conclusions of Dr Quinn. However this can afford them only partial mitigation. Lucy’s death was caused by a glaring medical error and if Mr Fee and Dr Anderson had thought about it they would have recognised that the clinicians were consistent in avoiding this central issue, and it would appear, deliberately so.

**Dr O'Donohoe’s contribution to Review**

4.114 In assessing Dr O'Donohoe’ contribution to the Review I have had regard to the findings reached by the GMC that his acts or omissions were not in Lucy’s best interests and fell below the standard to be expected of a reasonably competent physician. The GMC determined that Dr O'Donohoe had failed to calculate an acceptable plan of fluid replacement and had failed to ensure that nursing staff knew of an adequate fluid replacement plan and a system for monitoring its progress. Moreover, the GMC concluded that the entry made in Lucy’s notes by Dr O'Donohoe on the 14 April 2000 following his conversation with Dr Crean, was both “inaccurate and misleading.” Furthermore, it was found that the fluid therapy which Dr O'Donohoe “claimed to have ordered” was not communicated properly to those administering the fluid and was in any event, inappropriate.

4.115 It has been said on Dr O'Donohoe’s behalf that his role in the events following Lucy’s death was “of a very limited compass” and that he was only involved with the aftermath “to a comparatively limited degree.” I disagree with this analysis. Dr O'Donohoe could and should have played the central role in identifying the mismanagement in her care and in assisting the review to determine what it was that had caused her death. It is clear that he failed to fulfil that role.

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202 163-005-001
203 400-033-002 to 004 - para 7 & 25(4), Submissions made on behalf of Dr O'Donohoe
4.116 In his statement for the Review, Dr O’Donohoe rehearsed those fluids which he claimed to have directed Dr Malik to give Lucy, namely 100mls as a bolus over the first hour and then 30mls per hour thereafter. However, he knew very well that Lucy had not received those fluids. He had checked this issue after Dr Crean’s telephone call and knew that Lucy had received Solution No. 18 at a rate of 100ml/hr until she suffered a seizure and that thereafter she had been given a large quantity of normal saline. He did not refer to these important matters in his statement. He knew that her fluid management was wrong and he avoided saying so.

4.117 Dr O’Donohoe, having stated that he could not remember why he did not particularise the fluids actually given, ventured to explain that he didn’t know that Dr Anderson was conducting a Review on behalf of the Trust and that in any event Dr Anderson liked to receive short, factual reports. Ultimately, Dr O’Donohoe accepted in his evidence that his avoidance of all reference to fluid mismanagement in his statement was a failing and he expressed regret.

4.118 It was said on Dr O’Donohoe’s behalf that his mental and physical health had declined since the events in question and that his memory was in consequence impaired. While all of this may be so, I found his explanations implausible and bizarre. Dr O’Donohoe contended that at the time of Lucy’s death it did not occur to him that her deterioration was “a fluid balance issue” although he accepted in retrospect that this is precisely what should have occurred to him at the time. He stressed that he did not think her repeat serum sodium level of 127mmol/l could be associated with “such a profound catastrophic outcome.” In defence of his position Dr

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204 033-102-293
205 WS-278-1 p.8
206 Dr O’Donohoe T-06-06-13 p.148 line 1-8
207 400-033-004 - Submissions made on behalf of Dr O’Donohoe
208 400-033-002 - Submissions made on behalf of Dr O’Donohoe
209 Dr O’Donohoe T-06-06-13 p.13 – This position was consistent with his evidence before the General Medical Council by whom he was condemned for serious professional misconduct.
210 Dr O’Donohoe T-06-06-13 p.100 line 8
O’Donohoe relied on the fact that the issues were not clarified by the post-mortem undertaken at the RBHSC.²¹¹

4.119 I do not consider that Dr O’Donohoe should necessarily have reached the initial conclusion that errors of fluid management caused the death. Rather, I believe that an experienced paediatrician with a developed understanding of this field of medicine should have suspected that fluid mismanagement could be implicated. Instead of engaging with the Review on this issue, he remained silent. This was unacceptable.

Dr Malik’s contribution to the Review

4.120 Dr Malik submitted a statement for the Review²¹² but made no reference whatever to the fluids. His omission is extraordinary. His failure to engage was not challenged by those conducting the Review. At best, this was worryingly complacent.

4.121 Dr Malik had been present when Dr O’Donohoe gave his directions for Lucy’s fluid management. So much is clear from Dr O’Donohoe²¹³ and Staff Nurse Swift.²¹⁴ However, Dr Malik stated that having admitted Lucy for “administration of intravenous fluids”²¹⁵ he was probably called away before Dr O’Donohoe directed Lucy’s fluids.²¹⁶ Even if Dr O’Donohoe and Staff Nurse Swift are wrong and he was absent when the fluids were prescribed, Dr Malik nonetheless had the opportunity to identify the fluids because they were still running when he returned to see her at 03:00. I conclude that he knew what she had been given and ought to have said so in his statement.

4.122 Furthermore, Dr Malik’s position that he “did not mention the rate and volume of fluid actually received by Lucy as [he] was not the one who initiated the fluid regime”²¹⁷ is disingenuous. The fact that Dr Malik did not
initiate the pre-collapse fluids is irrelevant and merely avoids explanation of what he knew.

4.123 Dr Malik was likewise evasive in relation to the fluids administered after collapse. Staff Nurse Sally McManus\textsuperscript{218} confirmed that Lucy’s fluids were changed to normal saline with Dr Malik in attendance.\textsuperscript{219} Accordingly, Dr Malik was probably responsible for that prescription and indeed he recorded the infusion of 500ml normal saline over 60 minutes.\textsuperscript{220} However, he chose not to mention it in his statement for the Review.

4.124 I consider that a remarkable and telling failure. The decision to discontinue Solution No. 18 and infuse as much normal saline as possible for an hour was a radical change in treatment and required clear explanation. Dr Malik ought to have particularised and justified the treatment he directed rather than omitting all reference to it.

4.125 Dr Malik said that he had only been asked to deal with his role in caring for Lucy and had not been asked for his view about the appropriateness of the treatment.\textsuperscript{221} However I consider that it was his responsibility to inform the Review both about the treatment given and the reasons for that treatment. He was no mere bystander but an active participant.

4.126 Dr Malik said that he was reassured because his consultant Dr O’Donohoe had made the initial prescription and there were senior nurses present who would have challenged the treatment had they been concerned.\textsuperscript{222} This is inconsistent with the explanation he gave to the GMC that “\textit{the nursing staff should not have started the fluid without written prescription; they should have been aware of the inappropriate amount of fluid regime and they should have queried it with me or the consultant.}”\textsuperscript{223} His evidence and attitude confirms my suspicion that he was aware that the treatment

\textsuperscript{218} 325-002-002
\textsuperscript{219} 027-017-057
\textsuperscript{220} 027-010-024
\textsuperscript{221} WS-285-1 p.10
\textsuperscript{222} WS-285-1 p.10
\textsuperscript{223} WS-285-1 p.22
provided was open to criticism and that is why he was so unhelpful when asked to account for it.

4.127 In assessing Dr Malik’s conduct, I take into account the fact that at the time of Lucy’s death he was a relatively inexperienced paediatrician. His appointment to the Erne as an SHO appears to have been his first substantive appointment to a paediatric post in the UK.\textsuperscript{224} He did not give oral evidence and so his Inquiry witness statement could not be tested. Whilst I appreciate that it may have been difficult for him to travel from Pakistan, he made no application to be excused.

4.128 I conclude that Dr O’Donohoe and Dr Malik were aware that the fluid management was flawed. It is troubling that they should have deliberately avoided dealing with the issue for the Review. They disregarded their duty as doctors to co-operate fully with the Review and specifically not to withhold relevant information.\textsuperscript{225} They acted unprofessionally and by so doing undermined the critical process of review.

\textit{Dr Auterson’s contribution to the Review}

4.129 I have already reviewed Dr Auterson’s engagement with the Review process.

4.130 He was at all times under a professional duty to make proper disclosure.\textsuperscript{226} In his evidence he admitted that he was ashamed by his failure to assist the Review but said that, "\textit{There was no deliberate attempt on my part to conceal any facts. The fact that I did not mention fluid balance and possible errors on that in my report [for the Review], I can’t explain it, it’s a bad reflection on me.}"\textsuperscript{227}

4.131 In many respects the motivation for Dr Auterson’s silence is not the most important issue, but it does seem to me very likely indeed that he failed to

\textsuperscript{224} WS-285-1 p.18  
\textsuperscript{225} 315-002-009 - GMC Good Medical Practice (1998)  
\textsuperscript{226} 315-002-009  
\textsuperscript{227} Dr Auterson T-31-05-13 p.153 line 23
inform management of Lucy’s care because of a misplaced loyalty to colleagues.

**Dr Murray Quinn’s report for the Review**

4.132 The decision to appoint an ‘outside’ Consultant Paediatrician to advise was sound in principle. However, Dr Quinn imposed limitations on his involvement. He did not wish to interview clinicians or meet the family. His was a paper exercise which involved examining the records, identifying issues, raising questions and attempting to draw conclusions. He was not asked for a formal medico-legal report. Such limitations were likely to reflect in the quality and completeness of his work.\(^{228}\) He maintained that the Trust knew what he was prepared to do and accepted his approach.\(^{229}\) This confirms the Trust’s lack of ambition for the Review which undermined its prospects from the start.

4.133 Dr Quinn agreed that he was obliged to bring professional rigour to his task.\(^{230}\) His work may have been limited but he was to do it to the best of his professional ability. In the event, Dr Quinn was unable to identify the ultimate cause of the cerebral oedema.\(^{231}\) That may have been understandable but his report made fundamental errors which served to mislead.

4.134 Dr Quinn was an experienced Consultant Paediatrician and the medical issues of gastroenteritis, dehydration, fluid and electrolyte therapy and cerebral oedema were all within his competence to analyse.\(^{232}\) Nonetheless, errors appear in his report which individually and cumulatively gave the Trust reassurance when its clinicians ought to have been subject to criticism.

4.135 Dr Quinn categorised the use of Solution No. 18 to manage the fluids of a child with recent vomiting and diarrhoea as “appropriate.”\(^{233}\) He later

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\(^{228}\) Dr Quinn T-14-06-13 p.99 line 23
\(^{229}\) Dr Quinn T-14-06-13 p.99 line 14
\(^{230}\) Dr Quinn T-14-06-13 p.97-98
\(^{231}\) 036a-048-106
\(^{232}\) Dr Quinn T-14-06-13 p.109 line 19
\(^{233}\) 036a-048-104
acknowledged that this was wrong, explaining that he used “this ‘appropriate’ term, which is maybe inappropriate, on the perception that the doctors in the Erne felt she wasn’t very sick, and therefore at that time were going to use fifth-normal saline for maintenance or mild dehydration.”

4.136 There are problems with this analysis because Dr Quinn knew from the notes that Dr O’Donohoe claimed to have intended a different fluid regime for Lucy not involving Solution No. 18 at 100ml/hr. Accordingly, Dr Quinn’s perception that the doctors thought her in a better state of health than she was, had no basis in fact. In any event, his report did not contain this explanation. If he believed that they used the wrong fluid because they underestimated the severity of her condition then it was his obligation to say so. He should not have engaged in an analysis on the basis that the doctors were correct in using Solution No. 18 when he recognised that this was in fact a mistake.

4.137 Dr Quinn accepted that Lucy had not been mildly dehydrated but was suffering dehydration in the order of 5%-10%. In such circumstances it was necessary to administer fluids containing more sodium than Solution No. 18. He should have made this observation and with force but did not. Dr Quinn sought unconvincingly to argue that it was at least possible that he could have told the Trust that the fluid should have been normal saline. However, the note of his meeting with Dr Kelly and Mr Fee on the 21 June 2000 clearly records him expressing a view that “choice of fluid correct.” Similarly, his report written the following day, described the choice of fluid as “appropriate.”

4.138 Dr Quinn failed to adequately condemn the fluids given as excessive. Whilst he insisted that he had always taken the view that the volume of fluids administered “was absolutely incorrect” this does not emerge

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234 Dr Quinn T-14-06-13 p.134-135
235 Dr Quinn T-14-06-13 p.121 line 19 & 027-010-024
236 Dr Quinn T-14-06-13 p.138 line 8
237 Dr Quinn T-14-06-13 p.148 line 10
238 036a-047-101
239 036a-048-104
240 Dr Quinn T-14-06-13 p.141 line 10
clearly from his report. It notes that Lucy received 100ml/hr of Solution No. 18 over a four hour period but is silent as to whether Lucy’s condition warranted the infusion of 100ml/hr. Moreover, Dr Kelly’s note of their meeting on 21 June 2000 records Dr Quinn as indicating that “fluid replacement 4 hours @ 100mls provided was greater than normal but not grossly excessive.” By contrast, Dr Quinn agreed in oral evidence that not only did Lucy receive the wrong fluid, but she received it at a rate (100ml/hr) which would only have been acceptable had she been much more dehydrated than he believed.

4.139 Notwithstanding, that the volume of normal saline given was not clarified to Dr Quinn’s satisfaction by the co-ordinators of the Review his working notes indicate that he was suspicious that 500ml had been administered. Regrettably, he did not use his report to highlight the basis for this justifiable concern, nor did he indicate that the infusion of such a volume could have contributed to the oedema. This was in strong contrast to the directness with which he gave his oral evidence when he described a volume of 500ml as “massively excessive.” He explained that running that volume into a sick child of Lucy’s weight would place “tremendous strain on the right side of the heart.”

4.140 Additionally, Dr Quinn reported that he would have been “surprised” if the volume of fluid given “could have produced gross cerebral oedema causing coning.” That this was his stated view is confirmed by Dr Kelly’s note. Whilst Dr Quinn denied this, I am nonetheless satisfied that this was the impression given to Dr Kelly. In his discussions with the Trust as in his written report, Dr Quinn expressed himself in such a way as to mislead as to the appropriateness of the type and volume of fluids given and to

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241 036a-048-104
242 036a-047-101
243 Dr Quinn T-14-06-13 p.173 line 19
244 WS-279-1 p.35
245 Dr Quinn T-14-06-13 p.126 line 17
246 036a-048-105
247 036a-047-101
248 Dr Quinn T-14-06-13 p.167 line 19
communicate a sense that the fluid therapy presented little cause for concern.

4.141 Dr Quinn also failed to recognise that because the normal saline was infused before the blood sample was taken, the serum sodium count could have been even lower than the 127mmol/l recorded. Whilst Dr Quinn admitted that he did not seek clarification in relation to the sequencing before writing his report, I received no adequate explanation from him as to why his written report should have so failed in analysis.

**Criticisms of Dr Quinn**

4.142 It has been suggested on Dr Quinn's behalf that it would be fair to criticise him for three errors only: describing the infusion of Solution No. 18 as “appropriate” because this was potentially misleading (albeit not intentionally so); for failing to state explicitly in his report that it was intended as a ‘desk-top’ review and not a medico-legal report; and for allowing himself to be persuaded to commit his thoughts to writing at all.

4.143 I agree that these concessions were properly made, but there is an additional concern. Importantly, Dr Quinn failed to draw attention to what he knew to be a possibility, namely that the mismanagement of fluids could have caused the fatal cerebral oedema. In his defence Dr Quinn considered that he was not in a position to give an opinion on the likely cause of the cerebral oedema and coning because he had not been provided with all the necessary information.

4.144 Notwithstanding that Dr Quinn did not receive all the materials which would have been supplied to him had he been asked to conduct a detailed investigation and whilst accepting that Dr Quinn may not have been able to reach a definitive conclusion because he had not spoken to Lucy’s mother, nursing staff or the clinicians involved, it is nonetheless clear, that he could have identified the poor fluid management and indicated that it could have

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249 Dr Quinn T-14-06-13 p.117  
250 400-029-009 to 011 - Submissions on behalf of Dr Quinn
caused the cerebral oedema and coning.\textsuperscript{251} He properly accepted that by omitting this from his report the Trust may have been falsely reassured.\textsuperscript{252}

4.145 Dr MacFaul described Dr Quinn’s report as “\textit{wrong and misleading}.” I agree with that view. Indeed, it is reasonable to conclude that the conclusions in his report about fluid management were directly contradicted in his oral evidence. I consider that his approach to the task demonstrated a reluctance to criticise other professional colleagues. This has been a recurring theme in this Inquiry. There were certainly deficiencies in the information supplied to him, but I take the view that he had sufficient information to be more critical of the treatment provided to Lucy, and that he ought to have alerted SLT to more problems than he did. He was keen to adopt a limited role and was insufficiently committed to his task to give the issues which confronted him the attention they deserved. He approached his obligation to report without due professionalism.

\textit{Independence of Dr Quinn}

4.146 The appointment of Dr Quinn to assist with the Review has been questioned on the basis that he may have lacked the independence necessary to assess the issues with obvious detachment. It was of fundamental importance that he should express independent views without fear or favour and that there should be confidence that he was so doing.

4.147 Dr Quinn was at that time employed as a consultant in the Altnagelvin Area Hospital which was run, like the Erne Hospital, within the same WHSSB area. Additionally, Dr Quinn had previously provided paediatric services to the Erne Hospital and knew some of the clinicians who worked there including Drs Anderson and O’Donohoe. He knew Mr Mills both professionally and socially.

4.148 I am concerned there was no assessment by the Trust of the potential for conflict of interest.\textsuperscript{253} Dr Quinn was a very poor choice to conduct this work.

\textsuperscript{251} Dr Quinn T-14-06-13 p.150 & p.156 line 18 & p.154 line 22
\textsuperscript{252} Dr Quinn T-14-06-13 p.163 line 22 & p.164 line 2
\textsuperscript{253} 162-002-006 - Dr Michael Durkin has commented that Dr Kelly, in his capacity as Medical Director, ought to have made such a record.
on behalf of Trust, not least because of his professional and social connections. The Trust is to be criticised for retaining an expert who was not transparently independent.

4.149 It is clear to me that Dr Quinn did not approach his task with the necessary degree of professional detachment. His familiarity with the organisation and the people who had retained him plainly influenced him. He has indicated that he was “sweet talked” into providing a written report for the Review against his better judgment.254 He should not have carried out this work on behalf of the Trust, and should not have been asked to do so.

**Deployment of Dr Quinn’s Report by Sperrin Lakeland Trust**

4.150 Mr Crawford made a formal complaint to the Trust on 22 September 2000 requesting that it investigate the “inadequate and poor quality of care provided.”255 He was entitled under the 1992 Patient’s Charter to expect that this would be dealt with quickly with a full investigation and written report to be issued within one month. Additionally, the Trust had been issued with Departmental guidance on handling complaints by the HPSS Executive in 1996.256 This emphasised as a “key objective” an approach which was honest and thorough.257

4.151 Mr Mills eventually made the Trust’s substantive response to Mr Crawford on 30 March 2001. He sought to reassure him that,

“the outcome of our review has not suggested that the care provided to Lucy was inadequate or of poor quality. As you will be aware, the Trust engaged an independent consultant, from another Trust, to review Lucy’s case notes and to advise us on this very question. We do however accept and acknowledge that the review has flagged up issues which the Trust will

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254 In the UTV Insight documentary Dr Quinn used the term “sweet talked.” It was an unfortunate turn of phrase in this context. However, I note the submission made on Dr Quinn’s behalf that I should not place importance upon it. I agree that of itself, the use of the phrase does not assist me in coming to a determination in relation to whether his independence was compromised.

255 015-014-114


257 314-016-006
wish to address for the future. These include communication and written records, and are referred to in Mr Fee’s report.”

4.152 The deliberate impression conveyed was that the independent expert’s advice had established that there were no inadequacies in the care. Mr Mills did not tell Mr Crawford that the RCPCH had been asked to review Lucy’s case as part of a broader appraisal of Dr O’Donohoe’s competence. I am concerned that Mr and Mrs Crawford were encouraged to conclude that there had been a proper consideration of the issues surrounding their daughter’s death and that the Trust was justified in defending the quality of care provided.

4.153 Mr Mills insisted that he was entitled to respond to the complaint in this way given what he knew at the time. He contended that it was only after engaging with the RCPCH, the litigation process and the inquest that the Trust could understand the inadequacy of the care.

4.154 Nevertheless, there were problems with Mr Mills’ decision to deploy Dr Quinn’s report in response to Mr Crawford’s complaint because it had not been commissioned or compiled for that purpose. Dr Quinn’s report was a “desk-top review” undertaken without detailed investigation for the purpose of “highlighting issues rather than attempting to provide definite conclusions.”

4.155 Dr Quinn had very clearly not intended his report to be conclusive. It expressed uncertainties about whether Lucy had suffered a seizure, why she was floppy, what her mother had observed and even how much normal saline she had been given. Such statements as were obtained by Mr Fee and Dr Anderson were not shared with Dr Quinn. Dr Quinn had written that “It is always difficult when simply working from medical and nursing records and also from not seeing the child to get an absolutely clear picture.
of what was happening..."264 His report raised more questions than it supplied answers.265 However, no such uncertainty was conveyed to Lucy’s parents.

4.156 Furthermore, Dr Quinn’s report did not absolve the Trust, and Mr Mills was wrong to suggest that it did not identify inadequacies in the care. Dr Quinn had “questioned a lot of what had been done in terms of the record keeping and the IV fluids”266 and for his part, Mr Fee was very properly prepared to accept that the failures identified by Dr Quinn’s report were “deficits in the quality of care provided to Lucy.”267

4.157 Mr Mills should not have suggested that Dr Quinn’s report was an independent expert determination of the adequacy and quality of the care because it was not. It was misleading to suggest his reported view to Mr Crawford as an answer to the complaint. It was not. That the Trust chose not to furnish Mr Crawford with a copy of Dr Quinn’s report compounds the obvious failure to respond with the openness and fairness expected of it by the Departmental guidance.268

**Involvement of RBHSC and Mr and Mrs Crawford**

4.158 Mr Fee acknowledged that there were no restrictions on how he or Dr Anderson should conduct their Review. Notwithstanding, the Review was markedly limited in the scope of its inquiry. Whilst the obvious first step would have been to approach the RBHSC for input269 this was not done and there is no good explanation as to why it was not done. Dr MacFaul believed it “an outstanding deficit” of the Erne Review process that the opinions of the RBHSC clinicians were not sought.270

4.159 Nor did the Trust formally notify Mr and Mrs Crawford of the Review process, invite them to participate in the Review or advise them as to the

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264 036a-048-106
265 400-029-008 - Submissions on behalf of Dr Quinn
266 Dr Quinn T-14-06-13 p.181 line 8
267 WS-287-1 p.21
268 314-016-018
269 Mr Fee T-13-06-13 p.149 line 1
270 250-003-093
procedure and terms of reference. Dr Anderson\textsuperscript{271} could not even recall any suggestion that they be involved in the Review process.\textsuperscript{272} He accepted that Mrs Crawford should have been asked to participate.\textsuperscript{273} So too did Mr Fee\textsuperscript{274} and Dr Kelly.\textsuperscript{275} Mr Crawford did not even learn of the Review until almost four weeks after he had lodged his complaint.\textsuperscript{276}

4.160 It could never have been a very meaningful Review without asking for Mr and Mrs Crawford’s contribution. Lucy’s parents had every right to be told that their child’s death was to be investigated. In addition Mrs Crawford was a witness to key events. It is therefore remarkable that the final Review report should have expressed regret at the absence of an account of the seizure suffered by Lucy from Mrs Crawford.\textsuperscript{277} It should have been a straightforward matter to seek her input and it should have been done.

4.161 Dr Kelly, as Medical Director, was responsible for ensuring that the Review was effective and appropriate. His failure to ensure that the family was involved cannot be explained by reference to his inexperience in his role or by the demands of a busy professional life.\textsuperscript{278} Since the report of the Review referred explicitly to the absence of an account from Mrs Crawford, his failure to ensure that engagement defies common sense.

\textit{Report}

4.162 At the conclusion of the Review it should have been obvious that it had failed to make clear findings. Whilst the conclusions ostensibly provided some reassurance, Dr Quinn’s report left much to be investigated. Notwithstanding that it was clearly not too late to seek input from Mrs Crawford or to make a request for the opinion of the RBHSC clinicians,\textsuperscript{279} the report was finalised and published on 31\textsuperscript{st} July 2000.

\textsuperscript{271} WS-291-2 p.5
\textsuperscript{272} Dr Anderson T-11-06-13 p.52 line 19
\textsuperscript{273} Mr Fee T-13-06-13 p.111-112
\textsuperscript{274} WS-287-1 p.16
\textsuperscript{275} Dr Kelly T-13-06-13 p.83 line 17
\textsuperscript{276} 015-020-121
\textsuperscript{277} 036a-053-125
\textsuperscript{278} 400-030-012 para 19-20 - Submissions made on behalf of Dr Kelly
\textsuperscript{279} 250-003-067
4.163 The Review report appears sanitised. It concluded that “there was some confusion between the Consultant, Senior House Officer and nurses concerned in relation to the intended volume of fluid to be given intravenously.”\textsuperscript{280} The problems were very much more profound than just volume or communication. It is accordingly a matter of concern that the findings of the Review were not shared or discussed with the clinicians in the Erne Hospital. Further error would then have been detected. If, for example, Dr Quinn’s report had been shown to Dr Auterson, he could have immediately pointed out the error in deeming the use of Solution No. 18 ‘appropriate.’

4.164 The Trust should have acknowledged the limitations of the Review and identified the need for further investigation. Mr Fee could not recall this being considered\textsuperscript{281} but conceded, that with the benefit of hindsight, that he was,

“… not now satisfied with the review we conducted or the conclusions we reached given the findings of the inquest. On reflection, we should have involved the family at the outset; the review should have been conducted using a more systematic approach such as a Root-Cause Analysis. The Team selected should probably have benefitted from the inclusion of a Paediatrician and an experienced paediatric nurse and perhaps the Medical Director. We probably relied too much on the external opinion without having the expertise to examine the opinion offered. The case should probably have been jointly reviewed or investigated by the two hospitals involved in Lucy’s care.”\textsuperscript{282}

4.165 Dr Anderson not only adopted this statement but said that he thought at the time that Dr Quinn’s conclusions were suspect but felt in no position to challenge them. He believed he discussed this with Mr Fee but Mr Fee had no recollection of this.\textsuperscript{283} Notwithstanding, the Trust regarded itself satisfied
with the work of the Review and answered Mr Crawford’s complaint on that basis.

4.166 The Review report recommended that the family should be invited to a meeting to discuss its findings. However, the Trust did not send the report to the Crawfords but suggested instead that it would be shared with them at a meeting at which Trust officials would explain the findings. The Trust only finally shared the report in January 2001, six months after it had been finalised.

4.167 On the face of it the Trust wanted such a meeting in order to convey to the Crawfords a proper understanding of the Review’s findings. However, I detect a determination on the part of the Trust to control the manner in which the family would receive and interpret the information to which they were entitled. This approach is confirmed by the fact that even when a copy of the report was finally made available, it was stripped of its recommendations together with the appendices and the report of Dr Quinn. There can be no justification for this and Mr Fee could offer no explanation.

4.168 It was submitted on behalf of Dr Kelly that his failure to recognise the flawed nature of the Report at the time was in part understandable because he was reliant on the apparently conscientious work of Mr Fee and the appearance of the 67 page Review report complete with appendices and external paediatric opinion gave every impression of being comprehensive.

4.169 I cannot accept this submission. Dr Kelly was the Trust Medical Director and had responsibility to ensure the adequacy of the Review. If Dr Kelly had adequately considered the Review report he could not have failed to recognise that it and the investigation were substandard. I accept that

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284 033-036-076
285 015-019-119
286 015-024-127
287 015-028-133 to 136
288 Mr Fee T-14-06-13 p.71 line 17
289 I also note the reliance which Dr Kelly’s legal advisors have placed on the report of Dr M.A. Durkin dated 22nd August 2011: 162-002-001. I have given full consideration to the opinions expressed by Dr Durkin.
serious adverse clinical incident reviews were not commonplace at that time but consider that there can be no excuse for a Medical Director who fails to recognise that obvious enquiries have not been made.

4.170 On one interpretation the Review was deliberately superficial and Dr Kelly knowingly accepted a flawed report because it helped to conceal the truth about what had happened to Lucy. That is not my conclusion. I do not believe that Dr Kelly conducted himself in that way. Rather, I accept that Dr Kelly, Mr Fee and Dr Anderson and the Trust took some steps to discover what had gone wrong. However, those steps were clearly not sufficient. They failed to uncover the glaring failures in the treatment of a girl who, apart from a minor ailment, was otherwise healthy, and who was rendered moribund as a result of that treatment a few hours after it was initiated. Nobody has suggested to the Inquiry that the cause of Lucy’s death was difficult to discern. What was lacking was a willingness to involve the Crawford family and be open to the need to criticise those involved with Lucy’s care.

4.171 I consider that Dr Kelly, on behalf of the Trust, presided over a process which was ineffective and which, as a consequence, failed to identify medical mismanagement in causing her death. He ought to have identified the need to initiate an external review to resolve the questions left unanswered by Dr Quinn. For those failures he is to be criticised.

_Failure to disclose the findings of RCPCH Reports to Mr and Mrs Crawford_

4.172 The initial failure of the SLT to be transparent and straightforward with Mr and Mrs Crawford was repeated when the Trust received the first RCPCH report which clearly challenged any perception that the care provided to Lucy was adequate. It was received by the Trust in late April 2001\(^{290}\) and dealt in part with Dr O’Donohoe’s practice in the context of Lucy’s treatment.

\(^{290}\) 036a-022-039
4.173 Dr M. Stewart reported “deficiencies in the prescription and recording of volumes of fluids administered.”\textsuperscript{291} In particular she stressed that in cases of moderate or severe dehydration APLS guidelines recommended the use of normal saline and not Solution No. 18.\textsuperscript{292} Her report also indicated that after collapse, Lucy was given an excessive volume of normal saline.

4.174 I consider that having received this report, the Trust was then subject to a continuing obligation to provide the family with this new information because it superseded both the Review findings and the response which Mr Mills had provided in answer to Mr Crawford’s complaint.

4.175 The RCPCH produced a second report for the Trust on the 7\textsuperscript{th} August 2002.\textsuperscript{293} It went further than the first report to conclude that:

“The prescription for the fluid therapy for LC was very poorly documented and it was not at all clear what fluid regime was being requested for this girl. With the benefit of hindsight there seems to be little doubt that this girl died from unrecognised hyponatraemia although at the time this was not so well recognised as at present.”\textsuperscript{294}

4.176 This was unequivocal external opinion that the hyponatraemia was a direct cause of death and that it was linked to the fluid regime.\textsuperscript{295} Dr Kelly regarded this as an advance on what was previously known, which was likewise acknowledged by Mr Mills.\textsuperscript{296} However, no one within the Trust sought to correct the view given to the Crawford family that Lucy had received an acceptable standard of care. All those who were involved on behalf of the Trust, particularly Dr Kelly and Mr Mills in this context, are to be criticised because all were under a duty to ensure that Mr and Mrs Crawford were not misled.

\textsuperscript{291} 036a-025-060
\textsuperscript{292} 036a-025-058
\textsuperscript{293} 035-021-074
\textsuperscript{294} 035-021-077
\textsuperscript{295} Dr Kelly T-13-06-13 p.77 line 19
\textsuperscript{296} Mr Mills T-17-06-13 p.163 line 22
As before, the report was not shared with Lucy’s parents. Mr Mills explained that by the time the Trust received the RCPCH reports the family had commenced legal action against the Trust and that in this context he “would have sought assurance that the reports were shared with the Trust’s legal representatives for their advice.” There is no evidence that the Trust was advised against disclosing either report and indeed there are strong grounds for considering that the report should have been drawn to the attention of the Crawford’s as part of the very process of litigation.

Accordingly, it seems likely that a decision was taken that the Crawford family should not see the reports. In addition, they were not disclosed to the Coroner and whilst it was argued that there was no legal duty to furnish the reports to the Coroner, I am left to consider the motivation for such deliberate non-disclosure to the next of kin. The obvious explanation is that they were deliberately withheld to keep from the Crawford family the known connection between medical mismanagement and the death of their daughter.

Mrs Crawford said that she and her husband “were not listened to and sidelined in every way” and that “everyone was avoiding the most important issue, what happened to Lucy?” Mr Mills, the Chief Executive of the Trust, was ultimately responsible for ensuring that there was a full and transparent engagement with Mr and Mrs Crawford. Regrettably, I must find that the Trust’s engagement with them was reluctant, incomplete, defensive and misleading. The Chief Executive must bear responsibility for this failing.

Sperrin Lakeland Trust and the Western Health and Social Services Board

The SLT was directly accountable to the Department of Health and Social Services and Public Safety (‘the Department’) in respect of the provision
and management of services. The main commissioner of those services was the WHSSB under a ‘purchaser-provider’ service agreement.

4.181 Whilst remaining accountable to the Department and with no accountability to the WHSSB in management terms, the Chief Executive of the Trust nevertheless continued to report to and discuss significant issues with the WHSSB because it required assurance that the services purchased were of appropriate quality. If problems arose in respect of those services, the WHSSB expected to be told. The WHSSB was thus able to exert influence over the Trust and require compliance with the terms of its service agreement which emphasised, amongst other things, the importance of effective clinical governance.

4.182 It was in this context that Lucy’s death was reported to the WHSSB. Dr William McConnell, then Board Director of Public Health, was informed on the day of Lucy’s death. Mr Martin Bradley, then Chief Nursing Officer for the Board, met Mr Mills on 19th April and the death was discussed. Both Dr McConnell and Mr Bradley were responsible to Dr Thomas Frawley (General Manager, WHSSB) and he too was informed. The death became the subject of discussion at subsequent meetings between Trust and WHSSB officials.

4.183 Lucy’s death was not, however, reported to the Department which was not notified until March 2003 when the Coroner informed Dr Henrietta Campbell, the Chief Medical Officer (‘CMO’). The WHSSB expectation at the time was that the Trust would report such a serious clinical incident to both the Board and the Department. Mr Bradley considered a report to the Department was critical, because the
"Department also ultimately is in a better position [than the Board] to influence policy and to pick up on regional learning that needs to be implemented."313 I accept this analysis.

4.184 Dr McConnell insisted that he advised Mr Mills to report Lucy’s death to the Department at that time, although the detail of his recollection was somewhat vague.314 Mr Mills had no memory of this315 and said that in any event at that time he would only have reported financial and strategic matters to the Department. He maintained that the Trust did not at that time report adverse clinical incidents to the Department and there was no expectation that it should.316 He even questioned whether there was mechanism at that time to make such a report.

4.185 Indeed, there was then no designated reporting procedure by which Trusts might report serious adverse clinical incidents to the Department. Mr Bradley sympathised with Mr Mills and acknowledged that there was probably a lack of clear direction about how such matters could be reported.317 However, I consider that it should have been natural to report to the Department. It did not make sense for the Trust to make a report to the WHSSB and not the Department because the Trust was directly accountable to the Department and that accountability was not solely limited to financial and strategic matters. Lucy’s death ought to have been reported to the Department in the same way as Raychel’s death was reported by Altnagelvin Hospital a year later.

4.186 The question arose as to whether the WHSSB had a responsibility to ensure that the Trust reported the death to the Department and to the Coroner.318 I do not consider that it was any part of the Board’s duty to monitor the Trust so closely as to ensure that its experienced and well qualified health professionals performed routine reporting tasks.

313 Mr Bradley T-18-06-13 p.113 line 20
314 Dr McConnell T-19-06-13 p.30 line 12-14
315 Mr Mills T-17-06-13 p.62 line 2-4
316 Mr Mills T-17-06-13 p.54 line 1-15
317 Mr Bradley T-18-06-13 p.115 line 1
318 251-002-007 to 008 & 015
The WHSSB did, however, recognise its responsibility to ensure that lessons were learned from adverse clinical incidents occurring within the undertakings of its service providers. Mr Bradley said that whilst the Board would not become involved in a clinical incident investigation it would certainly wish to consider any recommendations arising and if there were obvious problems it would have had a responsibility to raise those with the Trust.319

Given that the Trust had reviewed the circumstances of Lucy’s death, Dr Frawley expressed the view that the WHSSB should then have examined the outcome of that Review. He indicated that “...where the investigation and its conclusions resulted in the preparation of a formal report, I would have had an expectation that the report would be shared with the Board in order to enable the Board to consider whether the Board needed to initiate any action in light of the report. In making such a judgment, I would seek the views of the relevant professional leads in the Board on whether the findings, conclusions and recommendations proposed by the Trust were a proportionate response to the incident that had been investigated.”320

It is unlikely that the Review report was forwarded on any formal basis to the WHSSB321 but both Dr McConnell322 and Mr Bradley323 informally obtained copies. Nevertheless the death and the Review findings ought to have come before the Board’s Healthcare Committee for consideration.324

Dr McConnell accepted that he had a responsibility to bring known adverse clinical incidents to the attention of this Committee325 and he said that he would be “amazed” if that had not been done in this case.326 He said that he would generally have wanted to be reassured that a Trust had “got to the bottom of a serious adverse incident” and having done so he indicated

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319 Mr Bradley T-18-06-13 p.119 lines 14-17
320 WS-308-1 p.8
321 WS-308-1 p.26
322 WS-286-1 p.8
323 Mr Bradley T-18-06-13 p.131 line 11
324 Mr Bradley explained to me that the Healthcare Committee of the WHSSB was the appropriate mechanism within which a variety of professionals could meet to discuss the output from a Trust’s review: Mr Bradley T-18-06-13 p.120 line 10
325 Dr McConnell T-19-06-13 p.7 line 14
326 Dr McConnell T-19-06-13 p.39 line 6
that he would have envisaged a role for the WHSSB in terms of reporting any lessons to other Trusts, other Boards and possibly to the Department.  

4.191 However, the Committee minutes make no reference to Lucy’s case and there is no evidence to suggest that this important Committee ever discussed Lucy’s death or its implications. Professor Scally considered it the responsibility of the WHSSB to point out “significant deficiencies” and that it was “remiss of them” not to do so in this case.  

4.192 Mr Bradley conceded that it was “extraordinary” that the WHSSB had not openly discussed the outcome of the Trust Review and properly acknowledged that the Board’s handling of the report into Lucy’s death was not “its finest hour.”  

4.193 Such failure on the part of the WHSSB to ensure proper examination of the Review report was a serious neglect of its responsibilities. I consider that it is at least possible that had the report been deliberated upon in committee by experienced healthcare professionals they would have identified some of the most serious issues presented by Lucy’s case and raised them, not only with the Trust, but with the Department.  

4.194 Notwithstanding, the officers of the WHSSB were clearly concerned by Lucy’s death. Mr Bradley visited the Paediatric Unit of the Erne Hospital to familiarise himself with where Lucy had been treated and subsequently worked with Directors of Nursing in the Board area to address some of the issues raised by Lucy’s case including the importance of clinical records and the necessity to avoid ambiguity in prescribing.  

4.195 Dr McConnell insisted that he discussed the Review report with Dr Kelly and told Dr Kelly that because the Review had failed to establish the cause of death, further work was necessary. Specifically, he claimed to have

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327 Dr McConnell T-19-06-13 p.22 line 6
328 251-002-011
329 Mr Bradley T-18-06-13 p.137 line 12
330 Mr Bradley T-18-06-13 p.148 line 13
331 Mr Bradley T-18-06-13 p.144 line 24
recommended “a wider review” involving external independent experts\footnote{332 WS-286-1 p.7} and indicated that Dr Kelly agreed with him and undertook to discuss it within the Trust.\footnote{333 WS-286-2 p.5} This indeed would have been sensible and appropriate.

4.196 Professor Scally expressed the view that the WHSSB should have exerted its influence over the Trust to ensure that it engaged with the RBHSC in order to establish an independent review of Lucy’s care with written terms of reference and appropriate expertise.\footnote{334 251-002-007-008 & 015}

4.197 However, the Trust instead chose to engage the RCPCH to review the general professional competence and conduct of Dr O’Donohoe. Whilst there was also good reason to commence such a review given broader concerns about Dr O’Donohoe’s practice, there was an equally pressing need to commission a specific investigation to address with precision the cause of Lucy’s death. In my view Dr McConnell should have done more to ensure that the Trust pursued further investigation of this kind.

4.198 Mr Bradley accepted that the WHSSB should have obtained the assurance of the Trust that further investigation would be undertaken to establish the cause of Lucy’s death.\footnote{335 Mr Bradley T-18-06-13 p.141, line 22} Dr McConnell and Mr Bradley, as the clinical professionals within the Board, should have ensured that the Trust was pressed to explain how this question was going to be addressed. Professor Scally considered that Dr McConnell (and indeed the Board in general) had “\textit{significant positional and sapiential authority}” to advocate a thorough investigation of Lucy’s death.\footnote{336 251-002-010}

4.199 In addition, the WHSSB failed to hold the Trust to account for the procedural failings in its Review, the failure to gather relevant evidence, the failure to establish exactly what had happened and most especially the failure to identify mismanagement as a possible or probable cause of death. Furthermore, it ought to have considered whether Lucy’s death raised issues of more general application. Whilst I have no doubt that Dr
McConnell was troubled by the outcome of the Trust’s Review, he failed to ensure that the Trust addressed the outstanding questions when he was in a position to do so.

4.200 The fact that the Board was not sent a copy of the second RCPCH Report was an additional failing on the part of the Trust. The first RCPCH report had been shared and Dr McConnell believed that he should certainly have received the second report but he had not even been informed that there was to be a second RCPCH review.

4.201 Mr Mills recognised that the second RCPCH report contained new information and that the report ought properly to have been disclosed to the WHSSB. He could offer no explanation for this omission and appeared to accept that there could be no excuse for this failure. As I have also noted in connection with the Trust’s failure to disclose this report to the Crawford family, it is impossible to escape the conclusion that the report was withheld from the WHSSB to conceal the connection between medical mismanagement and Lucy’s death. Mr Mills is to be strongly criticised for this failure.

**RBHSC: Consultant responsibility for Lucy’s Care**

4.202 Debate surrounded the question as to who had individual responsibility for Lucy’s care after she was admitted to the RBHSC. She was documented as being admitted into the consultant care of Dr Crean who saw Lucy at ward round soon after admission and spoke with her parents. He arranged for review by Paediatric Neurologist Dr Hanrahan and spoke with Dr O’Donohoe in the Erne Hospital about Lucy’s fluid management upon receipt of her notes.

4.203 Dr Crean told me that whilst his name appears as Lucy’s consultant on the admissions record, this was an administrative formality “to designate a
direct ICU admission” from another hospital. He explained that notwithstanding that Lucy was jointly managed by the anaesthetists and Dr Hanrahan in PICU, the actions of Dr Hanrahan indicated to everyone that he was the consultant with actual charge of Lucy’s care. He conceded nonetheless that this ought to have been formalised with an entry in Lucy’s notes.

4.204 Dr Hanrahan had been responsible for arranging the specialist neurological investigation and conducting the brain stem testing for death with Dr Chisakuta. Furthermore, after Lucy’s death Dr Hanrahan contacted the Coroner’s Office, arranged for the consent post-mortem and oversaw the certification of death. He communicated with Mr and Mrs Crawford.

4.205 For his part, Dr Hanrahan did not consider that he had been in charge. He took the view that the lead consultant was the paediatric intensive care consultant on duty at any particular time. On the day of Lucy’s admission that would have been Dr Crean, and on the following day Dr Chisakuta, although he admitted that he had not thought about it in that way at the time. Dr Hanrahan accepted that he had provided “quite significant input” but considered that Lucy’s care was jointly managed between himself and the “intensivists.” He insisted that at no time had he agreed to become lead consultant with responsibility for care.

4.206 I consider this issue, from the perspective of this Inquiry’s terms of reference, to be something of an academic debate, though doubtless important in terms of clinical practice and hospital administration. I am told that things have changed in PICU and greater formality is now attached to the designation of patient specific lead consultants.
4.207 In the event, Lucy was cared for by a team of specialist doctors comprising paediatric intensive care consultants, namely Dr Crean, Dr Chisakuta and to a lesser extent, Dr McKaigue, together with paediatric neurologist Dr Hanrahan who was assisted by his specialist registrar, Dr C. Stewart. The two disciplines worked together at the end of Lucy’s life to perform brain stem testing. After confirmation of death, I consider that it was incumbent upon these same doctors to continue to work together to try to identify the cause of death, regardless of who might properly have been regarded as lead consultant.

4.208 In the event, Dr Hanrahan took the lead in managing important matters after Lucy’s death. The opportunity existed to determine the cause of death. That was not, however, the responsibility of Dr Hanrahan alone. It is clear that there was a broader responsibility on the part of the clinical team and more generally within the RBHSC to discover the cause of death and determine whether there were any lessons to be learned.

**RBHSC: Suspicions**

4.209 The clinicians in the RBHSC quickly recognised inadequacies in the Erne Hospital fluid management. Dr Crean made the effort to contact Dr O’Donohoe because he was concerned, on the basis of Lucy’s notes, as to how her fluids had been managed. It is likely that Dr Crean was aware that a child such as Lucy, suffering from fluid loss after a short but significant bout of gastroenteritis, should have been prescribed normal saline for replacement purposes and not large volumes of Solution No. 18. Indeed, at that time his colleagues were teaching students that hypotonic solutions should only be given for maintenance purposes, and never for replacement.\(^{350}\) Dr Crean said he was,

“...unable to recollect what my view was at that time. However, I anticipate that, on looking at the Erne fluid balance chart now, I would have had specific concerns regarding the administration of boluses of hypotonic fluids to children...The administration of large volumes of hypotonic solutions may

\(^{350}\) Dr Crean T-04-06-13 p.24 line 5
produce very low concentrations of electrolytes, in particular sodium, leading to undesirable fluid shifts... A fluid deficit would normally have been replaced with normal saline.”³⁵¹

4.210 I conclude that Dr Crean recognised, just as Dr Evans was to do, that the volume of hypotonic fluid given was wholly inappropriate and that Lucy had become hyponatraemic over a relatively short period of time. He would therefore probably have sensed that the fluid management was the cause of the hyponatraemia. It was disconcerting that Dr Crean should have given the impression during his evidence that at the time of treating Lucy he did not see very much wrong with how her fluids had been managed.³⁵² He explained that the use by paediatricians of a hypotonic solution (such as Solution No. 18) as a replacement therapy was “a common fluid regimen that many of the paediatricians used at that time” and one that he did not think he “would have considered inappropriate for them.”³⁵³

4.211 Dr Crean’s evidence was inconsistent with what he knew to be the correct approach to fluid management in a case such as Lucy’s, and inconsistent with his decision to make contact with Dr O’Donohoe.

4.212 Dr Crean also gave evidence that children were sometimes transferred to the RBHSC by paediatricians who were “administering hypotonic solutions above maintenance” and it was his practice and that of his colleagues to counsel them against the inappropriate administration of hypotonic fluids.³⁵⁴ Had he no such concerns about how paediatricians were using fluids he would not have engaged in such communication nor telephoned Dr O’Donohoe.

4.213 Accordingly, I have little doubt that Dr Crean was concerned when he understood the fluid therapy as administered by the Erne Hospital. His reservations would have been confirmed after talking to Dr O’Donohoe (if Dr O’Donohoe’s record of their discussion is correct) because, as he

³⁵¹ WS-292-1 p.6
³⁵² Dr Crean T-04-06-13 p.93 line 17
³⁵³ Dr Crean T-04-06-13 p.92 line 12
³⁵⁴ Dr Crean T-04-06-13 p.127 line 12
acknowledged himself, the fluids seemingly intended for Lucy (a bolus of 100ml followed by Solution No. 18 at 30ml/hr) made no more sense than the fluids actually given (Solution No. 18 at 100ml/hr). Nonetheless, no concern was recorded at the RBHSC about the fluid therapy.

4.214 Whilst I am satisfied that Dr Crean recognised that Lucy’s fluids had been mismanaged, I do not find that he decided that this was significant in terms of her deterioration and death. He maintained that he “would never have considered a problem with the fluids with sodium of 127 in 2000” and relied on medical literature to indicate that the majority of children developing hyponatraemic encephalopathy had sodium levels of 120mmol/L or less. He emphasised that although it is now known that dilutional hyponatraemia deriving from fluid imbalance was the primary factor in causing Lucy’s cerebral oedema that is not what he thought at the time.

4.215 Dr MacFaul confirmed that, “A blood sodium level at 127mmol/l was not usually regarded as causative of cerebral oedema in the year 2000 although many intensivists and some paediatric neurologists were aware that a rapid fall could make worse an acute encephalopathy whatever its cause. This was not necessarily widely known in paediatric practice.” Furthermore, Dr MacFaul observed that “less prominence” was given in the literature at that time to the significance of rapidity in the fall of blood sodium to the development of acute encephalopathy.

4.216 It is a function of the treating clinician to assist the Coroner. It is in this respect that Dr Crean and his colleagues could have done more. Whilst I accept that dilutional hyponatraemia need not have been cited unequivocally to the Coroner as the cause of death, it is surprising that it was not advanced as a possible cause.

355 Dr Crean T-04-06-13 p.95 line 4
356 Dr Crean T-04-06-13 p.103 line 20
357 WS-292-2 p.4-5
358 Dr Crean T-04-06-13 p.100 line 2
359 250-003-121
360 250-003-123
Fluid management was acknowledged by Dr Crean as his “core business.” He believed that he did not think carefully enough about the part played by fluid therapy in the cause of Lucy’s condition. Had he done so, he would have suspected a possible connection between the fluid therapy and the fatal cerebral oedema. He also believed that together with his colleagues in the RBHSC who cared for Lucy, Dr Crean did not want to be seen to be exposing to critical scrutiny, the mistakes which were made in the Erne Hospital.

**RBHSC: Failure to adequately consider the evidence**

It is a matter of concern that notwithstanding that Lucy’s Erne Hospital records contained all the information necessary to permit the RBHSC clinicians to conclude that her sodium levels had probably dropped even lower than the 127mmol/L recorded, this does not appear to have been recognised.

Dr Crean said that despite having read Lucy’s notes many times he only realised that those notes revealed this likelihood when he was actually giving evidence to the Inquiry although he had previously been aware of the issue because it had been raised by Dr Sumner. He accepted that had clinicians recognised at the time that the serum sodium had probably been lower than 127mmol/L then dilutional hyponatraemia would have been identified “as a more obvious cause of the development of cerebral oedema.” He admitted that they “did not fully consider the timing of the blood test taken around the time of her acute deterioration.”

For his part, Dr Hanrahan said that he only realised that Lucy’s second blood sample was taken after the infusion of normal saline when he discussed it with Dr O’Donohoe in December 2004. It was then, he explained, that “everything [fell] into place.”
4.221 I consider the failure by senior RBHSC clinicians to adequately consider Lucy’s notes so as to determine the sequence of testing and treatment to be unacceptable. Notwithstanding that it has been suggested that other experts also failed to draw this particular conclusion,\textsuperscript{366} the omission is particularly troubling because the relevant information is detailed on the very same page which recorded the excessive administration of normal saline.\textsuperscript{367} This note ought therefore to have been the subject of particular scrutiny, especially when those treating her were struggling to understand the cause of her condition.

4.222 Dr MacFaul observed that “\textit{in the absence of any other satisfactory explanation for Lucy’s death a review by RBHSC of the fluid management in the Erne hospital was justified}”\textsuperscript{368} and indeed this ought to have been conducted when considering referral to the Coroner.\textsuperscript{369} He characterised the failure to seek further explanation for Lucy’s death as “\textit{a significant failing}” and whilst acknowledging that it was understandable “\textit{in the context of the knowledge at the time}” not to appreciate the significance of the sodium level and rate of change, he insisted that a fluids review would have concluded that Lucy was “\textit{overloaded with fluid}” and that this “\textit{had probably been contributory or causative}.”\textsuperscript{370}

4.223 Dr Crean told me that he did not have the time to conduct a forensic investigation of the notes.\textsuperscript{371} I do not accept that because he could have delegated this important task to a colleague. The same criticism applies to Dr Hanrahan, who may, because of the responsibilities he assumed after Lucy’s death,\textsuperscript{372} have been even more obligated to review the fluid management. Dr Hanrahan accepted that he could have been “more

\textsuperscript{366} It has been suggested in submissions on Dr Hanrahan’s behalf (403-031-002) that even Dr Sumner “\textit{proceeded on the basis that 127 was the base level for sodium}.” However, I take the view that this is incorrect. Dr Sumner considered Lucy’s notes and found in his report for the Coroner (at 013-036-140) that “\textit{it is possible that the serum sodium had been lower [than 127], but increased during the administration of this huge volume of saline}.” Regardless of whether the serum had been lower, and in my view it probably had been lower than 127 before the normal saline was administered, he believed that it was possible to explain the death on the basis of what he called a “\textit{rapid and dramatic fall}” of sodium from 137 to 127 over the course of several hours.

\textsuperscript{367} Here, I am referring to the Erne Hospital nursing notes which had been forwarded to the Children’s Hospital and which can be found at 061-017-050

\textsuperscript{368} 250-003-121

\textsuperscript{369} 250-003-121

\textsuperscript{370} 250-003-122

\textsuperscript{371} Dr Crean T-04-06-13 p.112 line 17

\textsuperscript{372} 250-003-121
rigorous in questioning the timing of the sodium analysis in the Erne" and could indeed have identified the evidence suggesting a lower sodium level.

**RBHSC: Internal discussions**

4.224 Dr Crean was not alone in recognising that Lucy’s fluid therapy had not been properly managed. Dr C. Stewart recalled general agreement within the RBHSC that there had been mismanagement. She said that no one thought Lucy’s fluid therapy appropriate and confirmed that this was recognised “reasonably quickly in PICU.” However, Dr C. Stewart recalled that it was relatively common at that time to see children with low sodium and that the feeling amongst consultants was “that they would have expected her sodium level to be much lower” if it was going to cause cerebral oedema and collapse. In this regard her evidence was consistent with that of Dr Crean and Dr Hanrahan.

4.225 Dr Hanrahan told me that he was quite unaware of Dr Crean’s conversation with Dr O’Donohoe on the morning of Lucy’s transfer to the RBHSC. He said that whilst he was aware of the general view that Lucy’s fluids had not been properly managed at the Erne, this did not cause him any great concern in the absence of a really low sodium reading. At that time he said that he was “fairly definite in [his] mind that this wasn’t a fluid related problem...” By contrast Dr Chisakuta admitted to having been concerned about the part fluid management may have played in Lucy’s death but insisted that he was not sure about the cause of death. It was because of his uncertainty that he considered that the case ought to be reported to the Coroner. I am
entirely satisfied that Dr Chisakuta did consider Lucy’s case in this way and do not find it surprising given the similar, if more confident conclusions reached independently by Drs Evans and Auterson.

4.227 It is disappointing therefore that Dr Chisakuta did not then raise his suspicions directly with his colleagues. He said he believed that Dr Crean had similar concerns and would be “surprised” if Dr Crean had not expressed them but could not actually remember him doing so. Whilst I am satisfied that Dr Crean had concerns about Lucy’s fluid management and that it is likely that he discussed those concerns with his colleagues, I find no good evidence to suggest that Dr Crean expressed any view that the fluids were implicated in the death.

4.228 Additionally, Dr Chisakuta said that he discussed the death with Dr Hanrahan and the necessity that it be reported to the Coroner. Despite this, he acknowledged that he did not share with Dr Hanrahan his concern that poor fluid management had possibly been a cause of the cerebral oedema.

4.229 Dr Hanrahan for his part recognised that he “should have talked to a lot more people in a lot more detail” about what had happened to cause Lucy’s death and conceded that he “should have investigated this more and the evidence may have been there if [he] had looked more carefully.” I consider this concession appropriately made because he assumed the responsibility for contacting the Coroner’s Office. His obligation was to inform the Coroner as to the facts and circumstances relevant to the death. It is unclear how he could have hoped to do so effectively without some investigation and the input of those senior colleagues with knowledge of Lucy’s case.

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384 Dr Chisakuta T-29-05-13 p.73 line 8
385 Dr Chisakuta T-29-05-13 p.91 line 2
386 Dr Chisakuta T-29-05-13 p.64-65
387 Dr Chisakuta T-29-05-13 p.71 line 10
388 Dr Hanrahan T-05-06-13 p.64 line 19
389 Dr Hanrahan T-05-06-13 p.75 line 12
The cause of Lucy’s condition ought to have been the subject of urgent internal consideration by clinicians in the RBHSC on the day of her admission. Dr Crean’s discussion with Dr O’Donohoe and his realisation that the fluid regime made no sense should have been the starting point for wider discussion. Her death ought to have made this a priority. Dr Crean should have told Dr Hanrahan about his conversation with Dr O’Donohoe and the significance of the fluid management errors could have been debated allowing Dr Chisakuta to ventilate his concerns. There might then have been agreement as to what further information could be obtained from the Erne Hospital, and precisely what the Coroner, the family, the Erne Hospital and RBHSC management should be told.

No such discussion took place. Lucy’s death passed without appropriate thought or inquiry at Northern Ireland’s only paediatric teaching hospital. Dr C. Stewart drafted a clinical diagnosis for the autopsy request form but such conversation as may have surrounded her formulation was no substitute for informed discussion about the cause of death. That there was an absence of a thorough multi-disciplinary discussion about Lucy’s death has to be regarded as unacceptable.

It is a cause for real concern that experienced clinicians did not speak with each other about their reservations in such a case or even inform their own Medical Director. It has been suggested that because the treatment happened elsewhere they felt no pressing need for informed discussion or formal reporting within their own Trust. However none of the clinicians notified the SLT or the Crawford family GP either.

**RBHSC: Discharge letter**

The RBHSC did not issue a conventional discharge letter to either the GP or the referring Hospital. Dr MacFaul considered this omission unusual and referred to it as a “significant deficiency.” He indicated that the

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390 Dr Chisakuta T-29-05-13 p.117 line 22. Dr Chisakuta confirmed to me that the usual practice in 2000 was to issue a discharge letter to the patient’s GP

391 250-003-117
discharge letter should have included some information about the patient’s presentation and outlined the investigations, diagnosis and treatment.

4.234 Dr Chisakuta went further and said that in this instance it would have been appropriate to use the discharge letter to document concern about Lucy’s treatment at the Erne. Such would have enabled the GP to explain the position to Lucy’s parents, support them in their bereavement and articulate matters of concern. Additionally, the discharge letter would have formally advised the SLT that there were concerns about the adequacy of Lucy’s treatment.

4.235 Dr Crean believed that it was essential to issue a discharge letter. He thought that an ‘inpatient/outpatient advice note’ had been sent by the RBHSC to Lucy’s GP, although the evidence I received on this was very far from conclusive. In any event the advice note merely informed that the primary diagnosis was cerebral oedema with underlying viral gastroenteritis which Dr Crean accepted didn’t “give the whole story.”

4.236 Dr Hanrahan confirmed that “the responsible clinician” usually wrote the discharge letter and would normally try to telephone the deceased patient’s GP. Whilst he accepted that he ought to have telephoned the GP he suggested that the task could equally have been performed by one of the intensive care practitioners and may perhaps have fallen “between two stools.”

4.237 I consider that because Dr Hanrahan had been directly involved with Lucy’s care at the end of her life, took the lead role in contacting the Coroner’s Office, arranged the hospital post-mortem and oversaw the completion of the death certificate, he should also have telephoned the GP and assumed responsibility for drafting a suitably detailed discharge letter for the Erne.
Hospital and the GP. Alternatively, he could even have delegated this task to a suitably informed and qualified colleague.

4.238 The discharge letter was a critical communication and responsibility for the task ought to have been clear. That this routine task was not carried out is consistent with the other obvious failures by clinicians within the RBHSC to document, discuss and communicate their concern about how Lucy had been treated in the Erne Hospital. I cannot avoid the conclusion that the individual failures within the RBHSC to communicate that concern, cumulatively form a pattern of behaviour indicating reluctance to draw critical attention to the failures of other professional colleagues.

**RBHSC: Failure to raise concerns directly with the Erne Hospital**

4.239 The failure of clinicians at the RBHSC to communicate concerns about Lucy’s treatment to Lucy’s family doctor was matched by their failure to advise the Erne Hospital or the SLT. Dr Ian Carson, then Medical Director of the Royal Group of Hospitals Trust (‘RGHT’), explained that he “would have expected a consultant who had a patient referred to them to have had a continuing and an open communication with the referring consultant.” He deemed this both a professional and an organisational expectation and thought it should have been relatively easy for the RBHSC to talk to the Erne about errors in the management of Lucy because it was not a case that had been badly managed in the RBHSC.

4.240 Additionally, he considered that the RBHSC consultant in charge of Lucy’s care should have advised him of any concerns. It would then have been appropriate for him (or the Chief Executive of the Trust) to write to the SLT to relay those concerns. He acknowledged that this “probably should have been done.”

4.241 Professor Scally also expressed the view that if staff at the RBHSC had any “significant suspicion” that “Lucy’s death was due to inadequate treatment”
then there was an obligation to make a formal report to the SLT. He went on to explain “that this expectation arises out of a general obligation in the case of a death that may have been caused by inadequate treatment and is reinforced by the RBHSC role as a regional centre of excellence.”  

4.242 The evidence revealed that after Lucy was transferred from the Erne to the RBHSC there were in all five communications between the two hospitals. Significantly, in none of these interactions was the Erne asked to explain what had happened to Lucy or to justify its management of the case, and still less was it placed on formal notice of the concerns of medical mismanagement.

4.243 Dr Crean’s informal telephone contact with Dr O’Donohoe may nonetheless have caused him to draw Lucy’s case to the attention of Dr Kelly in order to prompt the Review at the Erne. However, I do not consider that Dr Crean’s conversation with Dr O’Donohoe satisfied the RBHSC obligation to formally report concerns in respect of the mismanagement of Lucy’s care. Dr Crean accepted that if the RBHSC was not going to investigate Lucy’s treatment because the problem had not been caused there, he should have satisfied himself that it was going to be properly investigated at the Erne.

4.244 Asked why neither he or his colleagues informed the Erne Hospital that there were problems with Lucy’s care Dr Chisakuta said, “I have no response to that” which was at least an honest recognition that there was no good explanation for the failure. Both Dr McKaigue and Dr Hanrahan agreed that it should have been done. Dr Hanrahan went further and accepted that the matter should have been reported even if there was no consensus and even where there was no concern that the

\[\text{404} \quad \text{251-002-017} \]
\[\text{405} \quad \text{Dr Auterson contacted PICU on the 13 April relaying the results of the repeat blood tests, Dr Crean telephoned Dr O’Donohoe seeking clarification of the fluid regime, Dr Hanrahan telephoned Dr O’Donohoe advising that the Coroner had been informed and that a hospital post-mortem would be carried out with the consent of Mr and Mrs Crawford, an unidentified RBHSC clinician contacted the Erne Hospital on the 18th April 2000 to provide a verbal report in respect of the post-mortem and Dr Hanrahan telephoned Dr O’Donohoe again on 14th June 2000 to ask him to meet with Lucy’s parents again.} \]
\[\text{406} \quad \text{Dr Crean T-04-06-13 p.150 line 6} \]
\[\text{407} \quad \text{Dr Chisakuta T-29-05-13 p.116 line 9} \]
\[\text{408} \quad \text{Dr McKaigue T-30-05-13 p.130-131} \]
\[\text{409} \quad \text{Dr Hanrahan T-05-06-13 p.231-232} \]
treatment had affected the outcome.\textsuperscript{410} However, he said that he did not then know of the mechanism for making a report to a referring hospital.\textsuperscript{411} This admission reveals a surprising lack of knowledge on the part of an experienced, senior clinician.

\textbf{4.245} Dr Crean acknowledged that when mistakes were made there was a tendency amongst clinicians to think that “if I put my head above the parapet and say about this, they’ll shoot me for it.”\textsuperscript{412} Nonetheless, Dr Crean denied that the silence of clinicians in the RBHSC amounted to a ‘cover-up’ and pointed to the fact that he had reported the circumstances of Raychel’s death to the Coroner the following year.\textsuperscript{413} Whilst Dr Crean acted properly in respect of Raychel’s death, I consider that his failure and that of his colleagues to challenge the Erne about Lucy’s treatment was intentional so as not to draw wider attention to the clinical shortcomings in her treatment.

\textbf{4.246} Dr Crean said that the RBHSC had no idea that the Erne Hospital was conducting a review. He explained that the “crossover of information” simply wasn’t there.\textsuperscript{414} That neither hospital communicated with the other, only confirms for me that both hospitals were anxious to avoid scrutiny of the events which led to Lucy’s death, and had limited interest in gaining a full understanding of those events.

\textbf{4.247} I consider that both the failure of the Erne Hospital and the RBHSC to communicate formally about Lucy’s case and the subsequent failure of the Erne to involve the RBHSC in its review, contributed to the overall failure to learn from her case and this may not have been without serious consequence.

\textit{RBHSC: Adverse Incident Reporting}

\textbf{4.248} No adverse incident report was made of Lucy’s death within the RBHSC or the RGHT. There was no formal requirement to do so at the time.

\begin{itemize}
\item \textsuperscript{410} Dr Hanrahan T-05-06-13 p.232 line 3
\item \textsuperscript{411} Dr Hanrahan T-05-06-13 p.233 line 9
\item \textsuperscript{412} Dr Crean T-04-06-13 p.150 line 10
\item \textsuperscript{413} Dr Crean T-04-06-13 p.124 line 17
\item \textsuperscript{414} Dr Crean T-04-06-13 p.148 line 2
\end{itemize}
Notwithstanding, Dr Carson advised that in the event of a “death or where a doctor’s practice is called into question or patients are put at risk, those are cases that quite definitely should have been referred to the Trust Medical Director” and the Clinical Director of Paediatrics.

4.249 A month after Lucy’s death the RGHT published its first adverse clinical incident reporting policy. Accordingly, and notwithstanding Dr Carson’s expectation of an informal notification, there can be no criticism of RBHSC clinicians for failing to make a policy compliant adverse incident report. Indeed, Dr MacFaul’s considered that the absence of an adverse incident report at the RBHSC “was not unreasonable by the standards of the day.”

4.250 Dr Crean suggested that even if the adverse incident reporting scheme had been operational at the time of Lucy’s death, it is unlikely that he would have made a report. He said that although he regarded the death as “unexpected” he did not then make the connection with the medical treatment given and even if he had recognised that the medical treatment had caused or contributed to the death, the fact that she was treated in the Erne Hospital would not have prompted a report under the procedures. Dr Chisakuta agreed.

4.251 However, this was a death which was unexpected, and the cause of it was unknown. It was also a death which took place in circumstances where it was known that fluid therapy had been mismanaged. In failing to report such a death to their own medical or clinical directors the RBHSC clinicians repeated the pattern of non-reporting which so marked the RBHSC response to the deaths of Adam Strain and Claire Roberts. It had the effect of distancing those in positions of governance from suspicions of medical mismanagement and reducing the likelihood of a formalised response. This
approach cannot have been accidental and had the consequence that there was a failure to adequately investigate and learn from Lucy’s death.

**Reporting the death to the Coroner’s Office**

4.252 The legal duty to report a death to the Coroner is imposed by section 7 of the Coroners Act (Northern Ireland) Act 1959\(^{421}\) and requires “every medical practitioner” who “has reason to believe” that a person has died “directly or indirectly” from “negligence” or “from any cause other than natural illness or disease…” or in “such circumstances as may require investigation” to notify the Coroner “of the facts and circumstances of the death.”

4.253 Accordingly, the Erne clinicians were not absolved of responsibility to report Lucy’s death just because the death occurred in the RBHSC. Nonetheless the normal practice in Northern Ireland was for a clinician at the hospital where a patient has died, to report the death to the Coroner.

4.254 The duty to report is a continuing one. Therefore, if at any stage after death a medical practitioner receives information giving rise to a ‘reason to believe’ then there is an obligation to notify the Coroner. Failure to make such a report is a criminal offence.

4.255 I should add that contact with the Coroner’s Office need not necessarily be pursuant to the duty under the Coroners Act; contact could be made with the Coroner’s Office in order to clarify whether a section 7 duty arises on the facts of any given case.\(^{422}\)

4.256 Not only was there reason to believe that Lucy may have died as a result of negligence but there was also reason to believe that she may have died from a cause other than a natural illness or disease and in any event her death occurred in circumstances which clearly required investigation. It does not require the benefit of hindsight to conclude that it is obvious that

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\(^{422}\) I am referring here to the helpful submission made by Mr Nick Hanna QC on behalf of the Coroner: T-25-06-13 p.152-155
Lucy’s death should have been formally reported to the Coroner pursuant to section 7.

4.257 Before Lucy died Dr Hanrahan had noted that “if she succumb[s], a PM would be desirable – Coroner will have to be informed.” He explained that this was because, “we didn’t know what was going on” and because “Lucy had died within a short time of admission to hospital.” However, he said that in the event he contacted the Coroner’s Office with an “open mind” in order to discuss whether formal reporting of the death was necessary.

4.258 The evidence strongly suggests to me that when Dr Hanrahan contacted the Coroner’s Office he did not do so in the belief that the circumstances of Lucy’s death required him to make a formal report to the Coroner. Dr Hanrahan did not seemingly appreciate that a death in unusual and unexplained circumstances placed him under a duty to formally notify the Coroner. He was unfamiliar with his duty and had received no training in respect of his obligations.

4.259 When Dr Hanrahan telephoned the Coroner’s Office he was unable to speak to the Coroner but talked instead with Mrs Maureen Dennison who was a member of the Coroner’s staff. In respect of the information supplied by Dr Hanrahan she recorded, “Died 14.4.00 at RVH Childrens ICU. Gastro interitis (sic), dehydrated, brain swelling. Admitted Erin (sic) Hospital (2 days ago – transferred to RVH. Spoke to Dr Curtis.” The entry also noted “D.C.” (Death Certificate).

4.260 When questioned, Mrs Dennison thought that in all probability Dr Hanrahan was making a formal report pursuant to section 7 and not merely seeking guidance about whether it was necessary to make a report.
4.261 H.M. Coroner, Mr John Leckey, explained that it was the practice in his office that where there was doubt about whether a death should be dealt with by issuing an immediate death certificate or by Coroner’s post-mortem then “the advice of a pathologist in the State Pathologist’s Department would be sought.” 431 In such circumstances clarification “could be provided by the reporting Medical Practitioner speaking direct to one of the pathologists or the pathologist making contact with the reporting Medical Practitioner.” 432 The Coroner’s Office would then normally be advised as to the outcome of such discussions.

4.262 It was entirely proper that at that time the Coroner should have had an administrative procedure in place for dealing with enquiries from the medical profession. Most such enquiries are likely to have been straightforward and need not have troubled the Coroner directly. However, Dr Hanrahan’s contact with the Coroner’s Office would undoubtedly have benefitted from the Coroner’s own direct involvement. I have no doubt that had the Coroner been spoken to by Dr Hanrahan he would have decided to investigate the death.

4.263 In the event, Mrs Dennison could not remember what efforts she made to contact the Coroner 433 and instead spoke to Dr Michael Curtis 434 (Assistant State Pathologist) “to get advice about this death.” 435 She could not however, recall any direct contact between Dr Hanrahan and Dr Curtis.

4.264 The record made by Mrs Dennison supports her presumption that she contacted Dr Curtis and that he advised that a death certificate could be issued. 436 She believed that she would then have returned to Dr Hanrahan and relayed what Dr Curtis had said. 437 She could not remember ever

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431 WS-277-1 p.3
432 WS-277-2 p.4
433 WS 276-1 Page 4
434 325-002-007
435 WS-276-1 p.4
436 WS-276-1 p.4
437 WS-276-1 p.5
having put a clinician directly in touch with a pathologist in such circumstances.438

4.265 Dr Curtis said that as Assistant State Pathologist he was “infrequently” called upon by the Coroner’s Office to provide informal medical advice in relation to the cause of a death. However, he could not recall Dr Hanrahan or any conversation with him.439 Furthermore, he could not recall ever having spoken to a reporting clinician in this type of situation.440 In these important respects his evidence was consistent with that of Mrs Dennison.

4.266 The communication with the Coroner’s Office was entered in Lucy’s notes by Dr C. Stewart: “Coroner (Dr Curtis on behalf of coroners) contacted by Dr. Hanrahan – case discussed, coroners PM is not required, but hospital PM would be useful to establish cause of death + rule out another ∆441 Parents’ consent for PM ✓.”442

4.267 This note could suggest that Dr Hanrahan discussed the case with Dr Curtis acting on behalf of the Coroner. Dr C. Stewart said she probably made the entry on the basis of what Dr Hanrahan told her.443 Dr Hanrahan could not recall his conversation with the Coroner’s Office444 but thought, on an interpretation of Dr Stewart’s note, that he must have discussed the death directly with Dr Curtis.445

4.268 I think it unlikely that Dr Hanrahan spoke directly to Dr Curtis. Both Dr Curtis and Mrs Dennison indicated it would have been unusual if the clinician and pathologist had been put in contact with each other through the Coroner’s Office and Mrs Dennison’s contemporaneous note strongly suggests it was she who spoke to Dr Curtis.

4.269 I am satisfied that Mrs Dennison did her conscientious best to convey to Dr Curtis the information Dr Hanrahan supplied to her and it is to be noted that

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438 Mrs Dennison T-24-06-13 p.73 line 24
439 WS-275-1 p.5
440 Dr Curtis T-25-06-13 p.6-7
441 Signifying Diagnosis.
442 061-018-067
443 Dr C Stewart T-29-05-13 p. 178 line 13
444 Dr Hanrahan T-05-06-13 p.100 line 7
445 115-050-004
Dr Hanrahan did not even inform her about the known hyponatraemia which had been caused by clinical error. Whilst he accepted that this was a “very important omission”\textsuperscript{446} he sought to assure me that it was not deliberate. Taking into account the general failure to document let alone report the mismanagement of Lucy’s care despite the several opportunities available to him, I have struggled to find any good explanation for Dr Hanrahan’s omissions. Not surprisingly, Dr MacFaul was of the opinion that the hyponatraemia should have been reported.\textsuperscript{447}

4.270 Furthermore, Dr Hanrahan did not convey his uncertainty as to the cause of death. Had he done so, it is probable that Mrs Dennison would have told Dr Curtis and he in turn would have advised referral to the Coroner. Dr Hanrahan accepted responsibility for a “hopelessly incomplete report on Lucy’s death.”\textsuperscript{448} He now recognises that the three conditions reported by him do not make sense as a cause of death and that he should have recognised that at the time.

4.271 Dr Hanrahan’s interaction with the Coroner’s Office was considered by the GMC who concluded that there was no evidence that he acted in bad faith or intentionally withheld information from the Coroner or Lucy Crawford’s parents as part of a deliberate cover-up. I agree that there is no clear evidence of bad faith on Dr Hanrahan’s part and I am persuaded that Dr Hanrahan’s decision to contact the Coroner’s Office at all indicates that he was not seeking to avoid coronial scrutiny of Lucy’s death altogether. However, having provided an incomplete account of the circumstances relevant to Lucy’s death to the Coroner’s Office, he must bear primary responsibility for the failure to subject the causes of Lucy’s death to appropriate scrutiny.

4.272 I am unable to determine from the evidence the actual advice provided by Dr Curtis excepting only that he probably advised that there was no impediment to issuing a death certificate. I am concerned, however, that

\textsuperscript{446} Dr Hanrahan T-05 -06-13 p.103 line 3
\textsuperscript{447} 250-003-139
\textsuperscript{448} Dr Hanrahan T-05 -06-13 p.106 line 14
Dr Curtis should have so advised without obtaining a better understanding of how the death had come about. Dr Curtis had limited expertise in paediatric cases and almost none in fluid management.\textsuperscript{449} He conceded that he would not have suspected fluid mismanagement in a cerebral oedema case unless he was specifically directed to it\textsuperscript{450} but maintained that had he been informed of hyponatraemia in the context of dehydration, he would have found that unusual and would have known to refer it to the Coroner.

4.273 Whilst I accept that Dr Curtis was doing his best to assist the Coroner’s office and sought to advise appropriately, his approach was deficient. He should have insisted upon an explanation of the medical causes for death. Without a credible explanation it was inappropriate for him to advise that a death certificate could issue. Professor Lucas suggested that in the circumstances he should have inquired further into the causation of the brain oedema because whilst gastroenteritis can cause dehydration it cannot by itself lead to brain oedema.\textsuperscript{451}

4.274 In defence of his position, Dr Curtis emphasised that he did not appreciate that such reliance was being placed on his advices by the Coroner’s Office.\textsuperscript{452} Indeed, the situation should not have been allowed to arise since Dr Curtis and Mrs Dennison were not legally trained and therefore unqualified to advise Dr Hanrahan. It was not their responsibility to interrogate the information received in the context of the section 7 obligation.

4.275 Ultimately, Dr Hanrahan’s interaction with the Coroner’s Office resulted in him arranging for a consented post-mortem in order to clarify the cause of death, and a decision to issue a death certificate. It is a matter of concern that these actions took place without legal consideration or input from the Coroner. Whilst recognising that Dr Hanrahan did not provide Dr Curtis with a sufficient account of the circumstances relevant to Lucy’s death, it

\textsuperscript{449} Dr Curtis T-25-06-13 p.7-8
\textsuperscript{450} Dr Curtis T-25-06-13 p.11 line 6-9
\textsuperscript{451} 252-003-009
\textsuperscript{452} Dr Curtis T-25-06-13 p.15-18
must nonetheless be observed that a lack of adequate procedure in the Coroner’s Office was a vulnerability in the system which allowed the case to escape the Coroner’s jurisdiction at that important point in time.\textsuperscript{453}

**Subsequent Coronial involvement**

4.276 Soon after Lucy’s death, Mr Stanley Millar,\textsuperscript{454} Chief Officer of the Western Health and Social Services Council, was asked by the Crawford family to advise and help them. On the basis of what he was able to learn, he became concerned about the death and enquired about an inquest but was told that an inquest was unnecessary.

4.277 Subsequently, when he became aware of the fluid management issues which led to the death of Raychel Ferguson, he wrote on 27\textsuperscript{th} February 2003 to inform the Coroner Mr Leckey that, “Lucy was taken ill on 12 April 2000 and was admitted by her GP into Erne Hospital Enniskillen with relatively minor condition of vomiting. A drip was set up and the family was assured Lucy would be home next morning. During the early hours of 13 April 2000 Lucy fitted and collapsed. She was transferred to the Royal Belfast Hospital for Sick Children on a life support system. On 14 April 2000 the life support was switched off. A post mortem was undertaken and a ‘swollen brain with generalised oedema’ was discovered.”\textsuperscript{455}

4.278 Mr Millar also emphasised to the Coroner that Lucy’s death was unexplained and asked whether an inquest into her death in 2000/01 might have generated recommendations which could have saved Raychel’s life. It was this communication which finally notified the Coroner of Lucy’s death and prompted the investigation which was to lead to her belated inquest.

4.279 There was little in what Mr Millar communicated to the Coroner in 2003 which could not have been communicated to him by Dr Hanrahan and his colleagues at the time of Lucy’s death in 2000. That Mr Millar had no

\textsuperscript{453} The Coroner’s Office now employs a full-time medical officer and no longer relies upon informal assistance from the State Pathologist’s Office.
\textsuperscript{454} 325-002-011
\textsuperscript{455} 013-056-320
medical training only serves to emphasise the failings of the medical profession in this regard.

**RBHSC: Hospital Post-Mortem**

4.280 Dr Hanrahan obtained the consent of Mr and Mrs Crawford to the hospital post-mortem.\(^{456}\) Dr C. Stewart noted that a hospital post-mortem would "be useful to establish cause of death"\(^{457}\) confirming that these doctors were unaware that their inability to establish the cause of death was the very reason why they should not have been pursuing the hospital post-mortem.

4.281 Professor Lucas was clear that if a doctor is properly able to request a consented post-mortem then he must be able to write the death certificate: "Consented autopsies only take place where the cause of death is natural and satisfactory for registration i.e. a coroner has not taken the case on under his jurisdiction."\(^{458}\) Dr Crean did not know that this was happening and was surprised that Lucy’s death did not become a Coroner’s case. Quite properly, he understood that unexplained deaths should inevitably lead to Coroner’s post-mortems.\(^{459}\) He advised that when he finds himself unable to write a death certificate, he knows that a Coroner’s post-mortem is necessary.\(^{460}\)

4.282 The post-mortem was conducted by Dr Denis O’Hara\(^{461}\) who was an experienced consultant paediatric pathologist. He was briefed with the autopsy request form\(^{462}\) which appeared both reasonably detailed and accurate. It described Lucy’s short history of vomiting and diarrhoea, referred to the IV fluids and noted the seizure with fixed and dilated pupils. The clinical diagnosis given was “dehydration + hyponatraemia cerebral oedema-> acute coning and brain stem death.”

\(^{456}\) 013-031-114  
\(^{457}\) 061-018-067  
\(^{458}\) 252-003-010  
\(^{459}\) Dr Crean T-04-06-13 p.136 line 15  
\(^{460}\) Dr Crean T-04-06-13 p.131 line 23  
\(^{461}\) 325-002-006  
\(^{462}\) 061-022-073
4.283 Dr C. Stewart was responsible for formulating this clinical diagnosis.\textsuperscript{463} Whilst she made reference to the condition of hyponatraemia, she insisted that she had not thought that Lucy had suffered dilutional hyponatraemia.\textsuperscript{464} She explained that the clinical diagnosis defined the clinical problems and did not explain what had caused them.\textsuperscript{465} Importantly, Dr O'Hara was not informed that there was any concern in relation to the management of Lucy's fluids.

4.284 Dr Hanrahan considered that it was Dr C. Stewart's responsibility (as the practitioner to whom he had delegated completion of the autopsy request form) to ensure that Dr O'Hara had all relevant materials. At the time of giving her evidence, Dr C. Stewart was unsure of the procedures which had been in place.\textsuperscript{466} I find that as the senior clinician, it was Dr Hanrahan's responsibility to ensure that Dr O'Hara received every assistance. Dr Hanrahan reasoned that if the pathologist felt that he required further information he could have asked for it.\textsuperscript{467} That was very far from adequate.

4.285 Professor Lucas explained that in his experience the usual practice involved the relevant clinicians attending the mortuary to view some or all of the post-mortem and discussing the findings with the pathologist. He added, "It is at [the] CPC [clinico-pathological correlation] that all the issues in a case are discussed and resolved, as far as they are resolvable (for not all deaths do have a completely satisfactory pathophysiological explanation). The clinical presentation, laboratory data, imaging, differential diagnosis, and the autopsy results are considered all together to determine what actually happened to the patient who died; and they consider what can be learned from the case for future practice."\textsuperscript{468}

4.286 The necessity for clinico-pathological discussion was clear in Lucy's case and a matter of common sense. I consider that it was a basic professional obligation to convene such a meeting but Dr Hanrahan said that it simply

\textsuperscript{463} Known as the working pathogenesis
\textsuperscript{464} WS-282-2 p.3
\textsuperscript{465} WS-282-2 p.4
\textsuperscript{466} Dr C Stewart T-29 -05-13 p.186 line 12
\textsuperscript{467} Dr Hanrahan T-05 -06-13 p.145 line 18
\textsuperscript{468} 252-003-012
didn’t occur to him. Clinicians were invited to attend with the pathologist for a review on the day of the post-mortem but Dr O’Hara was informed that no one would be in attendance.469

4.287 It is difficult to avoid the conclusion that as well as failing to disclose to Dr O’Hara the known deficiencies in Lucy’s care, the RBHSC clinicians who cared for Lucy were not motivated to engage with him to discover what had happened to her. Dr Hanrahan said that it was unlikely that he even read the post-mortem report470 and certainly could not remember doing so.471 Dr Chisakuta conceded that although he had cared for Lucy and was concerned that there may have been failures at the Erne Hospital, he did not seek to read the final post-mortem report. He admitted that such an omission was embarrassing.472 There is no evidence to suggest that Dr O’Hara’s findings were given any clinical consideration. This does not reflect well on any of the clinicians involved.

**Dr O’Hara’s post-mortem findings**

4.288 The post-mortem report dated 13th June 2000 is inconclusive.473 Dr O’Hara was unable to explain the cerebral oedema but concluded that the presence of a “pneumonic lesion within the lungs [has] been important as the ultimate cause of death.”474 He commented that bronchopneumonia was “well developed and well established” and speculated that it might have been present prior to the original disease presentation. He did not know, because he had not been told, that Lucy’s chest had been x-rayed at the Erne Hospital and was clear.475

4.289 Whilst any criticism of the late Dr O’Hara must be tempered by the fact that he can no longer explain his approach and conclusions, Professor Lucas advised that it was likely that the pneumonia was acquired in consequence of ventilator support in intensive care. He considered that Dr O’Hara’s

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469 061-022-075
470 WS-289-2 p.3
471 Dr Hanrahan T-05-06-13 p.200 line 13
472 Dr Chisakuta T-29-05-13 p.106 line 9
473 061-009-016
474 061-009-017
475 027-010-023
“most important act” should have been to examine the laboratory records, note the chronology of abnormal electrolytes and correlate that with what had happened clinically. He believed that Dr O’Hara had attached too much significance to the presence of pneumonia and had not sufficiently thought the case through.476

4.290 Mr Leckey became concerned when he read Dr O’Hara’s post-mortem report in 2003. He noted that whilst Dr O’Hara found the ultimate cause of death to be an oedema of the brain, he had obviously failed to establish the cause of that oedema.477 This was therefore a death which required investigation and as an experienced pathologist Dr O’Hara ought to have known to notify the Coroner himself.478 Had he done so, Mr Leckey would have inevitably directed his own post-mortem.

4.291 Dr O’Hara responded to the Coroner’s concern by providing a supplementary report indicating “two potential pathological processes that could impinge upon the brain” namely hyponatraemia and bronchopneumonia and concluding that it was difficult to know “what proportion of the cerebral oedema can be described to each of these processes.”479 Such analysis merely emphasises the inadequacy of his first report which failed to consider the significance of the known presence of hyponatraemia. Responsibility for that does not, however, rest solely with Dr O’Hara. He did not receive the assistance he had every right to expect from the clinical team led by Dr Hanrahan which had neglected to brief him with basic materials and thereafter failed to engage with him in the search for answers.

4.292 Dr Hanrahan, having initiated the post-mortem process on the basis that he “didn’t have a clue” why Lucy had died,480 now accepts that when the post-mortem did not identify the cause of her death he then ought to have referred the matter back to the Coroner’s office.481 He failed so to do. The
GMC, when it examined this issue, counselled Dr Hanrahan to ensure that the Coroner is informed of the conclusions reached by any hospital post-mortem if such circumstances arose in the future.\textsuperscript{482}

**RBHSC: Completion of the Death Certificate**

4.293 Before the final post-mortem report became available, Dr O’Donoghue issued a medical certificate of cause of death on the 4\textsuperscript{th} May 2000 certifying that Lucy’s death was due to:

“I (a). Cerebral oedema

(b). due to (or as a consequence of) dehydration

(c). due to (or as a consequence of) gastroenteritis.”\textsuperscript{483}

4.294 That the certificate was issued when there was continuing uncertainty about the cause of death is another matter of real concern.

4.295 Dr O’Donoghue was marginally involved in Lucy’s care before her death, in that he administered a hormone to her.\textsuperscript{484} For that reason he considered himself legally competent to sign the death certificate. Even if it might be said that he was legally competent to perform this role, Dr O’Donoghue certainly had no independent knowledge or understanding of the cause of the fatal cerebral oedema. I am satisfied, given the legal significance of the process, that a certificate should not be signed by a doctor who has no independent understanding of the causes of death.

4.296 Dr O’Donoghue said that he spoke to Dr C. Stewart\textsuperscript{485} and possibly to an intensivist in PICU\textsuperscript{486} before issuing the death certificate. He considered Lucy’s hospital notes and the anatomical summary prepared by Dr O’Hara\textsuperscript{487} but did not read the autopsy request form which made reference to the hyponatraemia.\textsuperscript{488} He then “presented the available information” to
Dr Hanrahan who advised him as to the causes of death.\textsuperscript{489} Dr O’Donoghue then entered into Lucy’s notes those causes as advised by Dr Hanrahan and transcribed them on to the death certificate.\textsuperscript{490}

4.297 It is inconceivable that Dr O’Donoghue would have completed the death certificate without the involvement of his more senior colleagues.\textsuperscript{491} I consider that in reality the certificate was formulated by Dr Hanrahan. In reality, he had ownership of that certificate even if he did not sign it.

4.298 The formulation of the cause of death appearing on the death certificate has been recognised as a nonsense. The cerebral oedema causing Lucy’s death was not due to dehydration. Both Dr MacFaul and Professor Lucas characterised the formulation as “illogical” because cerebral oedema cannot arise in consequence of dehydration.\textsuperscript{492}

4.299 That was the consensus view. Dr Crean recalled that in 2003 when he first read the certificate, “it didn’t make any sense”\textsuperscript{493} and Dr Taylor agreed that it was “not a correct cause of death.”\textsuperscript{494} Dr Chisakuta also accepted that Lucy did not die as a result of dehydration\textsuperscript{495} and observed that the death certificate could only begin to make sense if it explained that it was the treatment for dehydration which had given rise to the cerebral oedema.\textsuperscript{496}

4.300 Only Dr McKaigue really sought to defend the content of the death certificate. He claimed that dehydration was a cause of the death, albeit indirectly, and suggested that there was, in any event, insufficient space on the death certificate for the certifying doctor to refer to the fluid mismanagement. I consider such arguments to be wholly without merit and think it telling, in the circumstances, that Dr McKaigue should have sought to defend the indefensible.

\textsuperscript{489} Dr O’Donoghue T-31-05-13 p.57 line 15
\textsuperscript{490} Dr O’Donoghue T-31-05-13 p.60 line 20 (See also the entry in Lucy’s notes at 061-018-068)
\textsuperscript{491} Dr O’Donoghue T-31-05-13 p.32 line 19
\textsuperscript{492} 252-003-011 & 250-003-007
\textsuperscript{493} Dr Crean T-04-06-13 p.131 line 20
\textsuperscript{494} Dr Taylor T-04-06-13 p.214 line 20
\textsuperscript{495} Dr Chisakuta T-29-05-13 p.113 line 4
\textsuperscript{496} Dr Chisakuta T-29-05-13 p.112 line 17
4.301 Dr O'Donoghue explained that he allowed himself to certify an illogical cause of death because he acted under the direction of Dr Hanrahan who identified causes which he recognised as appearing in Lucy’s notes. Dr O’Donoghue accepted that, “…it is likely, if I had scrutinised it in greater detail… that it would have become apparent that that does not make physiological sense.” Dr O’Donoghue’s duty as a doctor was to take reasonable steps to verify the cause of death before he signed the certificate. He should have given his task more consideration and challenged Dr Hanrahan’s thinking, awkward though it may have been to ask questions of a senior colleague.

4.302 However, Dr O’Donoghue considered that because Dr Hanrahan was in charge of Lucy’s care, it was Dr Hanrahan who bore the responsibility to ensure that her death was properly certified. I consider that Dr O’Donoghue is correct in this analysis. It is to be recognised in this context that Dr Hanrahan authorised Dr O'Donoghue to issue the certificate before the cause of death was known, before Dr O’Hara produced his final post-mortem report and when the death certificate should not have been issued.

4.303 Dr Hanrahan conceded that he handled the death certificate “extremely badly.” He admitted that the content of the certificate was “illogical and unhelpful” and “did not reflect the true chain of events in Lucy’s death.” He accepted that the presence of “cerebral oedema was not due to dehydration, but rather to excessive rehydration leading to hyponatraemia.” Dr Hanrahan said that he allowed the certificate to

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497 Dr O’Donoghue T-31-05-13 p.74 line 20
498 Dr O’Donoghue T-31-05-13 p.75 line 15
500 Dr O’Donoghue T-31-05-13 p.43 line 16
501 061-009-017
502 Dr Hanrahan T-05-06-13 p.157 line 21
503 Dr Hanrahan T-05-06-13 p.156 line 17
504 Dr Hanrahan T-05-06-13 p.157 line 3
505 WS-289-1 p.26
506 WS-289-1 p.20
issue because he “was over-focussed on being kind to the parents” who could not make their funeral arrangements without the death certificate. 507

4.304 I am concerned that not only was the certificate issued in the absence of clarity around the cause of death, but that it was issued with an incorrect cause of death. I am satisfied that Dr Hanrahan knowingly permitted an inaccurate description of the cause of death to appear on the death certificate. That this happened is a matter for the gravest concern and cannot be excused by what I accept was his genuine sympathy for the family or a desire to help them expedite the funeral arrangements.

4.305 In its consideration of this issue, the GMC concluded that the entry on the death certificate was “consistent with the findings of the preliminary post-mortem report” and that therefore “Dr Hanrahan cannot be regarded as having misled the Coroner in this regard.”508 I reject this analysis. A death certificate should not have been written on the basis of a preliminary post-mortem report, and still less should the cause of death have been certified as it was. As I have indicated, the hospital post-mortem process did not identify the cause of Lucy’s death and therefore her case should have been reported back to the Coroner. The effect of the certification was to mislead the Coroner.

4.306 Dr Hanrahan now recognises that his conduct in this respect was indefensible. Not only did it have the effect of concealing the true cause of Lucy’s death but it also prevented, at that point in time, the further investigation of the death through the Coroner’s Office which was so obviously required. Accordingly, the clinical mismanagement which caused the cerebral oedema remained hidden until Mr Millar’s helpful intervention three years later.

RBHSC: Communication with Lucy’s parents

4.307 Dr Hanrahan had indicated to Mr and Mrs Crawford, even before Lucy had died, that they would have to go back to the Erne and to Dr O’Donohoe to
find out what had happened.\footnote{509} Dr Chisakuta indicated that had it been his
duty to speak to Mr and Mrs Crawford he would have told them that her
fluid management at the Erne Hospital may not have been appropriate and
that there was a concern that this may have contributed to the development
of cerebral oedema.\footnote{510} It is not thought that Dr Hanrahan told them about
any particular concern.

4.308 Dr Hanrahan met again with Mr and Mrs Crawford on the 9\(^{\text{th}}\) June 2000.\footnote{511} It is commendable that he initiated a meeting and it would appear that he
was genuinely concerned for them. He made a short note after the meeting
to record that he had gone "over the events around Lucy’s death and
encouraged them to re-attend with Dr O’Donoghue (sic) to clarify events in
the Erne..."\footnote{512} Importantly, whilst this does not record discussion about fluid
mismanagement, it does indicate that Dr Hanrahan tried to help Mr and Mrs
Crawford obtain a fuller account of what had happened. After the meeting
he contacted Dr O’Donohoe and secured his agreement to see them again.
It was not his fault that Dr O’Donohoe did not honour that agreement.

4.309 Dr Hanrahan was conscious at that time that whatever had gone wrong had
happened at the Erne.\footnote{513} Doubtless it was for that reason that he
considered that Dr O’Donohoe should be involved in providing an
explanation.\footnote{514} In June 2000 Dr Hanrahan knew more than enough about
Lucy’s treatment to be concerned about it.\footnote{515} He was aware that there was
discussion within the RBHSC about the errors even if he did not understand
the connection between the poor fluid management and the development
of the cerebral oedema.\footnote{516} He acknowledged that he should have informed
Mr and Mrs Crawford of those concerns.\footnote{517} He said that whilst he might
have told them there was some concern about how Lucy’s fluids were managed he could not be sure. 518

4.310 Dr Chisakuta observed that if Mr Crawford had been given such information he would likely have mentioned it when he wrote his letter of complaint to the SLT, which he did not. 519 Furthermore, had Dr Hanrahan suggested medical error to the Crawfords they would have pursued the issue with Dr O’Donohoe which they did not. I consider the strong likelihood is that Dr Hanrahan failed in his duty to tell the family that the fluids had been poorly managed. The parents had a right to that information and Dr Hanrahan had a duty to impart it. 520

4.311 Mrs Crawford has stated that Dr Hanrahan merely directed them back to the Erne for answers. 521 Any further meeting with Dr O’Donohoe must have seemed pointless. Responsibility for this further failure in transparency and communication is not Dr Hanrahan’s alone. There was a collective failure by all the RBHSC clinicians who had cared for Lucy to determine that concerns relating to Lucy’s treatment and death would be explained to her parents and to ensure that it was done. This reflected the like failure at the Erne Hospital.

**RBHSC: Audit/Mortality meeting**

4.312 Dr Carson maintained that whilst there was no formal auditing of death certificates at that time in the RBHSC, 522 every death was considered and discussed at a mortality section meeting of the Clinical Paediatric Audit. 523

4.313 Dr Taylor was the Paediatric Audit Co-ordinator in 2000 and responsible for chairing the mortality section of the Audit meeting. 524 He explained that the purpose of the mortality section was “to discuss the child’s death for

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518 Dr Hanrahan T-05-06-13 p.182 line 8
519 Dr Chisakuta T-29-05-13 p.95-96
521 115-002-002
522 Dr Carson T-26-06-13 p.44-45
523 Dr Carson T-26-06-13 p.22
524 WS-280-1 p.3
learning purposes among the clinicians present.”\textsuperscript{525} All agreed that this was the purpose, in order as Dr Hanrahan put it, “to try and learn lessons and to see should anything alternative have been done.”\textsuperscript{526}

4.314 The meetings convened monthly and lasted about half a day.\textsuperscript{527} Normally more than one death was discussed at each meeting. The mortality discussions were un-minuted but this practice was not untypical of arrangements elsewhere at that time.

4.315 Dr McKaigue explained that such discussions were,

“… an opportunity to present the events surrounding the death of patients in the Children’s Hospital, primarily to a wider body of doctors (multi-disciplinary). Further, at that time there was a push within Audit circles to establish audit as a multi-professional process (nurses and professions allied to medicine). Before the presentation, the presenter would have had to collate and organise in a logical way the different strands pertaining to the case. Presentations were a way of announcing that a patient had died under the said circumstances and what the cause of death was thought to be. The death was not only being reviewed by the presenter but also by peers and other disciplines, who could bring a different perspective to aspects of the case. Implicit in this process was the opportunity to learn and reflect from listening to the presentation and ensuing discussion. Individuals would have had different learning experiences according to their specialty, previous knowledge and experience.

Presentations were oral and usually facilitated by using computerised slides or an overhead projector and sometimes X-rays were displayed. For some presentations, radiologists and pathologists made a contribution. Patient details were anonymised.

The presentation would have consisted of a history including differential diagnoses, investigations and their results, when death occurred, the cause

\textsuperscript{525} WS-280-1 p.3
\textsuperscript{526} Dr Hanrahan T-05-06-13 p.233 line 20
\textsuperscript{527} Dr Crean T-04-06-13 p.152 line 20
of death and whether or not the Coroner had been advised of the death. The follow-up with the patient’s family was also described. In addition to the facts presented, there would have been commentary by the presenter to emphasise significant points/issues (as they saw them), put things into context and interpret results, if necessary.

Discussions around each presentation consisted of contributions from attendees reflecting their related experiences of similar cases, or making reference to a journal article or latest guideline, which they personally would recommend as being helpful.

Questions were asked by attendees to get more information where they felt detail was lacking or did not understand something. Suggestions were made to improve shortcomings if an attendee felt that was warranted. Occasionally, there were disagreements between attendees over expression of an opinion. A detailed minute of the presentation or discussion was not made.\(^{528}\)

4.316 Dr Taylor agreed that every child death should have been presented and discussed within the mortality section of the meeting. He would have expected Lucy’s death to have been presented by the lead consultant and pathologist\(^{529}\) who would then have answered questions from the clinicians present. He explained that the purpose of the discussion was to “review” the settled position after a death rather than to conduct an “investigation.”\(^{530}\) He said that mortality meetings were not “passive” but that “serious matters were discussed” and those who attended could say “stop” and ask that further investigations be conducted.\(^{531}\)

4.317 Dr Crean acknowledged that Lucy’s case ought to have provoked a serious discussion about the content of the death certificate. He contended that if Lucy’s case had been discussed, “people would have been jumping up and down asking all sorts of questions” and saying “this doesn’t make sense.”\(^{532}\)

\(^{528}\) WS-302-3 p.2-3
\(^{529}\) WS-280-1 p.3
\(^{530}\) Dr Taylor T-11-12-12 P.118, line 10-13
\(^{531}\) Dr Taylor T-04-06-13 p.203-204
\(^{532}\) Dr Crean T-04-06-13 p.153 line 17
He considered that such discussion would very probably have led to further and better investigation and possibly a referral back to the Coroner.533

4.318 The Inquiry was informed Lucy’s death was discussed at an Audit meeting on the 10th August 2000.534 That is all. It has not been suggested that discussion of the death triggered the kind of response which Dr Crean spoke about.

4.319 The evidence suggests that Dr Crean, Dr Chisakuta or Dr Hanrahan could each have been regarded as ‘lead consultant’ for Lucy within the RBHSC and each would have had the requisite knowledge to present her case at the Audit meeting. Both Dr Crean535 and Dr Chisakuta536 thought that Dr Hanrahan should have presented it. Dr Hanrahan did not accept that this was necessarily the case but recognised that there ought to have been a discussion to decide who should.537 I consider that Dr Hanrahan was best placed to make the presentation but that the other doctors were also perfectly capable of doing so. I deprecate the failure of Drs Crean, Chisakuta and Hanrahan to decide who should undertake this important task.

4.320 I have considered a three page document said to be relevant to the Clinical Paediatric Audit meeting of 10 August 2000.538 There is an attendance sheet dated 10th August 2000539 indicating the attendance of thirty four persons. Only one of the clinicians who had cared for Lucy attended and that was Dr McKaigue who only saw her briefly upon arrival and did not treat her thereafter. The names of Drs Crean, Chisakuta, Hanrahan and O’Hara are absent from the attendance sheet. No apology is recorded from any of these doctors in relation to non-attendance.

533 Dr Crean T-04-06-13 p.154 line 23
534 061-038-123
535 WS-292/2 p.7
536 Dr Chisakuta T-29-05-13 p.114 line 10
537 Dr Hanrahan T-05-06-13 p.225 line 18
538 319-023-004
539 319-023-003
There is then a document described as the ‘minutes’ of the Clinical Paediatric Audit for 10 August 2000 which records that “5 cases were presented and discussed” in the mortality section of the meeting. Neither the cases discussed nor the names of the presenting clinicians are given. An additional document described as a “redacted audit list” contains a spreadsheet noting Lucy’s name, date of death, department where treated, named consultant and name of the pathologist conducting post-mortem.

If Lucy’s death was discussed at the Audit meeting in August 2000 or indeed at any other time, I would have expected some evidence identifying the clinician(s) presenting her case. The attendance sheet does not indicate the attendance of anyone who could have given that presentation.

Dr Crean accepted that it is unlikely that he was in attendance. He explained that circumstances could have arisen such as an emergency to prevent him attending. Dr Chisakuta told me that he was not present at the Audit meeting and did not know whether Lucy’s death was discussed. Dr Hanrahan conceded that he “clearly wasn’t at it.”

Dr McKaigue was at the meeting and stated that whilst he could have spoken about Lucy’s condition at the time of admission he did not present her case. He had no memory of the meeting but did admit to what he described as a “vague memory that Dr Hanrahan presented Lucy Crawford’s case at an audit meeting in the Children’s Hospital,” but could not say when that meeting took place.

Dr Taylor cast doubt on whether the meeting on 10th August 2000 included presentation of Lucy’s death, reasoning that as Chairman of the meeting he would not have permitted “a case to be presented without at least two of the three major people involved.” He stated that it “defies logic to conclude
that her case was discussed at that meeting."548 Like Dr Taylor, I cannot understand how Lucy’s death could have been presented at an Audit meeting in the absence of Drs Crean, Chisakuta, Hanrahan and/or O’Hara.549

4.326 I conclude therefore that the Audit meeting of 10th August 2000 did not consider Lucy’s death. I received no evidence to suggest that her death was discussed at any subsequent Audit meeting. It is very unsatisfactory that no one could explain why her death was not discussed. However, Lucy’s death was no more considered at an audit meeting than the deaths from dilutional hyponatraemia of Adam Strain and Claire Roberts. It is hard not to discern a pattern of avoidance given that some of the same clinicians were involved.

4.327 The mortality section of the Audit meeting provided real opportunity to concentrate on how Lucy had died, to query what had happened and to derive some learning from the tragedy. The failure to present Lucy’s death must deepen concern that some clinicians at the RBHSC did not wish to focus on the question of how she had died.

4.328 If Dr Taylor was aware that the presentation of Lucy’s death had not occurred he ought to have taken steps to ensure that this was addressed. While I am satisfied that Dr Taylor had no formal authority to compel a presentation if Drs Crean, Chisakuta, Hanrahan and O’Hara were unable or unwilling to do it, pressure could and should have been applied. The failure of these doctors to arrange for an audit discussion and the consequence of that failure is disturbing. Each of these doctors was responsible for that failure. This was a real opportunity to learn from the tragedy of Lucy’s case, but it was squandered.

4.329 The failure to ensure the formal presentation and informed discussion of Lucy’s death was the failure of individuals within a weak governance system. The fragility of the system allowed clinicians to avoid audit

548 Dr Taylor T-04-06-13 p.208 line 23
549 Dr Taylor T-04-06-13 p.40 line 12
presentation without fear of sanction. Dr Carson said he did not have the staff to deliver “a robust governance arrangement.”\textsuperscript{550} It did not require staffing to discuss Lucy’s death in this context, just a willingness to do so.

**Concluding Remarks**

4.330 Having reflected upon the evidence, I am of the view that the poor care which Lucy received was initially and deliberately concealed by clinicians at both the RBHSC and the Erne Hospital from the family, the Coroner and the pathologist who all should have been told of the suspected mismanagement of fluids.

4.331 The failure by senior clinicians to address the issue with appropriate candour suppressed the truth and inhibited proper examination of what had gone wrong. The motivations for this concealment may be multiple, but I count amongst them a determination to protect professional colleagues from having to confront their clinical errors.

4.332 As a result the opportunity to learn lessons was disregarded and critical learning was lost to clinicians delivering fluid therapy to other children in Northern Ireland. When Raychel came to be treated in the Altnagelvin Hospital fourteen months later, Solution No. 18 was still being used without appropriate guidance as to the risks.

\textsuperscript{550} Dr Carson T-26 -06-13 p.23 line 3
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Introduction

5.1 Raychel Ferguson was born on 4th February 1992,¹ the fourth child and only daughter of Raymond and Marie Ferguson. In June 2001 Raychel was a happy, healthy 9 year old child and in her P5 year at St Patrick’s Primary School, Pennyburn, Derry.²

5.2 On Thursday 7th June 2001, Raychel went to school as usual. She was in good spirits and won a medal in her school sports.³ Later, at about 16:30 she began to complain of stomach ache.⁴ Nevertheless, she continued to play in and around the family home and ate normally. However, she continued to complain and Mrs Ferguson eventually made up a bed for her on the sofa.⁵ Her primary concern at that time was not that Raychel was in pain, but that she looked grey.⁶

5.3 Things did not improve and Mrs Ferguson decided to take Raychel to the Altnagelvin Area Hospital (‘Altnagelvin’). She put her in the car and set off, collecting Mr Ferguson on the way. They arrived at the hospital shortly after 19:00.⁷ Mr Ferguson thought Raychel looked grey and unwell.⁸ He carried her into the Accident and Emergency Department (‘A&E’).

5.4 Within 48 hours Raychel was to suffer brain death in consequence of hyponatraemia. In this chapter of the report, I set out my findings in relation to her case.

Expert reports

5.5 The Inquiry, in examining Raychel’s case and guided by its advisors, engaged the following experts to advise:

¹ 012-025-135
² 012-025-135
³ Mrs Ferguson T-26-03-13 p.10 line 5
⁴ 012-025-135
⁵ 012-025-135
⁶ Mrs Ferguson T-26-03-13 p.12 line 9
⁷ 012-025-136
⁸ Mr Ferguson T-26-03-13 p.13 line 10
(i) Dr Robert Scott-Jupp\textsuperscript{9} (Consultant Paediatrician, Salisbury District Hospital, England) who provided reports on paediatric and general medical issues.\textsuperscript{10}

(ii) Mr George Foster\textsuperscript{11} (Consultant General Surgeon, Countess of Chester Hospital, and Grosvenor Nuffield Hospital) who provided reports on the role and responsibilities of the surgical staff.\textsuperscript{12}

(iii) Dr Simon Haynes\textsuperscript{13} (Consultant in Paediatric Cardiothoracic Anaesthesia and Intensive Care, Freeman Hospital, Newcastle upon Tyne) who reported on anaesthetic as well as general management issues.\textsuperscript{14}

(iv) Ms Sally Ramsay\textsuperscript{15} (Independent Childrens’ Nursing Advisor) who advised on questions of nursing.\textsuperscript{16}

(v) Dr Wellesley St. C. Forbes\textsuperscript{17} (retired Consultant Neuroradiologist, formerly of Salford Royal Hospitals NHS Foundation Trust and Manchester University Children’s Hospitals NHS Foundation Trust) who reported on the Computerised Tomography (‘CT’) scans.\textsuperscript{18}

(vi) Dr Fenella Kirkham\textsuperscript{19} (Professor of Paediatric Neurology, Institute of Child Health, London and Consultant Paediatric Neurologist Southampton General Hospital), who provided a report on neurological issues arising.\textsuperscript{20}
(vii) Professor Charles Swainson\(^{21}\) (retired Consultant Renal Physician and Medical Director of the Lothian NHS Board, Edinburgh) who advised on governance.\(^{22}\)

5.6 The Inquiry also had the benefit of expert reports commissioned by the Coroner, the Police Service of Northern Ireland (‘PSNI’) and Altnagelvin, from:

(i) Dr Brian Herron\(^{23}\) (Consultant Neuropathologist, Royal Group of Hospitals) who provided the Autopsy Report following post-mortem on 11\(^{th}\) June 2001.\(^{24}\)

(ii) Dr Clodagh Loughrey\(^{25}\) (Consultant Chemical Pathologist, Belfast City Hospital) who reported on 24\(^{th}\) October 2001.\(^{26}\)

(iii) Dr Edward Sumner\(^{27}\) (Consultant Paediatric Anaesthetist at Great Ormond Street Childrens' Hospital) who provided reports to the Coroner on 1\(^{st}\) February 2002\(^{28}\) and to the PSNI in September 2005.\(^{29}\)

(iv) Ms Susan Chapman\(^{30}\) (Nurse Consultant for acute and high dependency care at Great Ormond Street Childrens’ Hospital) who reported to the PSNI on 24\(^{th}\) September 2005.\(^{31}\)

(v) Dr John Jenkins\(^{32}\) (Senior Lecturer in Child Health and Consultant Paediatrician) who provided reports dated 12\(^{th}\) November 2002,\(^{33}\) 27\(^{th}\) January 2003\(^{34}\) and 30\(^{th}\) January 2003\(^{35}\) for Altnagelvin.
(vi) Dr Declan Warde36 (Consultant Paediatric Anaesthetist, The Childrens’ University Hospital, Dublin) who provided Altnagelvin with a report in January 2003.37

(vii) Mr John Orr38 (Consultant Paediatric Surgeon, Royal Hospital for Sick Children, Edinburgh) who reported to Altnagelvin on the treatment given Raychel on 30th January 2013.39

Schedules compiled by the Inquiry

5.7 In an attempt to summarise the very significant quantities of information received, the following schedules and charts were compiled:

(i) Chronology of events (Clinical).40

(ii) Timeline of Raychel’s treatment.41

(iii) Chronology and Clinical Timeline post-collapse 9th June 2001.42

(iv) Table of Clinicians duty times 7th – 9th June 2001.43

(v) Schedule of Observations.44

(vi) Schedule of Persons (Clinical).45

(vii) Schedule of Persons (Governance).46

(viii) Schedule of nomenclature and grading of doctors 1948 – 2012.47

(ix) Schedule of nomenclature and grading of nurses 1948 – 2012.48
Consolidated Chronology of ‘Governance’ and ‘Lessons Learned’.\textsuperscript{49}

Table of Nurses’ training and experience.\textsuperscript{50}

Table of Trainee Doctors’ training and experience.\textsuperscript{51}

Glossary of Medical Terms.\textsuperscript{52}

All of the above have been published on the Inquiry website.

\textbf{Raychel in A&E}

5.8  Raychel was seen in A&E at 20:05 by Senior House Officer (‘SHO’) Dr Barry Kelly.\textsuperscript{53} Whilst he had limited paediatric experience,\textsuperscript{54} his role was confined to examination and onward referral for surgical opinion. Dr Kelly has no recollection of his involvement\textsuperscript{55} but did make a record of his examination in the medical notes.\textsuperscript{56}

5.9  He noted a history of sudden onset abdominal pain from about 16:30 and increasing thereafter. Nausea was noted with “pain on urination.”\textsuperscript{57} Pain was found to be maximal over ‘McBurney’s Point’ with clinical signs of tenderness in the right iliac fossa. On the basis of these findings, Dr Kelly noted his suspicion as “Appendicitis? Surgeons.”\textsuperscript{58} He arranged for blood and urine tests, referred Raychel for surgical assessment, and gave her cyclimorph to ease pain.\textsuperscript{59} This appears to have been effective as Mrs Ferguson thought her “back to normal after the injection.”\textsuperscript{60}

5.10 The only potential criticism of Dr Kelly relates to the painkiller. Cyclimorph is so powerful a morphine based drug that it risks compromising

\begin{flushright}
\textsuperscript{49} 325-004-001 \\
\textsuperscript{50} 312-007-001 \\
\textsuperscript{51} 312-008-001 \\
\textsuperscript{52} 312-005-001 \\
\textsuperscript{53} 312-003-002 \\
\textsuperscript{54} 026-006-010 \\
\textsuperscript{55} Dr Kelly T-05-02-13 p.7 line 17 \\
\textsuperscript{56} Dr Kelly T-05-02-13 p.11 line 19 \\
\textsuperscript{57} 020-006-010 \\
\textsuperscript{58} 020-006-010 \\
\textsuperscript{59} 020-006-010 \\
\textsuperscript{60} WS-020-1 p.2
\end{flushright}
subsequent medical assessment by masking clinical signs.61 This can be relevant in the diagnosis of appendicitis because clinical findings are important.62

5.11 Any criticism of Dr Kelly must be extremely limited. It is not suggested that Raychel should not have been given a painkiller. It would have been inhumane not to attempt pain relief. Rather he should have opted for milder analgesia.63 Whilst it would have been better if Dr Kelly had not prescribed as he did, it would be unfair, given the extent of his experience and the available textbook guidance64 to criticise him. In any event, he referred Raychel to another SHO who specialised in surgery and one who could, if necessary, contact a registrar or consultant.65

Diagnosis and admission for appendectomy

5.12 Dr Ragai Makar66 qualified as a doctor in Egypt in 1989. During the 1990s he gained experience in general surgery and emergency medicine and practiced as a registrar. He came to the UK in 1997 and worked almost exclusively in short-term posts as an SHO before moving to Altnagelvin in August 2000 as an SHO in general surgery. He was therefore more experienced than most SHOs, but his experience with children was limited.67

5.13 Upon request, Dr Makar saw Raychel and examined her on Thursday evening. He noted, but did not time, his examination in the record.68 He found tenderness at the right iliac fossa with guarding and mild rebound. He did not believe that the painkiller hindered his diagnosis.69 He noted normal blood test results70 and ordered a repeat urine test.71

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61 223-002-006
62 Dr Scott-Jupp T-20-03-13 p.6 line 9
63 223-003-004
64 WS-254-1 p.4 & p.11
65 WS-254-1 p.4
66 312-003-002
67 WS-022-2 p.2
68 020-007-011 & 020-007-012
69 Dr Makar T-06-02-13 p.167 line 13
70 020-022-045 (including sodium at 137mmol/L. Normal sodium range 135-145mmol/L)
71 020-007-012
5.14 Dr Makar concluded that Raychel had “acute appendicitis/obstructed appendix” and obtained Mrs Ferguson’s written consent to surgery. Raychel was admitted to Ward 6 at 21:41 to fast and receive fluids in preparation for an appendectomy. Dr Makar was to perform the operation himself.

5.15 Altnagelvin had only one childrens’ ward, Ward 6. It served both surgical and medical patients. Surgical patients were children admitted in relation to surgery and medical patients were those otherwise admitted for paediatric treatment. The ward could accommodate 43 children but on 8th June 2001, there were only 23. The majority of patients would normally have been medical cases. Paediatricians were employed on Ward 6 to care for the medical patients. However, because there were no paediatric surgeons at Altnagelvin, children were operated on by general hospital surgeons and cared for on Ward 6 by the general surgical staff. The nurses, some of whom were trained childrens’ nurses, cared for both the medical and the surgical patients.

5.16 The on-call surgical consultant for the night of 7th June was Mr Robert Gilliland. He was not consulted about the decision to operate and, in all probability, remained unaware of Raychel’s admission until Sunday 10th June. The fact that he was Raychel’s named consultant did not necessarily mean that he would see her. Dr Scott-Jupp considered that his non-attendance “by the standards of the time, was acceptable practice.” He should, however, have been informed of her case because his responsibility was, as he accepted, to “oversee the totality of the patient’s care.”

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72 020-007-012
73 020-008-015
74 020-001-001
75 Sister Millar T-28-08-13 p.111 line 8
76 316-011-001
77 Staff Nurse Noble T-26-02-13 p.103 line 8
78 312-003-002
79 WS-044-1 p.4
80 Staff Nurse Noble T-27-02-13 p.27 line 9 & Mr Gilliland T-14-03-13 p.136 line 21
81 222-005-005
82 WS-044-2 p.13
5.17 The Ferguson family “believe to this day that Raychel’s operation should never have taken place.”\textsuperscript{83}

5.18 There are significant issues about the decision to proceed to surgery including:

(i) Whether Dr Makar’s examination of Raychel could have been affected by the cyclimorph.

(ii) Whether Dr Makar should have requested an urgent urinalysis in light of Dr Kelly’s note of “pain on urination” and a finding of “+1” protein because these might have been suggestive of urinary tract infection.\textsuperscript{84}

(iii) Whether, because the Fergusons insist that Raychel was not in obvious pain at that time (and it is noted that Dr Makar did not record complaint), the decision to operate was premature.

(iv) Whether Raychel could have been observed overnight pending reassessment in the morning.

(v) Whether, given a disagreement between the Fergusons and Dr Makar as to the basis upon which Mrs Ferguson gave her consent to surgery, a valid consent was given.

5.19 Dr Makar did not consider that the pain relief given Raychel interfered with his diagnosis. His belief is supported by subsequent medical literature which suggests that “morphine effectively reduces the intensity of pain among children with acute abdominal pain and morphine does not seem to impede the diagnosis of appendicitis.”\textsuperscript{85}

5.20 Dr Scott-Jupp discounted the likelihood of a urinary tract infection on the basis of negative leukocyte and nitrate counts\textsuperscript{86} and in any event, Mr Orr said that if “the urine was sent off to the lab for microscopy and thereafter
culture... that culture will take two or three days."\(^{87}\) It is hard, therefore, to criticise failure to pursue the possibility of urinary tract infection.

5.21 I heard conflicting expert opinion about the decision to operate. Dr Scott-Jupp said that “by today’s standards, a child such as Raychel presenting with those sorts of symptoms would be more likely to have been left overnight and reassessed in the morning... However, when that happens... they’re taking a risk and the risk is that the condition can develop very rapidly, the appendix can burst.”\(^{88}\)

5.22 The surgeons, Mr Foster\(^ {89}\) and Mr Orr,\(^ {90}\) were of the view that it was premature to operate on the Thursday night given the available evidence\(^ {91}\) and Mr Orr’s opinion is noteworthy because it was commissioned by the Western Health and Social Care Trust (‘WHSCT’).\(^ {92}\) However, both Mr Gilliland and Dr Scott-Jupp challenged this view\(^ {93}\) and in terms, described an appendectomy in such circumstances as routine practice. Dr Haynes, while questioning the wisdom of proceeding so quickly to surgery\(^ {94}\) did point out that “it was not an unusual scenario.”\(^ {95}\)

5.23 I have reservations about the decision to operate. However, given the conflicting expert evidence I do not formally criticise the decision. I am influenced in this regard by the generally accepted opinion that “the conduct of the anaesthetic for Raychel’s appendicectomy appears to have been completely satisfactory and the appendicectomy operation carried out with due care and attention.”\(^ {96}\) What went so catastrophically wrong in Raychel’s case was not the surgery but the way she was cared for afterwards.

\(^{87}\) Mr Orr T-21-03-13 p.40 line 19
\(^{88}\) Dr Scott-Jupp T-20-03-13 p.18 line 11
\(^{89}\) 317-007-001
\(^{90}\) WS-320-1 p.18
\(^{91}\) Mr Foster and Mr Orr T-21-03-13 p.45 line 15
\(^{92}\) As successor to the Trust responsible for Altnagelvin in 2001
\(^{93}\) 222-004-002 & Dr Scott-Jupp T-20-03-13 p.15 line 16
\(^{94}\) 220-002-008 & Dr Haynes T-22-03-13 p.7 line 24
\(^{95}\) 220-002-008
\(^{96}\) 220-002-005: the view of Dr Haynes
5.24 While I understand why the Fergusons and some experts believe that Raychel should not have undergone surgery, my focus in this report is on hyponatraemia-related deaths and accordingly I will concentrate on the management of Raychel’s fluids after the surgery and what led to the development of hyponatraemia.

5.25 There are however, two related issues about which I am critical. The first was a failure within Altnagelvin to follow relevant clinical recommendations and the second was Dr Makar’s failure to make it clear to Mr and Mrs Ferguson that it was his intention to operate on Raychel that night.

NCEPOD Recommendations

5.26 In 1989 the Royal College of Surgeons published a ‘Report of the National Confidential Enquiry into Perioperative Deaths’ (‘NCEPOD’).\(^{97}\) It specifically recommended that “no trainee should undertake any anaesthetic or surgical operation on a child of any age without consultation with their consultant.”\(^{98}\) This was to ensure that senior clinicians became involved with the care of children in surgery.

5.27 The data upon which NCEPOD made its recommendations derived from hospitals throughout the UK including Altnagelvin.\(^ {99}\) NCEPOD was in part funded by the Department in Northern Ireland.\(^ {100}\) Mr Orr described its report as a widely circulated “wake-up call” to surgeons and anaesthetists managing children.\(^ {101}\) He said that he would be both surprised and worried if the 1989 Recommendations had not been adopted in Altnagelvin by 2001.\(^ {102}\) Mr Foster agreed.\(^ {103}\) However, Mr Gilliland explained that “they were not standard practice in Altnagelvin in 2001 and [suspected] that they had not been implemented elsewhere within N. Ireland at that time.”\(^ {104}\) I found this strange, indeed given that the 1999 Report on Paediatric Surgical...

\(^{97}\) 210-003-156  
\(^{98}\) 223-002-052  
\(^{99}\) 210-003-346  
\(^{100}\) Dr Carson T-30-08-13 p.28 line 5  
\(^{101}\) Mr Orr T-21-03-13 p.46 line 23 & p.47 line 9  
\(^{102}\) Mr Orr T-21-03-13 p.53 lines 14-18  
\(^{103}\) Mr Foster T-21-03-13 p.54 line 21  
\(^{104}\) WS-044-3 p.3
Services in Northern Ireland recommended adherence to this particular NCEPOD guideline\textsuperscript{105} and Mr Panesar FRCS of Altnagelvin served on the working group responsible for that Report.\textsuperscript{106}

5.28 However, some support was offered Mr Gilliland by Dr Scott-Jupp who observed that NCEPOD reports carry more weight now than they did in 2001.\textsuperscript{107} While I am pleased that is so, the suggestion that they did not carry significant weight in 2001 is alarming given that Altnagelvin was a teaching hospital and their purpose was to improve the quality of care.

5.29 As a direct result of Altnagelvin’s failure to adopt the 1989 NCEPOD recommendations less than best practice was tolerated. Whilst Dr Makar should have known about the report and its recommendations, it appears that none of his employers in Northern Ireland from 1997 to 2001 brought it to his attention. This was a major failing in health service governance in Northern Ireland and not just Altnagelvin.

5.30 I cannot conceive of any reason for not adopting the NCEPOD guidance. Even were there compelling reason not to adopt an individual recommendation, such could not justify a rejection of the whole. Consultants and healthcare managers must ensure adherence to as many of such recommendations as possible because they are best practice standards. This was particularly important at Altnagelvin because, being so far from the specialist Children’s Hospital in Belfast, it had to ensure that appropriate practices were in place to manage paediatric emergencies.

5.31 Had the NCEPOD recommendations been implemented, Mr Gilliland would have been consulted about the plan to operate. He had the right to know. His view was however, that in any event and even with hindsight, it was appropriate for the operation to proceed.\textsuperscript{108} Notwithstanding, he should have been contacted at the time. The Chief Executive, Mrs Stella

\textsuperscript{105} 224-004-100 & 121
\textsuperscript{106} 306-079-037
\textsuperscript{107} Dr Scott-Jupp T-20-03-13 p.17 line 3
\textsuperscript{108} WS-044-2 p.8
Burnside,\textsuperscript{109} acknowledged this shortcoming and said how “sincerely sorry” she was that the recommendations had not been followed.\textsuperscript{110}

**Consent**

5.32 My second criticism relates to Dr Makar. The clear evidence of Mr and Mrs Ferguson is that they signed the consent form\textsuperscript{111} on the understanding that Raychel would only go to surgery if her condition deteriorated. They did not therefore believe that there had been a decision to operate\textsuperscript{112} and accordingly did not stay long with Raychel before going home.

5.33 Dr Makar’s evidence is that their understanding was mistaken because he had already decided to operate and that this should have been clear to them. He suggested that their only uncertainty might have been as to whether the operation would start that night.\textsuperscript{113}

5.34 I am entirely satisfied from the evidence of Mr and Mrs Ferguson and more particularly from their behaviour that they did not believe that Raychel was going straight to theatre otherwise they would have stayed with her. I also think that it quite likely that Dr Makar did decide to operate from the outset, as he said he did. He gave the anaesthetist the impression that it was an urgent case\textsuperscript{114} and suggested that surgery should commence at the earliest opportunity after appropriate fasting.\textsuperscript{115} He communicated as much to the theatre nurse.\textsuperscript{116} I therefore conclude that when Dr Makar obtained the written consent he had not expressed himself as clearly as he should nor had he confirmed with the Fergusons their understanding.

5.35 It is accepted by the Fergusons that Dr Makar did discuss risk, both in relation to general anaesthesia and the removal of the appendix.\textsuperscript{117} However, there is contention about how those risks were explained.

\begin{itemize}
\item \textsuperscript{109} 328-001-002
\item \textsuperscript{110} Mrs Burnside T-17-09-13 p.58 line 22
\item \textsuperscript{111} 020-008-015 & Mr and Mrs Ferguson T-26-03-13 p.17 line 15
\item \textsuperscript{112} Mr Ferguson T-26-03-13 p.17 line 15
\item \textsuperscript{113} Dr Makar T-06-02-13 p.142 line 21 & 022-084-215
\item \textsuperscript{114} Dr Makar T-06-02-13 p.137 line 1
\item \textsuperscript{115} 020-009-017
\item \textsuperscript{116} Staff Nurse McGrath T-26-02-13 p.25 line 20
\item \textsuperscript{117} Mr Ferguson T-26-03-13 p.19 line 20
\end{itemize}
Difference of understanding and recollection is not unusual, which is why Dr Makar should have ensured:

(i) that Mr and Mrs Ferguson had an absolutely clear understanding of what was to happen to Raychel before consenting, and

(ii) that he documented their discussion about consent in the medical record.\(^{118}\)

5.36 It is not at all clear however, that Mr and Mrs Ferguson would have actually withheld their consent had they understood Raychel was to undergo immediate surgery. They might, however, have refused consent had they understood the alternative of overnight observation but given that Dr Makar had already made the decision to operate that was not an option.

5.37 The consequence of this criticism is limited because what was to go wrong on Friday 8\(^{th}\) June and Saturday 9\(^{th}\) June did not follow from Dr Makar’s inadequate communication with Mr and Mrs Ferguson.

**Dr Makar and Dr Zawislak**

5.38 Notwithstanding that Dr Makar was unaware at the time of the NCEPOD Recommendations, he subsequently claimed to have proceeded to surgery only after he had made two telephone calls to the on-call Surgical Registrar Dr Waldermar Zawislak\(^{119}\) in order to obtain permission.\(^{120}\)

5.39 Dr Makar said that he made this contact because “it [was] the appendix and I gave him the criteria I used to diagnose appendix and I felt it needed to be done before midnight.”\(^{121}\) He said he also canvassed the alternative of delay until the morning\(^{122}\) but subsequently called Dr Zawislak to advise that he was proceeding to theatre that night.\(^{123}\)

\(^{118}\) WS-046-2 p.115 – In compliance with the Altnagelvin ‘Policy on Consent to Examination or Treatment’ (1996)

\(^{119}\) 312-003-002

\(^{120}\) WS-022-2 p.19 & Dr Makar T-06-02-13 p.125 line 5

\(^{121}\) Dr Makar T-06-02-13 p.133 line 16

\(^{122}\) Dr Makar T-06-02-13 p.125 line 12

\(^{123}\) Dr Makar T-06-02-13 p.125 line 23
5.40 However, Dr Zawislak disputed Dr Makar’s evidence, maintaining:

(i) He has no recollection whatever of being contacted by Dr Makar.\textsuperscript{124}

(ii) He was entirely unaware of Dr Makar’s suggestion until 2013.\textsuperscript{125}

(iii) That had permission been given in the manner described it would have been recorded in the notes and it is not.\textsuperscript{126}

(iv) His role as registrar did not involve granting permission to operate in uncomplicated cases\textsuperscript{127} and especially not to a surgeon as experienced as Dr Makar.

(v) Had Dr Makar sought his views, he would have examined Raychel himself and contacted the on-call consultant Mr Gilliland, which he did not.\textsuperscript{128}

(vi) Otherwise the only reason he could suggest why Dr Makar might have telephoned him, was to let him know he would be in theatre and accordingly otherwise unavailable.\textsuperscript{129}

5.41 Dr Zawislak accepted that he may have received a telephone call from Dr Makar.\textsuperscript{130} I believe that this could have happened, but even if it did, I prefer Dr Zawislak’s explanation that any such call would have been to alert him to what Dr Makar intended to do rather than seek his permission. It could not therefore satisfy the NCEPOD recommendation for pre-surgery consultation.

Pre-operative fluids

5.42 Having decided to operate, Dr Makar prescribed intravenous fluids to be administered pre-operatively. His initial prescription\textsuperscript{131} was for the isotonic

\textsuperscript{124} Dr Zawislak T-05-02-13 p.24 line 25
\textsuperscript{125} Dr Zawislak T-05-02-13 p.80 line 20
\textsuperscript{126} Dr Zawislak T-05-02-13 p.78 line 25
\textsuperscript{127} Dr Zawislak T-05-02-13 p.65 line 9
\textsuperscript{128} Dr Zawislak T-05-02-13 p.73 line 12
\textsuperscript{129} Dr Zawislak T-05-02-13 p.65 line 24
\textsuperscript{130} Dr Zawislak T-05-02-13 p.24 line 25
\textsuperscript{131} WS-022-2, p.5
solution known as Hartmann’s.\textsuperscript{132} However, he changed this prescription to Solution No.18 after a discussion with Staff Nurse Ann Noble\textsuperscript{133} because she assured him that Solution No.18 was the accepted IV fluid for use on Ward 6.\textsuperscript{134} The evidence confirmed that Solution No.18 was the IV fluid of choice on Ward 6 and had been for at least 25 years.\textsuperscript{135}

5.43 He amended his prescription, not only because of ward practice,\textsuperscript{136} but also because he knew that the anaesthetic team would, in any event, make separate prescription for fluids intra-operatively and direct Raychel’s fluids thereafter.

5.44 I do not criticise either Dr Makar or Staff Nurse Noble in this regard. His prescription for Solution No.18 was only to assume significance much later and after surgery, when not only the choice of fluid but also the rate as prescribed was to prove important.

5.45 Rates were calculated with reference to patient weight using a set formula.\textsuperscript{137} Dr Makar prescribed 80mls per hour\textsuperscript{138} which was more than the 65mls indicated by formula\textsuperscript{139} and more than was necessary even allowing for a possible deficit.\textsuperscript{140} The excess was, however, of little consequence at that time because Raychel was to receive only 60mls before the anaesthetic team assumed responsibility for her fluids and changed the prescription.\textsuperscript{141}

\textbf{Nursing care plan}

5.46 Upon Raychel’s admission onto Ward 6 Staff Nurse Daphne Patterson\textsuperscript{142} downloaded a computerised pro-forma episodic care plan (‘ECP’) for Raychel’s abdominal pain.\textsuperscript{143} By so doing Staff Nurse Patterson

\begin{thebibliography}{99}
\bibitem{132} 312-005-020
\bibitem{133} 312-003-004
\bibitem{134} WS-049-2 p.5 & Nurse Noble T-26-02-13 p.167 line 24
\bibitem{135} WS-056-3 p.21
\bibitem{136} Dr Makar T-06-02-13 p.183 line 18
\bibitem{137} Dr Makar T-06-02-13 p.176 line 10
\bibitem{138} 020-019-038
\bibitem{139} 220-002-004, 223-002-013 & 224-004-017
\bibitem{140} WS-035-4 p.2
\bibitem{141} 021-061-146
\bibitem{142} 312-003-004
\bibitem{143} 020-027-056
\end{thebibliography}
automatically became Raychel’s nominal ‘named nurse.’ The ECP was designed to be regularly updated and adjusted to a patient’s ongoing needs in order to guide nursing care. It was used to communicate accumulated patient information in print-out form at handover. In connection with Raychel’s IV fluid therapy, the plan directed that nurses should:

(i) “Observe/record urinary output”

(ii) “Check the prescribed fluids, set rate & flow as prescribed, inspect infusion rate hourly, encourage oral fluids [and] record.”

(iii) “Encourage parental participation in care.”

The operation

5.47 Mr and Mrs Ferguson, having left the hospital believing that Raychel would not have surgery unless her condition deteriorated, then received a call that the operation was to proceed. They managed to return before Raychel was taken to theatre. They did not enquire further because “it was a hospital, we thought they know best, so we just went with it.” Mrs Ferguson accompanied Raychel to the operating theatre with Staff Nurse Fiona Bryce. Raychel seemed “a bit nervous.” She was anaesthetised by Dr Vijay Gund who was assisted in part by Dr Claire Jamison. Dr Makar performed the operation.

5.48 Dr Vijay Gund was an SHO in anaesthesia and had started at Altnagelvin just four weeks before. Dr Jamison was his senior and about to

144 Staff Nurse Patterson T-04-03-13 p.30 line 25 & Mrs Margaret Doherty T-09-09-13 p.119 line 17
145 Staff Nurse Bryce T-04-03-13 p.171 line 5
146 020-027-063
147 020-027-059
148 020-027-056
149 Staff Nurse Patterson T-04-03-13 p.40 line 9
150 Mrs Ferguson T-26-03-13 p.26 line 16
151 312-003-004 & WS-054-1 p.3
152 Staff Nurse Bryce T-04-03-13 p.152 line 19
153 312-003-002
154 312-003-002 & Dr Jamison T-07-02-13 p.79 line 17
155 WS-023-2 p.2-3
156 Dr Gund T-05-02-13 p.144 line 15
become a registrar. She attended because she was free to assist and not because her presence was necessary.157

5.49 The 1989 NCEPOD Recommendations applied to anaesthetists as well as surgeons. However, neither Dr Gund nor Dr Jamison was aware of the recommendations158 but neither thought the case so complex as to warrant discussion with a consultant before proceeding to surgery.159 As with Dr Makar, my criticism relates not to the actions of these two trainee doctors but rather the failure within Altnagelvin to implement the 1989 recommendations.160

5.50 The operation went smoothly, starting at 23:40 and finishing about 00:20. It was unusual but not improper for paediatric surgery to start so late.161

5.51 Raychel received IV Hartmann’s solution intra-operatively. There is no record of precisely how much she received which is an obvious failing in the anaesthetic documentation but one not seemingly that unusual for the time.162 In addition, Dr Gund noted “Hartmanns 1 L”163 which was a potentially misleading entry because it is most improbable that Raychel received a full litre of Hartmann’s during surgery. It was thus that after Raychel’s death, Dr Jamison was asked to and did make “Retrospective note dated 13/6/01. Patient only received 200mls of noted fluids below when in theatre. Litre bag removed prior to leaving theatre.”164 This was signed by her and countersigned by Dr Geoff Nesbitt,165 Consultant Anaesthetist and Clinical Director in Anaesthesia and Critical Care. Whilst this unusual entry aroused considerable suspicion, it must be recognised that it very obviously identifies itself as a retrospective note and is clearly

157 WS-024-2 p.5
158 Dr Gund T-05-02-13 p.147 line 11 & Dr Jamison T-07-02-13 p.61 line 5
159 Dr Gund T-05-02-13 p.145 line 8 & p.146 line 7 & Dr Jamison T-07-02-13 p.60 line 2 & p.65 line 24
160 Dr Jamison T-07-02-13 p.64 line 8
161 Staff Nurse McGrath T-26-02-13 p.29 line 16
162 Staff Nurse McGrath T-26-02-13 p.41 line 9
163 020-009-016
164 020-009-016
165 312-003-003
dated. It is also now accepted as being most probably correct by Dr Gund.166

5.52 Even though Dr Gund should have kept a better record of the fluids infused, it was the view of Dr Haynes that “the anaesthetic administered by Dr Gund (including the fluid administered during the operation) was entirely appropriate and cannot be faulted.”167

5.53 Raychel took a little longer than expected to regain consciousness after surgery168 but was ready to be returned to the ward by about 01:30. Whilst not particularly unusual169 this caused her parents concern because they had understood from Staff Nurse Bryce that the surgery would take about an hour.170 Staff Nurse Bryce thought it most unlikely that she would have given any such indication.171 I do not believe it necessary to examine this misunderstanding. I accept that Staff Nurse Bryce was trying to be helpful to Mr and Mrs Ferguson.

5.54 Post-operatively Dr Makar recorded that the appendix was “mildly congested” with an “intraluminal faecolith.” Accordingly, whilst the appendix was not inflamed, it was not normal.

5.55 Dr Makar did not speak to the Fergusons after the operation. He conceded that, had circumstances permitted, it would have been good practice but because he was the sole SHO in a busy hospital, he may not have been able to manage it.172

Post-operative fluids

5.56 After the operation and while Raychel was still in the recovery room Dr Gund gave his prescription for Raychel’s initial post-operative fluids.173 He prescribed Hartmann’s Solution to continue at the same rate as pre-
operatively, namely the over-prescribed 80mls per hour. He was then told by Dr Jamison and Staff Nurse Marian McGrath,\(^\text{174}\) that post-operative fluids were not prescribed by the anaesthetist but were managed by the doctors on the ward.\(^\text{175}\) Dr Gund, being new to the hospital, acquiesced and deleted his prescription for Hartmann’s. I am certain that he did so because he was new and assumed such a practice could only be at the direction of a consultant and that a ward doctor would take active responsibility for the post-operative fluids. He now accepts that he ought to have made his views about post-operative fluids better known,\(^\text{176}\) not least because he could not have known how long it would be before a ward doctor would see Raychel nor in any event how any such doctor could have appreciated her individual fluid requirements.\(^\text{177}\)

5.57 Staff Nurse McGrath remembered the discussion with Drs Gund and Jamison.\(^\text{178}\) She recalled pointing out that normally the pre-operative fluid regime was resumed after surgery, and that while Dr Gund indicated that he preferred Hartmann’s, Dr Jamison told him that Hartmann’s was not used on Ward 6. Staff Nurse McGrath had no doubt that Raychel would receive Solution No. 18 on the ward\(^\text{179}\) and that is what happened.

5.58 Dr Jamison does not recall exactly what she said to Dr Gund but accepted that she might have told him that prescriptions for Hartmann’s were regularly cancelled on Ward 6 and the fluids thereafter managed by the doctors on the ward.\(^\text{180}\) It is not therefore surprising that Dr Gund should have felt there was little point in prescribing and left the fluids for ward management.

5.59 Staff Nurse McGrath said that anaesthetists who were new to the hospital were often surprised by this convention but nothing was done.\(^\text{181}\) Dr Jamison, herself, had no concerns “because No.18 was commonly used at

\(^{174}\) 312-003-004
\(^{175}\) WS-023-1 p.2 & WS-023-2 p.5
\(^{176}\) Dr Gund T-05-02-13 p.211 line 6
\(^{177}\) Dr Gund T-05-02-13 p.209 line 23
\(^{178}\) Staff Nurse McGrath T-26-02-13 p.52 line 15
\(^{179}\) Staff Nurse McGrath T-26-02-13 p.54 line 21
\(^{180}\) Dr Jamison T-07-02-13 p.115 line 4
\(^{181}\) Staff Nurse McGrath T-26-02-13 p.66 line 18 et seq
that time in the ward which was a paediatric ward with experience in giving fluids to children."\textsuperscript{182} However, she would not have prescribed it herself\textsuperscript{183} and nor does it seem would any other anaesthetist.\textsuperscript{184}

5.60 When asked why nurses challenged doctor’s decisions on fluids, Staff Nurse Noble explained that “previous to that if a child had been on other fluids, we would have been asked by our nursing seniors why that particular fluid had been used and why we hadn’t highlighted it to the doctors that Solution No.18 was always used on the paediatric ward.”\textsuperscript{185}

5.61 Whilst it was not inappropriate for nurses to advise doctors about ward practice,\textsuperscript{186} the choice of fluids remained the responsibility of the doctor. It was disturbingly clear from the evidence that Ward 6 nurses had very little understanding of the importance of the type and rate of post-operative IV fluids\textsuperscript{187} let alone the Syndrome of Inappropriate Antidiuretic Hormone secretion (‘SIADH’). They were ignorant as to the effect of administering Solution No.18 intravenously.\textsuperscript{188} Such lack of understanding should have been obvious. The anaesthetists should never have relinquished responsibility for directing the immediate post-operative fluids for their patients.

5.62 Of equal concern is that not only was the fluid as prescribed pre-operatively followed post-operatively, but so too was the rate.\textsuperscript{189} That created a problem for two reasons. First because Raychel’s pre-operative hourly rate was already excessive at 80mls and secondly, because it was generally held to be good practice to reduce fluids post-operatively by 20% to 30% to avoid the risks of SIADH.\textsuperscript{190}

\textsuperscript{182} Dr Jamison T-07-02-13 p.133 line 13
\textsuperscript{183} Dr Jamison T-07-02-13 p.117 line 17
\textsuperscript{184} Staff Nurse McGrath T-26-02-13 p.10 line 23
\textsuperscript{185} Staff Nurse Noble T-26-02-13 p.168 line 17
\textsuperscript{186} Miss Ramsay T-19-03-13 p.70 line 14
\textsuperscript{187} Staff Nurse Noble T-26-02-13 p.204 line 2 & Sister Millar T-28-02-13 p.51 line 11
\textsuperscript{188} Staff Nurse Noble T-26-02-13 p.135 line 9 & Sister Millar T-28-02-13 p.21 line 15
\textsuperscript{189} Staff Nurse Bryce T-04-03-13 p.128 line 23 & Staff Nurse McAuley T-05-03-13 p.50 line 24 & Staff Nurse Gilchrist T-11-03-13 p.47 line 9
Upon Raychel’s return to Ward 6 the anaesthetic team ceded control of Raychel’s fluids.\textsuperscript{191} There was then no prescription or clinical protocol to guide the post-operative management of Raychel’s fluid therapy.\textsuperscript{192} Without any reference to her post-operative needs, she was re-subjected to her pre-operative fluids.

Dr Haynes considered this “completely unsatisfactory”\textsuperscript{193} and Mr Foster described it “a rather bizarre protocol... it doesn’t make anaesthetic or surgical sense.”\textsuperscript{194} Mr Gilliland said that he was “not aware of [this practice] and it would appear none of my surgical colleagues were aware of it, nor indeed Dr Nesbitt,”\textsuperscript{195} Dr Raymond Fulton\textsuperscript{196} was “surprised”\textsuperscript{197} and Miss Irene Duddy,\textsuperscript{198} Director of Nursing\textsuperscript{199} said that “unless someone had brought that to my attention I would not have been aware of it.”\textsuperscript{200}

The evidence revealed that there was no clear delegation of the responsibilities for administering IV fluids. Fluid therapy was undertaken by the surgical, paediatric and anaesthetic specialties in conjunction with the nursing staff without agreed responsibilities or appropriate supervision.\textsuperscript{201} Dr McCord was left to describe his “perception... that one specialty was doing one thing, another specialty was doing another, and likewise they thought that we were doing one thing”\textsuperscript{202} – “the fact is that we thought it worked, but it evidently didn’t.”\textsuperscript{203}

I am critical of these Altnagelvin practices. The expert evidence was that the universal practice elsewhere at that time was for the anaesthetist to prescribe the initial post-operative fluids, which would continue until review, most probably at ward round. That was because it was only the
anaesthetist who could know what the fluid requirements were. That that was not the practice in Altnagelvin was wholly unacceptable. Nobody was able to explain the origin of this practice,\textsuperscript{204} although it is clear that it had been followed for many years.\textsuperscript{205} I suspect that it had no reasoned basis because it makes no sense. The fact that this practice continued unquestioned and for so long reveals an absence of system and control and raises the fundamental question as to whether any consultant - surgeon, anaesthetist or paediatrician – actually understood what was going on. It would indeed have been a miracle if Raychel had been the only child placed at risk.

5.67 However, neither the type nor the rate of fluid given at that time would have mattered very much had it not been for a catalogue of further failure on the Friday.

\textbf{Raychel’s return to Ward 6 and the ward round}

5.68 Raychel was sleepy when returned to the ward, opening her eyes only briefly for her parents.\textsuperscript{206} They stayed with her until about 06:00 when Mrs Ferguson left.\textsuperscript{207}

5.69 Mr Ferguson recalled Raychel waking at about 08:00 in relatively good form. Staff Nurse Patterson “helped Raychel sit up in bed and... told Raychel and her dad, [that] she was doing very well.”\textsuperscript{208} Mr Ferguson went to buy her a colouring book. Thereafter, and presumably while he was away, Raychel vomited shortly after 08:00.\textsuperscript{209}

5.70 After that she was well enough to get out of bed and sit colouring. The intravenous drip attached to her arm was infusing Solution No.18 at 80ml/h.

5.71 The evidence indicates:

\textsuperscript{204} Mr Gilliland T-14-03-13 p.178 line 17
\textsuperscript{205} Staff Nurse McGrath T-26-02-13 p.65 line 19 & Sister Millar T-28-02-13 p.53 line 3
\textsuperscript{206} Mr and Mrs Ferguson T-26-03-13 p.31 line 7
\textsuperscript{207} Mrs Ferguson T-26-03-13 p.32 line 6
\textsuperscript{208} Staff Nurse Patterson T-04-03-13 p.76 line 15
\textsuperscript{209} Staff Nurse McAuley T-05-03-13 p.81 line 10
(i) Raychel was the only child on the ward to have undergone surgery overnight.

(ii) At approximately 08:00 – 08:30 Staff Nurse Noble made a hand-over of Ward 6 to Sister Elizabeth Millar.

(iii) Sister Millar deployed Staff Nurse Michaela McAuley as Raychel’s principal carer.

(iv) Between 08:30 and 10:00 a surgical SHO Dr M H Zafar conducted the morning ward round with Sister Millar. Usually the ward round would have been taken by a registrar but on this occasion, because Raychel was the only surgical patient on Ward 6 Dr Zafar was assigned by the registrar to conduct the round. Dr Zafar was on a 6 month placement at Altnagelvin and was dealing with paediatric patients for the first time.

(v) There is uncertainty as to whether Dr Zafar was aware of the 08:00 vomit but in any event and given Raychel’s clear signs of recovery, Dr Zafar directed a routine and gradual reduction of intravenous fluids with staged encouragement to take fluids orally. Normally after an uncomplicated appendectomy, the reduction of IV fluids would start in the morning and continue into late afternoon or early evening with the expectation that a patient such as Raychel would “increase her drinking during the day; walk a short distance, and possibly eat something light later in the day.” In the usual way, Raychel might then have been ready to go home on the Saturday or at the latest on Sunday. Indeed 80% of such children might have expected to be discharged within 48 hours.
(vi) Sister Millar and her nurses were very familiar with such a plan for recovery. 220

(vii) Dr Zafar saw Raychel for no more than 5-10 minutes. 221 He did not concern himself with the rate or type of her IV fluids because she seemed well 222 and in any event he proposed to reduce her fluids and end her therapy. 223 Accordingly, he made no new prescription for her fluids and they continued as before.

(viii) Whilst it was comparatively unusual for Raychel to have been seen on a morning ward round by a SHO rather than a registrar, 224 it did not then seem of particular significance given that there was no cause for concern on Friday morning and complications in such circumstances were rare.

(ix) When Dr Zafar and Sister Millar were taking their leave of Raychel, Dr Makar arrived to enquire after her. 225 This was both routine, lest there be complication and a courtesy. He spoke briefly to Mr Ferguson.

(x) Dr Makar confirmed that “Raychel was sitting up... she was pain free at that time.” 226

(xi) Neither Sister Millar nor the doctors had any concerns at that time. In fact, Mr Ferguson telephoned his wife at about 09:30 and told her not to hurry to the hospital because Raychel was up and about. 227

**Underlying concerns**

5.72 Underlying these apparently un-troubling circumstances were matters of real concern.

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220 Sister Millar T-28-02-13 p.64 line 2
221 Dr Zafar T-01-03-13 p.185 line 11
222 Dr Zafar T-01-03-13 p.209 line 3
223 Dr Zafar T-12-03-13 p.206 line 14
224 Staff Nurse Noble T-26-02-13 p.189 line 2
225 Sister Millar T-28-02-13 p.106 line 21
226 Dr Makar T-13-03-13 p.174 line 20
227 Mr Ferguson T-26-03-13 p.35 line 12
5.73 The ward round was not taken by a consultant or a registrar but by a junior doctor with limited experience of children. Mr Foster found this concerning and “entirely unsatisfactory and unsafe and evidence of disorganisation of the surgical services...” Dr Haynes was of the view that the formal ward round should “ideally [be] supervised directly by the responsible consultant.”

5.74 In addition, there was no formalised handover between the surgeon who performed the surgery and the surgeon who conducted the ward round. There was no continuity. They appear to have passed each other without conferring as to Raychel’s fluid management. Had they done so, Dr Makar might have reconsidered the fluid therapy and the catastrophic outcome which was to ensue might have been avoided. Whilst neither Dr Makar nor Dr Zafar was aware of her fluid regime on the Friday morning, they each could have discovered it. That neither did was unacceptable.

5.75 This is to be understood in a context where the surgical patients on Ward 6 were cared for by the surgical team and not the paediatricians who were actually based on Ward 6. In practice, this meant that the surgical doctors might not always be available to their patients because they were elsewhere in the hospital. Whilst such an arrangement was not unusual in district general hospitals it did pose risk and had given rise to nursing complaint. This was an organisational shortcoming, which could keep surgical doctors from their patients and inhibit nurses from calling upon the medical doctors available on Ward 6.

5.76 Moreover, it was the most junior hospital surgical doctors who were relied upon for initial response to any summons in respect of the surgical patients on Ward 6. Mr Foster believed that “junior house officers who had no experience of paediatrics should not have been first on call for surgical children.” This was a further potential risk factor, not least because it was
these inexperienced doctors who had first oversight of the childrens’ post-surgical fluid management.

5.77 Furthermore, significant differences had developed in the care given to the paediatric and surgical patients on Ward 6. Medical patients receiving IV infusion under the care of paediatricians were subject to routine blood tests every 24 hours. However, surgical patients were not. Accordingly, a child vomiting with gastroenteritis would have daily blood tests as a matter of course whereas a child who vomited after surgery would not. This was an alarming anomaly and it is not at all clear how or why this had arisen. Dr Haynes suggested that it “occurred because of a lack of consultant ownership of the issue.” Such a lack of organisational control of Ward 6 would have consequences for Raychel.

5.78 These were important matters of concern and each reveals not only underlying systemic weakness but also the lack of consultant leadership in the management of surgical patients on Ward 6.

Friday 8th June: nursing issues

Fluid balance chart

5.79 The importance of fluid balance should have been known to all nurses in 2001 having been taught for many years. It was the clear responsibility of nursing staff to enter relevant fluid information into the fluid balance chart. In 2001, this permitted the following to be recorded:

(i) Type of fluid intake.

(ii) Amount of hourly fluid intake.

(iii) Type of output (i.e. vomit, urine etc.)

(iv) Amount of hourly fluid output.

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234 Staff Nurse Noble T-27-02-13 p.129 line 4
235 220-002-006
236 Professor Hanratty T-20-03-13 p.197 line 2
5.80 Fluid balance charts record information to guide fluid management. Accordingly and as Professor Hanratty observed “measuring and recording intake and output [is] a very significant part of the continuing care of the patient.” Had Raychel’s fluid balance chart been accurately compiled, it should have guided the nurses and doctors to an appreciation of what was happening to Raychel’s fluid balance in real time.

**Recording fluid output**

5.81 Some fluid information will always be imprecise. Unless the quantity of urine passed is actually measured, the entry can only really be “PU” (passed urine). The fluid output of a 9-year old girl toileted by her mother will go unrecorded unless the parent is advised to provide particulars. Mr and Mrs Ferguson were not so advised and, regrettably, even when such matters were brought to Sister Millar’s attention she neither noted nor investigated. Disturbingly she conceded that it was not always the practice on Ward 6 to record such an event. This was despite the requirement of the fluid balance chart and the specific direction of the ECP to “observe/record urinary output.”

5.82 Accordingly, neither the frequency nor quantity of urinary output was properly recorded. There is a single entry of “PU” timed at 10.00 but the Fergusons are sure that she also passed urine around noon and perhaps again in the early afternoon.

5.83 Similarly, the quantification of vomit in the record is uncertain. A shorthand was devised on Ward 6 to record vomit quantity using the ‘+’ sign. Unfortunately this had not always been explained allowing nurses to interpret “vomit ++” as indicating anything from small to large.

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237 Professor Hanratty T-20-03-13 p.163 line 3
238 Staff Nurse Bryce T-05-03-13 p.39 line 12 & Mrs Ferguson T-26-03-13 p.78 line 23 & p.46 line 25
239 Sister Millar T-28-02-13 p.16 line 7 & p.115 line 3
240 Sister Millar T-28-02-13 p.80 line 4
241 020-027-063
242 020-018-037
243 Mrs Ferguson T-26-03-13 p.78 line 19
244 Staff Nurse Bryce T-04-03-13 p.169 line 24
245 Staff Nurse Patterson T-04-03-13 p.78 line 14
246 Sister Millar T-28-02-13 p.124 line 10 & Staff Nurse Bryce T-04-03-13 p.169 line 10
5.84 Imprecision as to quantity of output was not the only problem. Additionally and critically individual incidents of vomiting were not accurately recorded.

5.85 The fluid balance chart shows\(^{247}\):

(i) "Vomit" around 08:00
(ii) "Large vomit" around 10:00
(iii) "Vomited ++" around 13:00
(iv) "Vomited ++" around 15:00
(v) "Vomiting coffee grounds ++" around 21:00
(vi) "Vomited small amount x 3" around 22:00
(vii) "Small coffee ground vomit" around 23:00.

5.86 I have no doubt that this record is incomplete. Evidence was given that Raychel vomited at about 18:00 but this was not recorded. Staff Nurse Sandra Gilchrist\(^{248}\) failed to note a vomit at about 20:30\(^{249}\) and additional vomit seen on pyjama top and pillowcase at 00:35 also went unrecorded.\(^{250}\) In addition, there were occasions when Raychel vomited into kidney dishes which were disposed of undocumented by the nursing staff.\(^{251}\) Even allowing for some confusion as to timings, I am certain that the incidence of Raychel's vomiting significantly exceeded that recorded in the fluid balance chart. Whilst I acknowledge the practical difficulties in accurately monitoring fluid balance, I can only agree with Staff Nurse McAuley that her "documentation was poor."\(^{252}\)

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\(^{247}\) 020-018-037
\(^{248}\) 312-003-005
\(^{249}\) Staff Nurse Gilchrist T-11-03-13 p.66 line 22
\(^{250}\) Staff Nurse Gilchrist T-11-03-13 p.112 line 17
\(^{251}\) WS-021-1 p.6-7 & Mrs Ferguson T-26-03-13 p.54 line 20
\(^{252}\) Staff Nurse McAuley T-05-03-13 p.173 line 7
**Recording fluid intake**

5.87 The nursing staff did not seemingly attach particular importance to the fluid intake record either. Staff Nurse McAuley acknowledged that she had been aware that Raychel was “taking sips” and yet did not record them. Mr Ferguson recalled allowing Raychel some soft drink but this was not noted because he had not been told to tell the nurses. These particular omissions from the fluid chart are of little consequence given the minimal amounts involved but do highlight a nursing failure to advise the Fergusons as to the importance of fluid information.

5.88 Overall, there was a lack of due attention to fluid documentation. In consequence, the fluid balance chart could not have been relied upon to indicate Raychel’s fluid balance. This was a major deficiency in record-keeping and a significant failing in nursing for which Sister Millar was primarily responsible.

**Repeated vomiting**

5.89 Raychel’s fluid balance chart for 9th June records nine vomits in the 15 hours between 08:00 and 23:00. In addition there were, at the very least, three additional vomits. Whilst it was probably reasonable for the nurses to consider Raychel’s initial vomiting a normal post-operative response, this became an increasingly unlikely explanation as the day progressed. However, the nurses did not reconsider their initial perception and in the view of Mr Foster became “locked into a mindset of what they expect to happen.”

5.90 As Mr Ferguson recalled “every time Raychel vomited in the bowl, I would actually take it out and show it to them. And as far as I can remember... the only words... back, 'its only natural. After an operation, she will be sick.' “

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253 Staff Nurse McAuley T-05-03-13 p.60 line 7
254 Mr Ferguson T-26-03-13 p.34 line 18
255 Mrs Ferguson T-26-03-13 p.53 line 4
256 Dr Scott-Jupp T-20-03-13 p.66 line 7
257 223-002-017
258 Mr Ferguson T-26-03-13 p.54 line 3
5.91 Mr Orr said that “alarm bells should have been ringing by lunchtime, if not after lunch, when there was the third vomit.” Medical staff should then have been contacted. A doctor would then, according to Mr Orr, have taken “blood for urea and electrolytes and... actively considered replacing the vomitus... with a solution such as normal saline and then altering the maintenance fluids as well.” That would have saved Raychel.

5.92 The vomiting continued all day and the coffee ground vomiting which started at about 21:00 (or even earlier if Mr Ferguson is correct) is a particularly disturbing feature. Mr Foster believed it an “indication of significant or severe and prolonged vomiting and retching... it should have attracted serious attention as it is due to trauma to the gastric mucosa causing bleeding.” Mr Orr considered it an alert “to the fact that something unusual and abnormal is happening.” Professor Mary Hanratty said that any coffee ground vomiting in a child should immediately prompt a nurse to contact an SHO.

5.93 It did not however alarm the nurses on Ward 6. Staff Nurse Gilchrist, who noted this development “thought maybe she had a wee tear when she was vomiting. That’s why it was all blood in it...” She waited for another hour before she contacted a doctor. She simply did not think.

5.94 I must record that I reject emphatically the evidence given by Sister Millar and Staff Nurses Gilchrist, Noble and Roulston that they considered that Raychel was suffering from conventional post-operative vomiting. I do not believe that they actually thought about it and that was the problem. Post-operative nausea and vomiting (‘PONV’) could not have explained

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259 Mr Orr T-21-03-13 p.147 line 13
260 Mr Orr T-21-03-13 p.149 line 6
261 Dr Scott-Jupp T-20-03-13 p.116 line 7
262 020-018-037
263 095-005-018
264 223-002-016
265 Mr Orr T-21-03-13 p.193 line 6
266 Professor Hanratty T-20-03-13 p.202 line 1
267 Staff Nurse Gilchrist T-11-03-13 p.75 line 1
268 WS-056-1 p.3
269 WS-053-2 p.6 & 098-293-771
270 WS-049-1 p.5
271 312-003-005 & WS-52-1 p.3
what was happening. Even if Raychel had suffered some post-operative vomiting, the overall frequency, duration and type of vomiting was of a very different order.

**Failure to appreciate deterioration**

5.95 It is a fundamental nursing task to monitor progress, identify deterioration and where necessary contact the doctor.\(^{272}\) That requires ‘active’ observation.

5.96 Over the course of Friday, Raychel who had started her day contentedly colouring-in, became very ill. She stopped passing urine, became increasingly lethargic, vomited repeatedly, failed to respond to anti-emetics and vomited coffee grounds. She was very obviously not recovering as expected from her uncomplicated routine surgery.

5.97 Sister Millar has since acknowledged “Raychel was... deteriorating earlier than we as nurses recognised.”\(^{273}\) However, I heard evidence that Raychel’s condition was recognised, not just by family\(^ {274}\) and friends,\(^ {275}\) but also by strangers.\(^ {276}\) I am struck by the contrast between the descriptions given by these witnesses and those proffered by the nurses.

5.98 I do not accept the nursing evidence that Raychel was well and presenting no real cause for concern\(^ {277}\) and in this regard, I note the evidence of those nurses who sought retrospectively to diminish the importance of the vomiting.\(^ {278}\) I believe that Staff Nurse McAuley must be wrong when she said that shortly before 20:00 she saw Raychel “up and about, walking in the corridor” and pointing things out to her brothers.\(^ {279}\) On the balance of the evidence, I do not believe her to be correct.
I also found disquieting the nurses’ unquestioning belief that Raychel could come to no harm while on Solution No.18.\textsuperscript{280} That induced complacency.\textsuperscript{281} I accept that because Solution No.18 was widely used, it was generally safe. I do not criticise the nurses for failing to appreciate that hyponatraemia was developing or even that her fluids were not replacing the sodium lost through vomiting. However, the nurses were obligated to monitor and respond. I find serious failure in each and every nurse caring for Raychel to:

(i) Consider whether the care given was having the desired effect.

(ii) Appreciate that her condition was deteriorating.

(iii) Recognise that she was very ill.

(iv) Understand that she needed the urgent attention of a capable doctor properly informed by nursing observation.

Accordingly, I criticise the nursing staff for failing to recognise and react to Raychel’s illness.

\textbf{Medical care: 8th June, post-ward round}

5.100 In addition and over the course of Friday 8\textsuperscript{th} June three junior doctors were involved in Raychel’s care.

\textit{Dr Mary Butler}

5.101 Dr Mary Butler\textsuperscript{282} was a second year SHO with 4 months experience in paediatrics.\textsuperscript{283} She attended the daily ward round and covered the neonatal, special baby and day care units. She understood the management of fluids and electrolytes in children.\textsuperscript{284}

\textsuperscript{280} Staff Nurse Roulston T-06-03-13 p.139 line 14 & Staff Nurse Noble T-26-02-13 p.205 line 10
\textsuperscript{281} Staff Nurse Noble T-27-02-13 p.92 line 2 & p.133 line 9
\textsuperscript{282} 312-003-002
\textsuperscript{283} Dr Butler T-11-03-13 p.3 line 5
\textsuperscript{284} Dr Butler T-11-03-13 p.9 line 21
Dr Butler’s involvement with Raychel was brief. At around noon, she was on Ward 6 when Raychel’s litre bag of Solution No.18 had almost emptied. She was asked by Staff Nurse McAuley to prescribe a replacement. She did so without investigating and probably without even seeing Raychel. She believes that she would have made some basic enquiries and if so, would probably have been told that according to the chart, Raychel had vomited twice. Such, she said, would not have caused her concern at that time. Had she been concerned, she would have contacted a surgical SHO or spoken to her paediatric registrar, which she did not.

In the event Dr Butler assumed that the rate prescribed for the fluids had been properly calculated and accordingly issued a repeat prescription for Solution No.18. She now recognises that she did so at a rate which was excessive and regrets that she did not double-check. While Dr Butler could have been more pro-active, I believe it would be unduly severe to criticise her in the context of her response to a limited request on behalf of a patient who was not her own.

Dr Joseph Devlin

Dr Joseph Devlin was a Pre-Registration House Officer. He was in the first year of his first post-graduate post. In his first six months, he had undertaken very little paediatric work and in his second six months he could not remember any. He could hardly have had less paediatric experience. Mr Orr was of the firm opinion that such doctors required close supervision and support.
5.105 His involvement with Raychel appears to have been entirely unintended. Staff Nurse McAuley recalls that at about 15:00 she was alerted to Raychel’s vomiting and, although not unduly concerned, thought it necessary to inform Sister Millar and contact a surgical JHO for an anti-emetic. Her evidence was that she tried repeatedly over the next 2-2½ hours to get a junior surgical doctor to come to Ward 6 but without success. Eventually Sister Millar saw Dr Devlin and directed that he be asked to “give Raychel an anti-emetic.”

5.106 The Fergusons are sceptical that Staff Nurse McAuley made the efforts she described. They suspect that a doctor was only called after the vomit recorded at 17:00. I understand their scepticism; indeed how could a childrens’ ward function, if a concerned and experienced nurse could not get hold of a junior doctor in over 2 hours? However extraordinary, and even in the absence of corroborative documentation I am inclined to believe Staff Nurse McAuley’s evidence, which of itself must raise concerns about the provision of care to surgical patients on Ward 6. That was not the fault of Staff Nurse McAuley.

5.107 When Dr Devlin attended Raychel at 18:00, he was alone. That may have been unavoidable but it carried risk. A nurse should have attended with him because Raychel was not recovering as had been expected and he should have been told. However, he was not and this very inexperienced doctor was left without any suggestion that there was much to worry about, apart from some vomiting and on that basis, he gave the anti-emetic as indicated.

5.108 As Dr Devlin explained “I had absolute confidence... [in] my nursing colleagues ability to relay on any concerns to the oncoming doctor and I suppose at that time in my career I felt that the safety net would lie with the

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296 Sister Millar T-28-02-13 p.140 line 10 & Staff Nurse McAuley T-05-03-13 p.186 line 5
297 Mrs Ferguson T-26-03-13 p.71 line 7
298 Staff Nurse Noble T-27-02-13 p.64 line 14
299 Sister Millar T-28-02-13 p.145 line 5
300 Staff Nurse McAuley T-05-03-13 p.149 line 2
301 Staff Nurse Roulston T-06-03-13 p.146 line 17 & Mr Foster T-21-03-13 p.164 line 5
302 Dr Devlin T-06-03-13 p.64 line 5
303 020-017-034
senior staff... that systems... would be in place to prevent the tragic outcome...”

5.109 Dr Devlin was the first doctor to see Raychel in almost 9 hours. He was inexperienced and had neither clinical guidelines, attendant nurses or the supervision of more senior clinicians to help him. That was unsafe. Dr Devlin recalled that Raychel vomited when he was with her but he did not understand what this might mean. He accepts that this should have been recorded but he thought this would be done by a nurse. It was not. With experience and hindsight, Dr Devlin accepts that he should have directed electrolyte tests. He also accepts that he should have recorded his intervention.

5.110 I have considered whether Dr Devlin should be criticised for his relative inaction. The expert evidence and his own evidence taken with that of other witnesses, including the nurses, persuades me that this would be unfair. Whilst he had an opportunity to help Raychel and did not, fault does not attach to the inexperienced Dr Devlin. He did what he was asked to do and moved on.

5.111 Dr Devlin believes that had he been called back to see Raychel four hours later, he might then have been more alert to her condition and would have been able to reassess. In terms, he was suggesting that the inexperienced doctor who is called to see a child once is at a major disadvantage. I think he is correct.

5.112 It is disturbing to record that after Dr Makar saw Raychel briefly on Friday morning, the only doctors to see her were JHOs and none of them saw her more than once. Raychel’s deterioration was not observed over time by any one doctor.

5.113 It is the role of the nurse to monitor patient progress and communicate relevant observation to the junior doctor. Responsibility for management

304 Dr Devlin T-06-03-13 p.75 line 21
305 Dr Devlin T-06-03-13 p.61 line 4
306 Dr Devlin T-06-03-13 p.73 line 21
remains with the doctor who acts under the direction and supervision of more senior colleagues and the consultant. Unfortunately, Ward 6 was over reliant upon the services of very junior and inexperienced doctors and in Raychel’s case, neither the nurses nor the senior surgical staff were supporting them. This was a deficiency in communication and system and carried risk.

Dr Michael Curran

5.114 Dr Michael Curran was a medical JHO with just 10 months experience and very little exposure to paediatric work. Due to staff pressure, he was unexpectedly doing a locum in surgery on the Friday evening of 8th June and in contact with children for the first time in months.

5.115 Like Dr Devlin, he considered that his role as a JHO was task orientated. He performed specific duties delegated at ward round, such as carrying out blood tests, organising x-rays and preparing discharge letters. These tasks were performed at the behest of senior colleagues and the more experienced nurses.

5.116 Dr Curran had limited understanding of the risks posed by prolonged vomiting. He believed that the risk posed by vomiting and/or diarrhoea was dehydration and that the appropriate response was fluid replacement. He did not understand that prolonged vomiting depleted sodium levels and was unsure of the causes of hyponatraemia.

5.117 Staff Nurse Gilchrist ‘bleeped’ Dr Curran at about 22:00 because of Raychel’s continued vomiting and he attended. He could not recall any

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307 Mr Orr T-21-03-13 p.135 line 15 & WS-320-1 p.15
308 312-003-002
309 Mr Gilliland T-14-03-13 p.124 line 18
310 Dr Curran T-07-03-13 p.5 line 20
311 Dr Curran T-07-03-13 p.36 line 15
313 Dr Curran T-07-03-13 p.33 line 11
314 Dr Curran T-07-03-13 p.29 line 10
315 WS-053-1 p.3
particular conversation but believes he must have been told where to find Raychel and the medication he was to prescribe and administer.\textsuperscript{316}

5.118 Staff Nurse Gilchrist assumed that Dr Curran would assess Raychel.\textsuperscript{317} However, she made no particular effort to speak to him\textsuperscript{318} assuming "he would have spoken to somebody."\textsuperscript{319} In the circumstances, she should have prompted Dr Curran to assess Raychel, or at the very least shown him the fluid balance chart and informed him that the vomiting had not been controlled by the earlier anti-emetic. Staff Nurse Noble also had the opportunity to speak to Dr Curran.\textsuperscript{320}

5.119 Mr Foster considered that "Dr Curran and the nursing staff should have really been alarmed at this point."\textsuperscript{321} Tragically they were not. Dr Curran’s attendance was to be the last opportunity for a doctor to respond to Raychel’s continuing deterioration. At that stage electrolyte testing would almost certainly have identified abnormally low sodium levels\textsuperscript{322} and at 22:00 it may still have been possible to save her.\textsuperscript{323}

5.120 Dr Curran is clear that he was not asked to assess Raychel’s condition and that no concern was expressed to him about coffee ground vomiting\textsuperscript{324} or deterioration.\textsuperscript{325} He said that had he been told of the coffee ground vomit or had he seen it recorded, he would have contacted an SHO immediately.\textsuperscript{326} He maintained that he was only asked to administer an anti-emetic which was a routine request.\textsuperscript{327} In that context, he believes that he would have performed only a very limited assessment. He would not have checked the fluid balance chart\textsuperscript{328} because he already knew she was vomiting. Accordingly, he prescribed and gave the anti-emetic, made an

\textsuperscript{316} Staff Nurse Noble T-27-02-13 p.96 line 4 & Dr Curran T-07-03-13 p.55 line 6
\textsuperscript{317} Staff Nurse Gilchrist T-11-03-13 p.93 line 1
\textsuperscript{318} Staff Nurse Gilchrist T-11-03-13 p.95 line 15
\textsuperscript{319} Staff Nurse Gilchrist T-11-03-13 p.110 line 23
\textsuperscript{320} Staff Nurse Noble T-27-02-13 p.132 line 14
\textsuperscript{321} Mr Foster T-21-03-13 p.189 line 2
\textsuperscript{322} Dr Scott-Jupp T-20-03-13 p.92 line 2 & Dr Haynes T-22-03-13 p.112 line 15
\textsuperscript{323} Dr Scott-Jupp T-20-03-13 p.116 line 7
\textsuperscript{324} Dr Curran T-07-03-13 p.76 line 22
\textsuperscript{325} Dr Curran T-07-03-13 p.63 line 3
\textsuperscript{326} Dr Curran T-07-03-13 p.76 line 13
\textsuperscript{327} Dr Curran T-07-03-13 p.56 line 20
\textsuperscript{328} Dr Curran T-07-03-13 p.75 line 11
entry in Raychel's drug record and left. He suggested that had the nurses
been genuinely worried about Raychel, they would most certainly have
informed him of their concerns and not just left out the anti-emetic for him,
and in any event in such a situation he believed that they would have called
someone rather more senior and experienced than he.  

5.121 Dr Curran is open to the criticism that, when asked to give an anti-emetic
he neither read the notes in respect of the vomiting nor asked any
questions. That was inadequate because the longer she vomited the more
urgent did the need become to check her electrolytes. He did not know
how long she had been vomiting or what had already been done about
it. The coffee ground vomit, which he accepts would have caused him
concern, was recorded at 21:00 but he did not read the record. He did not
know that her vomit was “++” or that she had headaches. He conceded
that would have been relevant. His obligation at 22:00 was greater than
that imposed on Dr Devlin at 18:00 because Raychel’s vomiting had
continued and her failure to recover should have been even more obvious.
Notwithstanding mitigating factors, including his own inexperience and the
lack of nursing support, I criticise Dr Curran for not taking the care to
recognise that the circumstances demanded more than just an anti-emetic.
At the very least, the situation demanded the attendance of a more senior
doctor.

Nursing communication

5.122 In considering how and why nursing staff failed to appreciate what was
happening to Raychel, I consider the following deficiencies in
communication to be relevant:

(i) There was a failure to liaise properly with Mr and Mrs Ferguson
whether to involve them in fluid management or to take advantage
of their observations and opinions. Their input was not recorded, nor does it seem to have been taken seriously.

(ii) Raychel’s ‘named nurse’ was such a nurse “in name only”\(^{334}\) and did not communicate with the family. Whilst I can understand that the provision at all times of an informed named nurse\(^{335}\) is almost impossible, no real attempt was made to provide the channel of communication intended and Raychel was, in terms, denied her right to a named nurse under the Patient’s Charter.\(^{336}\)

(iii) There was nursing failure to speak to Drs Devlin and Curran to provide or discuss appropriate information.

(iv) Nurses failed to communicate adequately with each other especially at handover. When Staff Nurse Bryce came on duty at 19:45, she was not informed that Raychel was still vomiting.\(^{337}\) Such a failure to communicate verbally was important because nurses did not conventionally consult patient records at handover.\(^{338}\) It should be noted that in November 2000 an assessment of the quality of nursing on Ward 6 specifically identified as a “negative” the fact that “the retiring and oncoming nurses in charge do not make walking rounds of the patients together.”\(^{339}\) This was not seemingly addressed.

(v) Even had nurses sought to rely upon the fluid balance chart, it would have been found wanting. Regrettably, inaccuracy in this important regard was an established feature on Ward 6. An audit in November 2000\(^{340}\) identified patients on Ward 6 with “intake/output charts [which] had information missing (7 were incomplete out of 14).”\(^{341}\) This deficiency should have been attended to and before Raychel's

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\(^{334}\) Mrs Margaret Doherty T-09-09-13 p.119 line 17
\(^{335}\) Mrs Margaret Doherty T-09-09-13 p.114 line 10
\(^{336}\) 306-085-010 & 317-042-001 & 321-068-005
\(^{337}\) WS-054-2 p.6
\(^{338}\) Staff Nurse McAuley T-05-03-13 p.68 line 6
\(^{339}\) WS-323-1 p.39
\(^{340}\) WS-323-1 p.42
\(^{341}\) WS-323-1 p.45
admission. Mrs Margaret Doherty, the Clinical Services Manager (‘CSM’) has since acknowledged that in this regard “not sufficient was done and I should have stepped in.”

(vi) Furthermore, the nursing notes could not have been relied upon. They failed to record the attendance of the three junior doctors on 8th June. Mr Foster concluded that “more detailed records throughout the 8th would have assisted the nursing staff to detect an ongoing deterioration throughout the afternoon and evening of the 8th.”

(vii) The ECP which was intended to communicate current care requirements was not updated. It neither referred to the continued vomiting nor indicated any need to monitor the effectiveness of anti-emetics. It did not therefore communicate the evolving situation as it was meant to. Staff Nurse Noble conceded that Raychel’s care plan should have been individualised.

(viii) In addition, entries in the care plan were inaccurate. The ECP, when updated at about 17:00 by Staff Nurse McAuley for her 20:00 handover recorded “observations appear satisfactory. Continues on PR flagyl. Vomit x 3 this am, but tolerating small amounts of water this evening.” She later conceded that this was “not right” because it ignored Raychel’s afternoon vomiting and hinted at recovery on the basis of a largely non-existent fluid intake. On the basis of this information, Staff Nurse Gilchrist said she “would have believed” that Raychel’s vomiting had been brought back under control. It did not even suggest, let alone inform, the incoming night staff as to the problems that were developing.
Nursing care plans had previously been the subject of a benchmarking exercise against other hospitals in 2000 which had identified “problems... as a result of not individualising care plans”\textsuperscript{353} and recommended that nurses be made “aware of the need to update and change care plans when there is a change in treatment.”\textsuperscript{354} Regrettably, this was not heeded any more than the internal 1999/2000 Nursing Record Audit which found a mere 44% compliance with individualisation of care plans.\textsuperscript{355}

5.123 That no effective steps were taken to rectify such known deficiencies was a further and significant failing for which the Director of Nursing, Miss Duddy, must bear ultimate responsibility.

Events after 21:00 on 8\textsuperscript{th} June

5.124 The development of coffee ground vomiting, which was noted in the fluid balance chart from 21:00, did not prompt consideration of the possible implications.

5.125 Raychel’s vomiting intensified between 21:00 and 23:00 hours. Mr Ferguson was by then increasingly alarmed by Raychel’s condition and “told nurse Noble that Raychel was complaining of a sore head and was bright red in the face. Nurse Noble said she would come and give Raychel a paracetomol and did so a short time later...”\textsuperscript{356} – “She appeared to me to be laid back and not concerned at all about my daughter.”\textsuperscript{357} Nurse Noble accepted that “he told me the facts, yes... I just felt Raychel had had a particularly poor post-operative first day and that I would try and relieve the symptoms...”\textsuperscript{358}

5.126 At 21:15 Staff Nurse Gilchrist recorded of Raychel “colour flushed \rightarrow{} pale, vomiting ++ c/o headache”\textsuperscript{359} and at about 21:30 hours, Mr Ferguson

\textsuperscript{353} WS-323-1 p.49
\textsuperscript{354} WS-323-1 p.50
\textsuperscript{355} 321-068-006
\textsuperscript{356} 095-005-019
\textsuperscript{357} WS-021-1 p.9
\textsuperscript{358} Staff Nurse Noble T-27-02-13 p.74 line 17
\textsuperscript{359} 020-015-029
telephoned his wife to voice his frustration and concern – “she’s starting to throw up blood on the bed and they’re not listening to me at all.” Nurse Noble recalled that “Mr Ferguson did not express to me at that time how much he was concerned.” Staff Nurse Gilchrist could not “agree that we weren’t taking her condition seriously... After her periods of vomiting I told him... that I was going to contact the surgical doctor to come and assess her. So, I was taking his concerns on board.” It was Dr Curran who attended but Mr Ferguson’s concerns were not communicated to him.

5.127 Mrs Ferguson returned at 22:00 to find Raychel very restless and with something trickling from the side of her mouth. The Fergusons now believe that she was beyond saving at that stage. In fact, they think she may have been beyond saving from about 17:00. It is not clear to me that their belief is medically correct but the experts agree that Raychel was, by that stage, increasingly threatened by an excessive infusion of hypotonic fluid in the context of SIADH and prolonged vomiting.

5.128 By that stage of the evening Raychel’s vomiting was clearly both severe and prolonged and yet, despite further vomiting at 23:00, and 00:35 on Saturday morning, the nurses still did not call a doctor. Dr Scott-Jupp was of the view that they should have. Staff Nurse Noble has accepted that with “hindsight... yes, we probably should have called a doctor back to re-evaluate the effectiveness of the anti-emetic, but because the amounts were less... we thought things were settling down.”

5.129 Mr and Mrs Ferguson, who had spent all Friday at Raychel’s side, whether in turns or together, recall that they eventually left the hospital at about 00:40. They did so because they had been reassured by nursing staff that Raychel had settled and would sleep for the night. I am certain that
the Fergusons would have stayed had they had even the slightest suspicion that Raychel was in danger. That they were allowed to leave was another failing in nursing.

5.130 Soon thereafter, Raychel became “restless again” and was possibly “behaving funny, ? confused.” This was reported to Staff Nurse Noble by Staff Nurse Bryce and although there is disagreement about the detail of this development, it nonetheless should have been taken seriously. In the circumstances, it should have prompted an immediate call for medical assistance. Instead, Staff Nurses Gilchrist and Bryce were asked to look after Raychel while Staff Nurse Noble took an extended tea break. Raychel then vomited again. Staff Nurse Bryce described her as being “a little unsettled” and took no action.

5.131 By then, over 24 hours had passed since surgery and Raychel was still vomiting. She had headaches, was flushed and unsettled. She had probably not passed urine for 12 hours and was still receiving Solution No.18 at 80mls per hour. As time progressed and as Raychel’s condition deteriorated, the deficiencies in nursing become ever more obvious and serious. Mrs Ferguson felt “Raychel was dying slowly in front of us and not one person... was even concerned.”

**Final collapse: 03:00 9th June**

5.132 Professor Arieff had observed in 1992, that “headache, nausea, emesis, weakness and lethargy are consistent symptoms of hyponatraemia in children. If the condition is allowed to go untreated there can follow an explosive onset of respiratory arrest, coma and transtentorial cerebral herniation.”

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369 316-085-013  
370 316-085-013  
371 Staff Nurse Noble T-27-08-13 p.169 line 3  
372 WS-054-1 p.3  
373 Mrs Ferguson T-26-03-13 p.185 line 10  
374 220-002-204
At 03:00, Auxiliary Nurse Elizabeth Lynch alerted Staff Nurse Noble to the fact that Raychel was fitting. She was found in a tonic state lying in a left lateral position with her hands and feet tightly clenched. She had been incontinent of urine. Staff Nurse Noble immediately sought the help of the nearest doctor who was Dr Jeremy Johnston, a paediatric SHO on Ward 6. It was the first time he had been called upon to care for a paediatric surgical patient.

Dr Johnston’s intervention has been praised. At that time, he had almost completed his three-year training as an SHO. Notwithstanding that he had only specialised in paediatrics since February 2001, he was very much more experienced than Drs Devlin or Curran.

Dr Johnston administered diazepam rectally and then intravenously. This quieted the seizure but Raychel was unresponsive and oxygen was given. Her vital signs were assessed and in the absence of raised temperature, Dr Johnston became concerned that there might be a critical underlying cause. He astutely identified electrolyte abnormality as the principal differential diagnosis and directed a Urea & Electrolyte (‘U&E’) test. Approximately 30 hours had passed since Raychel’s blood had last been tested.

Dr Johnston needed senior surgical assistance as a matter of urgency and asked Dr Curran to get it. Dr Curran contacted Dr Zafar who said he would “come as soon as possible.” Dr Johnston then awaited the senior surgical support, but it did not materialise. Dr Curran did not go beyond Dr Zafar to contact a registrar or consultant and just hoped that Dr Zafar would
Dr Zafar contacted nobody and Dr Johnston was left to cope with this major clinical event by himself. In the meantime he concentrated on “getting the ECG, chasing up blood results” and maintaining her airway.

5.137 Staff Nurse Noble telephoned Mr and Mrs Ferguson at about 03:45. There is disagreement as to whether Staff Nurse Noble attempted contact earlier. I am inclined to the Fergusons’ account and it is very clear that Mr Ferguson got to the hospital as soon as he could.

5.138 At about 04:00 hours, Dr Johnston was obliged to go and get a senior doctor himself. He found Dr Bernie Trainor, the SHO in paediatrics, in the neonatal unit. Dr Johnston explained the situation and they swapped roles so that Dr Trainor could go to Raychel. It was then that the results of the blood test came back recording a sodium level of 119mmol/L. This was lower than Dr Trainor had ever seen. She asked for a repeat test because the result was so abnormal she felt it could be wrong. It only confirmed Raychel’s acute hyponatraemia.

5.139 Raychel’s oxygen saturation levels were dipping. She was transferred to the treatment room. Dr Trainor telephoned the on-call consultant paediatrician, Dr Brian McCord who came as quickly as he could. Raychel suffered a respiratory arrest and Dr Aparna Date, anaesthetist, attended. Raychel was intubated and her fluids adjusted to restrict the rate and increase the sodium. Mr and Mrs Ferguson were with her.
CT scans

5.140 When Dr McCord examined Raychel at 05:00 on 9th June, her pupils were fixed and dilated. Her condition was almost certainly irretrievable. He noted “marked electrolyte disturbance with profound hyponatraemia” and arranged a CT scan.

5.141 Despite the extreme seriousness of the event, the on-call surgical consultant did not attend. Mr Foster was in no doubt that he should have and in no doubt that he should have been summoned. Mr Orr agreed. However, Dr Naresh Kumar Bhalla, the Surgical Registrar who was there, explained that he did not call his consultant surgeon because he thought it a metabolic or septic issue and not a surgical one. Notwithstanding that there was no specific call for surgical expertise at that time, I find the absence of the on-call surgical consultant very surprising. It was not only a remarkable detachment by the surgical team from their patient, but also from Mr and Mrs Ferguson who were seemingly ignored by them.

5.142 Indeed, Mr Foster thought “the absence of a senior member of the surgical team must have been noticed by everybody” and believed that a senior surgical doctor “should have spoken to the family and appraised them of the fears and anxieties of the whole of the team.” However, it was left to Staff Nurse Noble and Dr Trainor to speak to Mr and Mrs Ferguson and advise them that Raychel was being stabilised, that further tests were being undertaken and that it was the anaesthetic team that was looking after her.
5.143 The CT scan was thought to suggest sub-arachnoid haemorrhage\(^{415}\) with evidence of cerebral oedema. Dr Nesbitt, Consultant Anaesthetist arrived and discussed the scan via image linking with neurosurgeons at the Royal Victoria Hospital (‘RVH’). They suggested that there was “possibly a subdural empyema (an area of infection)”\(^{416}\) for which surgical intervention might have been possible.

5.144 Mrs Ferguson recalled Dr McCord telling them that Raychel’s brain was clear and that if Raychel’s sodium could be controlled “that would be better.”\(^{417}\) It is not at all clear that Mrs Ferguson knew what sodium was\(^{418}\) but nonetheless she drew reassurance from this and reacted to “thank God, Raychel’s brain is clear – she will be alright.”\(^{419}\) She now considers that it was wrong of Dr McCord to give her hope at that time. Dr McCord said he would not have intended to deliberately mislead\(^{420}\) but nor would he have wished to “remove all hope.”\(^{421}\) He accepted that he might have allowed an undue expectation\(^{422}\) for which he offered his apology.\(^{423}\)

5.145 Mrs Ferguson remembered “a doctor in ICU with a beard said that she was very seriously ill and that there was a lot of pressure inside her head and that they would operate to reduce the pressure.”\(^{424}\) Raychel’s aunt, Ms Kay Doherty\(^{425}\) “felt this was the first bit of information that we were given as to Raychel’s condition and as to what was going to happen to her...”\(^{426}\) However, Mrs Ferguson also recalled “a wee nurse coming up. When she put her hand on my knee and she said that she was so sorry and I remember saying to my sister, ‘she’s going on as if Raychel’s dead.”\(^{427}\) No
one took responsibility for communication with the family at that dreadful time and Mrs Ferguson could only sense mixed messages.  

5.146 A second and enhanced CT scan was sought to exclude the possibility of sub-dural empyema and haemorrhage. It was performed at 08:51 by Dr Cyril Morrison, Consultant Radiologist, who reported that "a sub-dural empyema [is] excluded." He discussed it with Dr Stephen McKinstry of the RVH who considered that "the changes were in keeping with generalised brain oedema (swelling due to increased fluid content) and that there was no evidence of haemorrhage."  

5.147 Mr Bhalla remembered "I was there... we got the report that the second CT scan confirmed that it was cerebral oedema and there was no haematoma there" - "it was quite clear that she had got a very bad prognosis." It was understood that she would not survive.  

5.148 Dr Nesbitt did not, however, have quite the same understanding. Whilst he knew that empyema was excluded, he remained under the impression that a diagnosis of subarachnoid haemorrhage was possible and surgical intervention, an option.

Transfer to the RBHSC

5.149 The decision was taken at 09:10 to remove Raychel to Paediatric Intensive Care Unit ('PICU') in Belfast. Such a transfer was indicated whether subarachnoid haemorrhage was excluded or not because as Dr Bhalla recalled "all of them said she needs intensive care, conservative management" and the only ICU for children was in Belfast.
5.150 However, Mrs Ferguson believed that a “cover-up began on the morning Raychel was being transferred to the Royal. We now know the situation was hopeless... Altnagelvin just sent her to Belfast so that it could be recorded that Raychel died there; there was no hope for her.”

5.151 However, Mr Orr doubted that the consultants at Altnagelvin “could be absolute in their opinion until they knew what the assessment was of Raychel in the Childrens’ Hospital” and as Dr Nesbitt recalled, she was sent to Belfast because “neurosurgeons had asked that we transfer her to their care.” In such a situation, I can understand that no one would want to abandon hope.

5.152 Transfer documentation was initially prepared on behalf of Dr Nesbitt citing “? Meningitis ? Encephalitis” as the suggested diagnoses, and “? sub-achnoid hae” as the finding on investigation. Dr Trainor then drafted the referral letter for the Royal Belfast Hospital for Sick Children (‘RBHSC’) summarising known and relevant information. She detailed the treatment with Solution No.18, the IV infusion rate, Raychel’s repeated vomiting and the sudden drop in her sodium levels to 118mmol/L.

5.153 Raychel arrived at the RBHSC at 12:30. She was formally admitted under the care of Dr Peter Crean, Consultant in Paediatric Anaesthesia and Intensive Care. She had no purposeful movement. Her serum sodium level was then 130mmol/L and her diagnosis “? Hyponatraemia.” Dr Dara O’Donoghue assessed her as having “coned with probably irreversible brain stem compromise.” She was admitted for “neurological assessment and further care.”

440 Mrs Ferguson T- 26-03-13 p.176-7
441 Mr Orr T-21-03-13 p.228 line 23
442 WS-035-2 p.21. See also Dr Crean T-11-09-13 p.32 line 11
443 012-002-073
444 312-003-005
445 012-032-159
446 012-032-159
447 312-003-005
448 063-009-023
449 063-015-035
5.154 Distressingly, Mr and Mrs Ferguson travelled to Belfast believing that Raychel was to have surgery. They recall that when they arrived at the RBHSC Dr Nesbitt told them that Raychel had “a good journey up and that there was plenty of movement, that’s a good sign.” Kay Doherty also remembered him saying “she’s in the best place.”

5.155 The Ferguson family feel that they were misled and given further false hope by the transfer to Belfast and the encouraging reference to movement. Dr Nesbitt maintained however that “the movements, which were evident prior to transfer, remained. I do not believe that I placed undue emphasis on these movements and there was no inference that there had been any recovery. It is very much regretted that Mr and Mrs Ferguson took this meaning.” At that stage, Raychel was still capable of reflex movement. I think it most unlikely that Dr Nesbitt could or would have misinterpreted this.

5.156 I do not believe that there was any deliberate attempt to give the Ferguson family false hope. The transfer to Belfast alone may have done that. It is however clear that communication should have been better and more considered. Dr Nesbitt acknowledged this when he observed how the circumstances of that day emphasised for him “the importance of effective communication with distraught family members.” The question of who should have spoken to the Fergusons, when and in what terms, was not considered at that time. One consequence of this was that the relationship of trust between the Altnagelvin doctors and the Ferguson family was critically undermined.

5.157 By way of contrast, when Mr and Mrs Ferguson met with Drs Crean and Hanrahan at PICU they were told in clear terms that “Raychel is critically ill and the outlook is very poor.” This was recorded in the medical chart

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450 Mr Ferguson T-26-03-13 p.148 line 13
451 Ms Kay Doherty T-18-09-13 p.157 line 3
452 WS-035-3 p.2
453 Dr Haynes T-22-03-13 p.152 line 6
454 Dr Haynes T-22-03-13 p.153 line 3
455 WS-035-3 p.3
456 312-003-005
457 063-009-021
and is confirmed by the counselling record. Dr O'Donoghue also met with the family. The Fergusons appreciated this straightforwardness and make no criticism of the way they were treated by the clinicians at the RBHSC. Mr Foster agrees and noted that Mr and Mrs Ferguson were treated with “all possible care and sensitivity at the RBHSC.”

5.158 Mrs Ferguson gave evidence that “I don’t remember whether it was Dr. Crean or Mr. Hanrahan, they kept going over about the vomiting, what kind of vomiting, how many vomits, what time was there blood in the vomit, they just kept repeating these questions... and... ‘What’s Altnagelvin trying to do here, pass the buck?’” and “this should never have happened.” Dr Hanrahan, however had no recollection of this and Dr Crean thought it most unlikely. He said “the main thrust of what we were doing at that time was to take the family through a terrible journey.”

5.159 Drs Crean and Hanrahan performed the first brain stem death test at 17:30 9th June and noted brain death. Their second test of 09:45 the following morning confirmed “no evidence of brain function... she is brain dead.”

5.160 Mr and Mrs Ferguson were advised that nothing could be done. With their consent and Raychel on her mother’s knee and with her family beside her, ventilation support was discontinued at 11:35. Raychel was pronounced dead at 12:09, 10th June 2001.

5.161 The Coroner’s office was notified.
Discharge advices

5.162 Altnagelvin was obliged to issue a formal hospital discharge letter and summary to Raychel’s GP but this was not done. As before, this was a particular failing in documentary compliance which had been previously identified by audit but not addressed.

5.163 Nor did Mr Gilliland contact Raychel’s GP, despite the fact that he had previously “telephoned quite a number of general practitioners about deaths of their patients.” He did not call her because “Raychel had died elsewhere and I simply didn’t think to do so.” He did however tell her “in casual conversation” when they met at the supermarket.

5.164 Further, and notwithstanding that Mr Gilliland recognised his responsibility for Raychel’s care and his duty under the General Medical Council (‘GMC’) ‘Good Medical Practice’ code to “explain, to the best of [his] knowledge, the reason for and the circumstances of the death to those with parental responsibility” he made no contact with the Ferguson family because again he did not think to do so. He made no expression of condolence. Professor Swainson believed that Mr Gilliland should have met the family and within days. Such would have been proper and if properly done could have been helpful.

5.165 Irrespective of whether the RBHSC might also have been expected to give full discharge details to the family GP, it was most important in the circumstances that Altnagelvin itself advise the family doctor because the Fergusons might have needed support in their bereavement and the GP was likely to be involved.

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470 321-068-004
471 Mr Gilliland T-28-08-13 p.64 line 3 & p.64 line 3 & p.68 line 15
472 Mr Gilliland T-28-08-13 p.97 line 13
473 Mr Gilliland T-28-08-13 p.97 line 17
474 Mr Gilliland T-28-08-13 p.64 line 9
475 Mr Gilliland T-14-03-13 p.217 line 25
476 Mr Gilliland T-28-08-13 p.81 line 1
477 Mr Gilliland T-14-03-13 p.83 line 4
478 Professor Swainson T-19-09-13 p.98 line 2
479 Professor Swainson T-19-09-13 p.45 line 3
Altnagelvin governance framework

5.166 The Altnagelvin Hospitals Health & Social Services Trust (the ‘Trust’) was created on 1st April 1996 and made accountable to the Department of Health and Personal Social Services & Personal Safety, Northern Ireland (‘DHSSPSNI’ otherwise ‘the Department’).

5.167 The Trust’s main commissioner of services was the Western Health & Social Services Board (‘WHSSB’) under a ‘purchaser-provider’ Service Agreement which required of it a commitment to a “clinical governance programme [which] must include key elements such as processes for recording and deriving lessons from untoward incidents, complaints and claims; a risk management programme; effective clinical audit arrangements; evidence based medical practice and a supportive culture committed to the concept of life-long learning.”

5.168 Whilst the Trust operated independently of the WHSSB and without managerial accountability, it was nonetheless required to “share details of its quality framework” with the WHSSB and maintain liaison “to ensure that the services it provides meet the needs of the resident population.”

5.169 Oversight was also given the Western Health & Social Services Council (‘WHSSC’) established to “keep under review the operation of the health and personal services in its area and to make recommendations for the improvement of these services.”

5.170 The Trust was led by a Board of Executive and Non-Executive Directors. Mrs Burnside as Chief Executive was the “accountable officer” “responsible for the management and leadership of the services provided” and “bore ultimate responsibility for the overall quality and quantity of the
services..."489

5.171 There were two Executive Directors bearing particular responsibility for clinical matters, namely the Medical Director, Dr Fulton and Miss Duddy, Director of Nursing.

5.172 Dr Fulton was responsible for the efficiency of clinical services, audit and professional standards. His task was to facilitate communication between clinicians and management.491 He monitored “the quality of medical care”,492 investigated serious clinical incidents493 and advised the Trust Board on medical issues, complaints, appraisal of medical performance and medical issues arising from litigation.

5.173 Miss Duddy provided professional leadership for nursing and advised the Board on nursing matters. She and Dr Fulton were jointly accountable to the Board for the quality of care and overall risk management.494 Mrs Therese Brown,495 the Risk Management Co-ordinator (‘RMCO’) had responsibility for “establishing systems for assessing, preventing and responding to [clinical] risk.”496 The task of managing standards and guidelines and administering the audit team fell to the Clinical Effectiveness Co-ordinator, Mrs Anne Witherow.497

5.174 Responsibility for overseeing operational management lay with the Hospital Management Team498 comprising the Clinical Directors and Clinical Service Managers of the individual clinical directorates.499 The role of the Clinical Director was one of leadership within a directorate and included those “issues relating to standards of care or poor performance.”500 The CSM was

489 WS-046-2 p.8
490 WS-046-2 p.5
491 321-004gh-005-007
492 WS-043-1 p.3
493 WS-043-1 p.3
494 WS-323-1 p.3
495 328-001-002
496 WS-322-1 p.31
497 328-001-003 & WS-322-1 p.5
498 321-004gj-011
499 321-004gj-011
500 WS-035-2 p.4
“the practitioner responsible for day-to-day management of the
directorate.”\(^{501}\)

5.175 The Surgery and Critical Care Directorate was responsible for the provision of Raychel’s surgical care and was under the clinical directorship of the late Mr Paul Bateson. Care for paediatric patients on Ward 6 was provided within the Women & Children’s Care Directorate under the directorship of Dr Denis Martin\(^{502}\) but was in reality directed by the CSM Mrs Margaret Doherty.\(^{503}\) Whilst she reported to Dr Martin she was accountable to the Director of Nursing. This was in contrast to the Clinical Directors who were both “responsible and accountable to the lead Clinical Director.”\(^{504}\)

**Altnagelvin clinical governance - June 2001**

5.176 In April 2001 the Department, recognising that “governance arrangements are already in place to ensure overall probity, transparency and adherence to public service values”, published for consultation ‘Best Practice Best Care’ proposing a more formalised “system of clinical and social care governance backed by a statutory duty of quality.”\(^{505}\)

5.177 In preparing to comply with this new statutory accountability for patient care,\(^{506}\) the Trust recorded in its Annual Report 1998-99 that “a clinical governance strategy has been developed... which details the structures and processes required to ensure that patients will receive the highest quality of care with the best clinical outcomes.”\(^{507}\)

5.178 The Trust made a commitment to the success of clinical governance\(^{508}\) and by June 2001 claimed to have introduced a range of policy initiatives, including amongst others:

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501 321-004-009
502 328-001-003
503 WS-336-1 p.26 & Sister Millar T-28-08-13 p.125 line 1 & 321-022-001
504 321-004gd-001
506 ‘Clinical and Social Care Governance Circular’ HSS (PPM) 10/2002
507 321-004gi-044
508 321-004fg-001
(i) Proposed Strategy for Implementing Clinical Governance, September 1998.\textsuperscript{509}

(ii) Clinical Governance Committee, 1998-99.\textsuperscript{510}

(iii) Clinical Governance ‘Steering Group’.\textsuperscript{511}

(iv) Policy for Reporting of Clinical Incidents and Critical Incident Protocol, February 2000.\textsuperscript{512}

(v) Procedure for appraisal of staff pursuant to DHSSPSNI consultation document\textsuperscript{513} by 2000.\textsuperscript{514}

(vi) Policy for the Management of Clinical Risk, including arrangements for the management of legal claims, October 1997.\textsuperscript{515}

(vii) Clinical Negligence Scrutiny Committee.\textsuperscript{516}

(viii) Clinical Incident Review Committee.\textsuperscript{517}

(ix) Procedure for Handling Complaints, Enquiries and Commendations, May 1996.\textsuperscript{518}

(x) Patients’ Forum.\textsuperscript{519}

(xi) Multi-disciplinary Clinical Audit Committee with Clinical Audit Co-ordinator and Clinical Effectiveness Co-ordinator, 1998-99.\textsuperscript{520}

(xii) Patient Case Note Standards, May 1996.\textsuperscript{521}

\textsuperscript{509} 321-004fg-001
\textsuperscript{510} 321-004gi-042
\textsuperscript{511} 321-004gr-008
\textsuperscript{512} 321-004ff-001 & 022-109-338
\textsuperscript{513} 321-004fi-001 - "Confidence in the Future...On the Prevention, Recognition and Management of Poor Performance of doctors in Northern Ireland" 2000. Chief Executive Mrs Burnside served on the Working Group responsible for this development of these proposals.
\textsuperscript{514} 321-004gi-044
\textsuperscript{515} 321-004fd-001
\textsuperscript{516} WS-323-1 p.14
\textsuperscript{517} WS-323-1 p.14
\textsuperscript{518} 321-004fb-001
\textsuperscript{519} WS-323-1 p.14
\textsuperscript{520} 321-004gi-044
\textsuperscript{521} 321-014c-001

Junior Doctors’ Handbook and a staff ‘Hotline’ to assist communication, 1998.

Trust Scrutiny Committee.

In addition, doctors were individually subject to wide ranging and long established codes of professional self-regulation, not least from the GMC, Royal Colleges and published guidance. Nurses were subject to the United Kingdom Central Council for Nursing, Midwifery and Health Visiting (‘UKCC’) ‘Code of Professional Conduct’ and standing guidelines for professional practice. Additionally within Altnagelvin, nurses were said to be subject to annual performance and training requirement appraisals, benchmarking exercises against best practice guidance, a “cascade system of dissemination” for external guidance, and auditing “of nursing and medical records.”

Notwithstanding that the Trust made application for the King’s Fund Organisational Audit (‘KFOA’) accreditation in 1998, achieved a number of charter standards and “full CPA accreditation of all departments” in 2001-02, the extent to which policy and strategy was actually put into practice is uncertain.

It took time and money to integrate clinical governance into the hospital system and money was not always available. For Sister Millar in Ward 6, clinical governance in 2001 was “very much in its infancy but we were striving to get our heads round it.” Altnagelvin did not publish a clinical...
and social governance report until 2003 some 5 years after making public its strategy for implementing clinical governance.

5.182 Even though the evidence confirmed that the implementation of clinical governance was not so complete as was claimed, it is however clear, that at the time of Raychel’s death, those within Altnagelvin who were charged with the governance response to her death, knew or ought to have known what constituted good practice.

**Initial RBHSC response**

5.183 On the day of Raychel’s death, ‘rumour’ spread from the RBHSC that her fluids had been mismanaged.\(^{535}\) Sister Millar recalled “a nurse in the intensive care in the Children’s [Hospital] in Belfast said when Raychel arrived and there was handover, that she was on the wrong fluid.”\(^{536}\) Mr Gilliland recalled “discussion between our own medical staff and the doctors in the RBHSC about the probable cause of Raychel’s death. I believe I was made aware of the discussions sometime on 11 June…”\(^{537}\) and “some of that discussion had been critical.”\(^{538}\)

5.184 By the Monday morning Mrs Burnside was also aware of Raychel’s death. She recalled the “‘rumour’ from PICU that the ‘wrong fluids’ had been used. This ‘rumour’ emerged from a nurse in PICU responding to an inquiry from Altnagelvin Ward Nurse on the child’s state, on the Sunday.”\(^{539}\)

5.185 Inconsistency about the origin of the rumour is not surprising but does draw attention to the more important fact that the RBHSC did not inform Altnagelvin in writing that the “wrong” fluids had been used.

5.186 Professor Swainson, noting the absence of a formal RBHSC discharge summary for Altnagelvin, said he would have expected “a full analysis of the cause(s) of the cerebral oedema and the role of acute hyponatraemia

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535 021-020-041
536 Sister Millar T-01-03-13 p.64 line 23 & cf WS-344-1 p.3
537 WS-044-4 p.11
538 WS-044-4 p.11
539 021-020-041
in that. The evidence that Altnagelvin Trust heard only through an informal conversation between nurses is surprising and disturbing.”

5.187 Professor Scally also considered that there should have been formal communication because a professional obligation to do so arose when a death may have been caused by mismanagement. He believed this obligation was “reinforced by the RBHSC role as a regional centre of excellence.” Dr Ian Carson, then Medical Director of the Royal Group of Hospitals Trust (‘RGHT’), agreed that concerns should have been communicated. Professor Swainson believed it would have been proper for the complications of care to be communicated “so that the doctors who referred [her could] understand what exactly has happened or at least... the Royal Belfast Hospital’s interpretation of that.” However, Dr Crean said it was not the “culture at the time. That’s not the way we did our business...”

5.188 The sole RBHSC communication was to Raychel’s GP and indicated only that Raychel had been “transferred from Altnagelvin hospital with seizures/hyponatraemia/cerebral oedema/fixed dilated pupils. Certified as dead on 10/6/01 @ 12:09 hours. For Coroner’s P.M.” No reference was made to mismanagement.

5.189 Notwithstanding that the death was the subject of discussion within the RBHSC, Raychel’s death was not made the subject of a Critical Incident Report or Review, because as Dr Crean explained “if an adverse event occurred in RBHSC and it was considered to have led to an unexpected death, then it would have been reported. However, I do not believe an event occurring in another hospital would have been reported.” This was the same unacceptable explanation as was offered in respect of Lucy’s death.
occurring the previous year.\textsuperscript{549} Furthermore, it contravened RGHT’s own Adverse Incident Reporting policy.\textsuperscript{550}

5.190 Whilst there was a clear lack of full and formal communication and that is to be criticised, it must nonetheless be emphasised that the RBHSC immediately notified the Coroner of Raychel’s death, informally communicated suspicion of mismanagement to both Altnagelvin and the Coroner\textsuperscript{551} and subsequently discussed Raychel’s case at an Audit Meeting on 10\textsuperscript{th} April 2003.\textsuperscript{552}

\textbf{Altnagelvin’s Critical Incident Review}

5.191 Likewise, within Altnagelvin, there was no formal adverse incident report of Raychel’s death. This was in contravention of the internal reporting policy "that any clinical incident should be reported on the appropriate documentation."\textsuperscript{553}

5.192 However, Mrs Burnside immediately and very properly asked Dr Fulton “to investigate this very serious event in [his] role as Medical Director.”\textsuperscript{554} To that end he, and Mrs Therese Brown the RMCO, decided to formally review Raychel’s case in accordance with the Altnagelvin Critical Incident Protocol.\textsuperscript{555} This procedure was broadly based on recommendations extracted from a ‘Clinical Governance’ textbook by Myriam Lugon\textsuperscript{556} and developed by Dr Fulton,\textsuperscript{557} Mrs Brown\textsuperscript{558} and Miss Duddy.

5.193 Professor Swainson thought that it was “in general a good protocol.”\textsuperscript{559} However, it has proved difficult to determine the extent to which it was actually followed because there is so little documentation. It might be thought that such a serious case involving numerous clinical witnesses and

\textsuperscript{549} Dr Crean T-04-06-13 p.147 line 24
\textsuperscript{550} WS-292-2 p.45 & 321-074-001
\textsuperscript{551} 012-052c-275
\textsuperscript{552} 063-037-085
\textsuperscript{553} 321-004ff-002
\textsuperscript{554} WS-043-1 p.3
\textsuperscript{555} 026-012-016
\textsuperscript{556} WS-043-1 p.2 1999 p.94-96 & Mrs Brown T-02-09-13 p.39 line 7
\textsuperscript{557} Dr Fulton T-04-09-13 p.22 line 18
\textsuperscript{558} Mrs Brown T-02-09-13 p.38 line 25
\textsuperscript{559} Professor Swainson T-19-09-13 p.73 line 14
multiple issues of fact would have generated copious documentation and opinion. However, that was not the case. Dr Fulton did not take notes\textsuperscript{560} and there is no written report of the review.

5.194 Notwithstanding, Dr Fulton immediately sought "to form an accurate account of the events leading to Raychel’s death while it was clear in everyone’s memory. I was also keen to ascertain whether lessons could be learned so that a recurrence of this tragic event could be avoided."\textsuperscript{561} He convened a critical incident review meeting for 12\textsuperscript{th} June. Speed was important and Dr Fulton achieved it.

5.195 Dr Fulton initially assured this Inquiry that Mrs Brown contacted the relevant staff, who all agreed to attend\textsuperscript{562} and that he noted those who attended and what they said.\textsuperscript{563} However, he has since recognised that not all relevant witnesses were contacted, that he made no record of those who did attend, that he did not note what was said and that, in terms, he has no reliable recollection of his review.\textsuperscript{564} It is however clear that “only the staff present at the Critical Incident Meeting were interviewed…”\textsuperscript{565} and absent from the Review were the surgeons Bhalla, Zafar and Zawislak,\textsuperscript{566} Drs Curran, Devlin,\textsuperscript{567} Gund,\textsuperscript{568} Jamison,\textsuperscript{569} Johnston,\textsuperscript{570} Trainor,\textsuperscript{571} Butler,\textsuperscript{572} Kelly,\textsuperscript{573} and Date,\textsuperscript{574} and Staff Nurses Patterson,\textsuperscript{575} McGrath,\textsuperscript{576} McAuley and Roulston.\textsuperscript{577}

\textsuperscript{560} Dr Fulton T-04-09-13 p.49 line 2
\textsuperscript{561} WS-043-1 p.4
\textsuperscript{562} WS-043-1 p.4
\textsuperscript{563} WS-043-1 p.4
\textsuperscript{564} WS-043-2 p.1-3 & Staff Nurse Noble T-27-02-13 p.185 line 9
\textsuperscript{565} WS-043-3 p.11
\textsuperscript{566} Dr Zawislak T-05-02-13 p.85 line 17
\textsuperscript{567} Dr Devlin T-06-03-13 p.3 line 18
\textsuperscript{568} Dr Gund T-05-02-13 p.184 line 1
\textsuperscript{569} Dr Jamison T-07-02-13 p.95 line 17
\textsuperscript{570} Dr Johnston T-07-03-13 p.224 line 24
\textsuperscript{571} Dr Trainor T-12-03-13 p.101 line 24
\textsuperscript{572} Dr Butler T-11-03-13 p.35 line 14
\textsuperscript{573} WS-254-1 p.6
\textsuperscript{574} WS-031-2 p.6
\textsuperscript{575} Ms Patterson T-04-03-13 p.112 et seq
\textsuperscript{576} Staff Nurse McGrath T-26-02-13 p.94 line 13
\textsuperscript{577} Staff Nurse McAuley T-05-03-13 p.202 line 3 & Staff Nurse Roulston T-06-03-13 p.151 line 24
Further and notwithstanding the suggestion of criticism from the RBHSC, Mr Bateson, the Clinical Director of Surgery, did not attend the Critical Incident Review despite his responsibility for the surgical team treating Raychel. Nor was there any involvement from Dr Martin, the Clinical Director charged with leadership of the paediatric department. Miss Duddy, the Director of Nursing, did not attend the meeting or learn of Raychel’s death until “sometime after the critical incident meeting.”

Mr Gilliland did attend but did not contribute. He did not speak to his doctors, review their performance, or ensure their attendance at the Critical Incident Review. He said that he “didn’t think about doing that at the time, nor did [he] necessarily feel that it was [his] role to call the people to that meeting.” However, Mrs Doherty, Mrs Witherow, and Staff Nurses Noble, Gilchrist and Bryce were present together with Sister Millar and Auxiliary Nurse Lynch.

Given the rumour that Raychel had been given the “wrong” fluid it is surprising that no input was sought or received from the RBHSC. There was no request for RBHSC notes and the Trust’s solicitor was not invited to attend. This was however the first time a formal Critical Incident Review had been convened at Altnagelvin and as Professor Swainson observed “to be fair to the people concerned, and to do that well, you do need a bit of experience.”

Critical Incident Review meeting

Dr Fulton said that “from the start we knew why Raychel had died, we knew about the low sodium and the cerebral oedema. So to some extent we were working backwards.” He recalled how “subdued and shocked all the
nurses and doctors appeared at the start of the meeting. It was clear... that they regarded this as a very serious and highly unusual event.” He stressed “that the purpose of the meeting was to establish facts and not to blame individual staff members. This was the approach recommended for Critical Incident investigations to allow staff to give essential information in a non-judgmental atmosphere.”

5.200 The meeting was not minuted. Dr Fulton “explained at the start of the meeting that Mrs Brown would take minutes. This caused anxiety and started a discussion about the need for legal advice before proceeding. I was concerned that this would delay the investigation.” Accordingly, he chose to continue which was proper but I consider that the reluctance of those present to allow any record of the proceedings is indicative of defensiveness from the outset.

**Fluids**

5.201 In preparation for the review meeting Dr Nesbitt conducted some preliminary research and noted “evidence relating to problems with low sodium containing solutions in children.” Some of the relevant medical literature was available at the meeting.

5.202 Mr Makar recalled that “most of the discussion was about the type of fluid” and Dr Fulton recalled how “Dr Nesbitt also felt a low sodium solution such as Solution 18 could be unsuitable for post-operative children as they were predisposed to hyponatraemia. However, he was aware that the use of Solution 18 was common practice in such situations in other hospitals in Northern Ireland. Dr Nesbitt offered to ring other hospitals in Northern Ireland to establish the current use of Solution 18.”
5.203 The review considered Raychel’s notes and scrutinised the volume of IV fluids administered. There appears to have been consensus that mistakes had been made. Dr Fulton remembered that “Dr Nesbitt reviewed the infusion rate of Solution 18 and felt it was too high for Raychel’s weight.” The retrospective and clarifying annotation of the record was made at this time by Drs Nesbitt and Jamison.

Electrolytes

5.204 Dr Fulton remembered that “Sister Millar clearly stated that the blood electrolytes should have been checked in the afternoon because of the continued vomiting” and that “medical help should have been called earlier.”

Documentation

5.205 Sister Millar’s “main concern at that meeting was our failure in the documentation.” She felt that the urinary output and the vomiting “could have been better documented.” Staff Nurse Noble recalled agreement in relation to this.

Vomiting

5.206 Dr Fulton stated that the nurses at the Review “agreed that the vomiting was prolonged but not unusual after this type of surgery. They did not believe that the vomiting was excessive though they may not have witnessed all the vomit” Sister Millar recalled differences of opinion between the nurses as to how much Raychel had vomited, and “there may have been a problem with the documentation of the vomit.”

595 Staff Nurse Noble T-27-02-13 p.168 line 8
596 WS-043-1 p.7
597 WS-043-3 p.15
598 Dr Fulton T-04-09-13 p.56 line 18
599 Sister Millar T-01-03-13 p.63 line 24
600 Sister Millar T-28-08-13 p.130 line 10
601 Staff Nurse Noble T-27-02-13 p.191 line 18 & Staff Nurse Noble T-27-02-13 p.179 line 19
602 WS-043-3 p.14
603 Sister Millar T-28-08-13 p.131 line 6
Dr Fulton found it “hard to form a clear opinion of the volume of vomit... and the frequency” not least because the nurses also indicated that “the Ferguson family told them during 8 June that they... believed that Raychel’s vomiting was repeated and severe.” Dr Fulton was therefore “unable to reconcile the different views of the nurses and the family over the severity of the vomiting” and could not “appreciate which side was right.”

The review took no further steps to investigate the severity of the vomiting. It did not seek to interview the Ferguson family or the junior doctors and gave no consideration to the engagement of external experts.

**Care of surgical patients on Ward 6**

Sister Millar took the opportunity to emphasise that she “had for some time been unhappy with... the system within the hospital for caring for surgical children.” “There was always a difficulty in getting doctors.” It “was my impression that there just weren’t enough.” “I had spoken about this before.”

In addition, staff Nurse Noble suggested that the responsibility for overseeing fluid management should not rest with inexperienced JHOs because assisting such junior doctors placed additional burden on the nursing staff. Sister Millar expressed her view that it “was totally unfair that the nurses had such responsibility for the surgical children. I felt it was unfair. I felt that we had to be the lead all the time in looking after the surgical children. We are nurses, we are not doctors. And whilst we do our very best, I don’t think we should be prompting doctors.” Dr Fulton could not
however recall this matter being raised with quite the force described by the nurses.\textsuperscript{614}

\textit{Informal review}

5.211 At or about the same time and in an unrelated initiative, Mrs Margaret Doherty, the CSM, asked Sister Kathryn Little\textsuperscript{615} to interview Staff Nurse Noble, review the patient notes and prepare a preliminary report.\textsuperscript{616} Regrettably, this did not come to the attention of either Mrs Brown\textsuperscript{617} or Dr Fulton\textsuperscript{618} in time to be incorporated into the work of the formal review.\textsuperscript{619} The CSM did not share it with Miss Duddy or pass on the information in her possession.\textsuperscript{620} Her investigation ended when she "was told it was the Risk Management that were taking it over."\textsuperscript{621}

5.212 Professor Swainson considered that, at the same time and in the same way, the surgeons should have been internally reviewing the case for their own benefit and assisting Dr Fulton in his review.\textsuperscript{622} It was, he said, a "huge opportunity for learning."\textsuperscript{623} Neither Mr Bateson nor Mr Gilliland availed of the opportunity.

\textit{Action plan}

5.213 In consequence of the review, Dr Fulton prepared and agreed a plan of action.\textsuperscript{624} He instituted a number of rapid and appropriate responses to address shortcomings recognised at review. It was decided:

(i) To review the evidence about the use of Solution No.18 and to suggest change if indicated.\textsuperscript{625}

\textsuperscript{614} Dr Fulton T-04-09-13 p.64 line 6
\textsuperscript{615} 328-001-003
\textsuperscript{616} 316-085-009 & 316-085-011
\textsuperscript{617} Mrs Brown T-02-09-13 p.74 line 13
\textsuperscript{618} Dr Fulton T-04-09-13 p.40 line 6
\textsuperscript{619} Mrs Brown T-02-09-13 p.74 line 14
\textsuperscript{620} Mrs Margaret Doherty T-09-09-13 p.77 line 16
\textsuperscript{621} Mrs Margaret Doherty T-09-09-13 p.82 line 13
\textsuperscript{622} Professor Swainson T-19-09-13 p.81 line 8
\textsuperscript{623} Professor Swainson T-19-09-13 p.76 line 18
\textsuperscript{624} 026-011-014
\textsuperscript{625} 022-108-336 & WS-035-2 p.33
(ii) To display a wall chart detailing correct rates for IV infusion.

(iii) To institute daily U&E assessments.

(iv) To monitor and record all urinary and vomit output.\textsuperscript{626}

(v) To review the fluid balance documentation.

(vi) To remove JHOs from the care of paediatric surgical patients.\textsuperscript{627}

(vii) To actively consider whether the anaesthetic team should assume responsibility for initial post-operative fluids.\textsuperscript{628}

5.214 Despite the non-involvement of key personnel and the failure to make a record or produce a report, it should be recognised, as Dr Haynes did, that “the Critical Incident Inquiry at Altnagelvin was convened at the first possible opportunity and... it is clear from the agreed action points... that the incident was treated with the utmost gravity...”\textsuperscript{629} Mr Foster thought “it was excellent that instant action was taken” especially to remove JHOs from the care of paediatric surgical patients.\textsuperscript{630} The review was a timely response and did valuable work. It genuinely strove to prevent recurrence.

**Systemic analysis**

5.215 It has been noted that matters were not analysed in line with the then emerging methods of root-cause analysis. Professor Swainson advised that “root cause analysis was a common methodology in Trusts in 2001 and does not appear to have been carried out.”\textsuperscript{631} It was not however common in Northern Ireland.

5.216 Dr McCord observed that Raychel’s death was caused by “all the factors coming together.”\textsuperscript{632} This should have been apparent at the outset. In such circumstances and notwithstanding a lack of the precise skills necessary to
perform root-cause analysis there could and should have been a broader consideration of the factors combining to permit the catastrophic outcome. Such might have included:

(i) Communication between consultant and trainee at time of emergency admission and proposed operation.

(ii) Supervision of junior doctors.

(iii) Consultant responsibilities in respect of fluids.

(iv) Communication between clinicians and parents.

(v) Post-take ward round and consultant review.

(vi) Appreciation of deterioration.

(vii) Lines of communication when recovery plans do not go as expected.

(viii) Implementation of external practice recommendations.

(ix) Failure to address deficiencies identified by practice audit.

(x) Concerns arising from aspects of nursing practice as outlined above at paragraph 5.122.

(xi) Questions of overarching responsibility for paediatric surgical patients, their IV fluid therapy and the potential problems associated with adult surgeons providing part-time surgery for children.

5.217 I do not believe it would have been unreasonable for the Chief Executive, Mrs Stella Burnside, to expect some consideration of these matters given that she had herself contributed in May 2000 to the consultation document ‘Confidence in the Future’ which recommended that.
(i) Senior doctors give clear guidance and supervision to junior doctors in training when tasks are delegated.

(ii) Clear leadership roles and responsibilities be identified and established in clinical teams.

(iii) Participation in clinical audit be made compulsory for all doctors.

With hindsight, Mrs Burnside regretted that she had not asked an external expert to join the review.636

**Report of discontinuance of Solution No.18 at RBHSC**

5.218 Dr Nesbitt having researched the medical literature, made enquiries about post-operative fluid management practice in other Northern Ireland hospitals. He reported to Dr Fulton and Mrs Brown on 14th June 2001 that at “the Children’s Hospital anaesthetists have recently changed their practice and have moved away from No.18 Solution... to Hartmann’s Solution. This change occurred six months ago and followed several deaths involving No.18 Solution.”637

5.219 The RVH records seemingly confirm a decline in the use of Solution No. 18 in the months prior to Raychel’s death.638 Dr Carson gave it as his understanding “that a decision was taken by anaesthetists in the RBHSC to change their use of No.18 solution. This decision was taken at a local level within the RBHSC.”639 He felt that in those circumstances “there would be justification” for informing other hospitals of this change.640

5.220 Dr Fulton was disappointed that the RBHSC had not informed Altnagelvin at the time about such an important matter of patient safety641 and Dr Nesbitt believed that had Altnagelvin known of the RBHSC move towards

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636 Mrs Burnside T-17-09-13 p.81 line 9
637 022-102-317
638 319-087a-001 & 319-087c-003 & 321-073-001
639 326-003a-001
640 Dr Carson T-30-08-13 p.40 line 6
641 Dr Fulton T-04-09-13 p.77 line 6 et seq
discontinuance of Solution No.18 at the time, they would have considered it “a strong message and one we would have acted on”\textsuperscript{642}

5.221 Dr Elaine Hicks,\textsuperscript{643} Clinical Director of Paediatrics at RBHSC, whilst herself unable to recall any change in the use of Solution No.18\textsuperscript{644} did agree that it would be reasonable to criticise the RBHSC if, as the Regional Paediatric Centre, it had made a significant change in its practice and failed to advise other hospitals.\textsuperscript{645} However, it is to be recognised that there were no systems in place at that time to formally disseminate such information and the responsibility may not have been fully understood within the RBHSC. The matter might most appropriately have been made the subject of a report to the Department but no guidance was available and as Dr Crean said there was no “culture at the time to do things like that.”\textsuperscript{646}

5.222 Although no explanation for this change was forthcoming from any source within the RBHSC, I am satisfied from the evidence that there was a move away from the use of Solution No.18 and for clinical reasons. Exactly what those reasons were is a matter of speculation.\textsuperscript{647} The catalyst may have been the publication in the British Medical Journal (‘BMJ’) of Halberthal’s article on the use of hypotonic solutions and hyponatraemia in March 2001.\textsuperscript{648} It was therefore a learning issue which should have been shared with other hospitals. That was in part the role of the RBHSC as the regional centre and a role which was subsequently acknowledged by the Department when it published its own guidelines on hyponatraemia.\textsuperscript{649}

\textit{Written report}

5.223 Altnagelvin’s critical incident protocol specified that “the Chief Executive will be kept informed by the RMCO throughout the investigation.”\textsuperscript{650} Dr Fulton and Mrs Brown gave the Chief Executive an oral briefing on the evening of

\textsuperscript{642} WS-035-2 p.34
\textsuperscript{643} 328-001-004
\textsuperscript{644} WS-340-1 p.2
\textsuperscript{645} Dr Hicks T-07-06-13 p.43 line 12
\textsuperscript{646} Dr Crean T-11-09-13 p.68 line 14
\textsuperscript{647} 321-073-001 & WS-360-1 p.2 & Dr Taylor T-18-09-13 p.8 line 7
\textsuperscript{648} 036a-056-142 & Dr Taylor T-18-09-13 p.16 line 12
\textsuperscript{649} 077-005-008
\textsuperscript{650} 022-109-338
the Critical Incident Review.\textsuperscript{651} There was no written summary of the case, or of the review or action plan, nor any briefing paper for the Chief Executive in preparation for her next Board meeting.\textsuperscript{652} Whilst Mrs Brown did provide a written update for the Chief Executive on 9\textsuperscript{th} July,\textsuperscript{653} I am struck by the general lack of documentation.

5.224 Having initiated the Critical Incident Review in the context of suspected clinical mismanagement, Mrs Burnside should have expected and required a critical incident report. She did not\textsuperscript{654} and despite the Critical Incident Protocol requirement,\textsuperscript{655} to “provide the Chief Executive with a written report with conclusions and recommendations within an agreed timescale”,\textsuperscript{656} none was offered her. Mrs Brown accepted that this “should have been done”\textsuperscript{657} and that it was her responsibility.\textsuperscript{658} Dr Fulton felt that in the circumstances he probably should have done it himself\textsuperscript{659} and accepted that this failure was a “deficit.”\textsuperscript{660} Remarkably, Mrs Burnside did not herself consult the protocol for guidance.\textsuperscript{661} She fully acknowledged her failing in this regard.\textsuperscript{662} I consider that this confirms a lack of commitment to the processes of clinical governance at that time. Nonetheless, Mrs Burnside said she “felt fully informed...”\textsuperscript{663}

5.225 Subsequently however, she was to erroneously recount her “clear understanding that the Critical Incident Review established that Raychel’s care and treatment were consistent with custom and practice,”\textsuperscript{664} that “an unusual or idiosyncratic response had precipitated the leading to the tragic death”\textsuperscript{665} and that “there were no indicators of persistent patterns of poor care to cause the alarm bells or to trigger an external review.”\textsuperscript{666} I believe
that had an appropriate written report been submitted to the Chief Executive she could not have made such ill-informed statements.

5.226 The Director of Nursing was responsible for the implementation of the Critical Incident Protocol. However, she made no attempt to find out what had been learned at the Review,\textsuperscript{667} did not ask to see the statements of her nurses\textsuperscript{668} and took no steps to request a written report.\textsuperscript{669} Whilst she accepted criticism in this regard,\textsuperscript{670} she was unable to explain herself. Accordingly, Miss Duddy made no report on the nursing issues to the Chief Executive or the Board and was not in a position to reassure as to the nursing on Ward 6.\textsuperscript{671} The Board meeting minutes for July 2001, which would have confirmed what was disclosed about Raychel’s death are missing. Miss Duddy said she could “\textit{only assume that someone got access to them and didn’t replace them.}”\textsuperscript{672} In such circumstances, I consider it unlikely that the Board could have been sufficiently informed to know whether the clinical services for children were safe or not.

5.227 Additionally, it is much to be regretted that at that time, no one thought to advise Mr and Mrs Ferguson as to the causes of their daughter’s death or the findings at review. The clinical shortcomings and the agreed action plan were not explained. They should have been and such silence could not easily have been maintained had a written report been available. It is easy to understand how, in such circumstances, the failure to report in writing might be interpreted as defensive.

5.228 A written report would have been an effective channel of communication with the Ferguson family. Professor Swainson observed that “\textit{in my experience over many, many years [families] have always said that what they are interested in is... what is being done to stop that happening again to anybody else... communicating with them broadly the lessons learned...}”
and what has been put in place... is a key piece of the interaction with the family.”

Actions: post-review

5.229 Professor Swainson also advised that “a Critical Review would typically meet again after a few weeks to check that the agreed actions had been completed and begin the task in determining what went wrong.” Dr Fulton agreed that this “would have been a very good idea.” However no such meeting took place nor indeed was there any surgical consideration of the issues whether at morbidity/mortality meetings or audit.

5.230 Dr Fulton’s action plan was not however forgotten and work started on its implementation. Mrs Brown was able to give an ‘update report’ to Mrs Burnside on 9th July 2001 confirming daily U&E checks for post-operative children receiving IV fluids and display of a chart detailing IV infusion rates, confirmation was given that these matters had been brought to the attention of junior surgical doctors.

5.231 She also reported the decision to discontinue the use of Solution No.18 for paediatric surgical patients. This had not proved straightforward because “one of the surgeons [was] not supporting this change” on the basis that “he saw no reason to change and was happy to use No.18 Solution.” Further review of the medical literature ensued and then, with some reservation, Hartmann’s rather than Solution No.18 eventually became the post-operative fluid for paediatric surgical patients in Altnagelvin. This was the determined achievement of Dr Nesbitt and was to eventually result in the complete removal of Solution No.18 from Ward 6. In this he was

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673 Professor Swainson T-19-09-13 p.97 line 2
674 226-002-023
675 Dr Fulton T-04-09-13 p.69 line 24
676 Miss Duddy T-29-08-13 p.109 line 23
677 022-097-307
678 026-009-010
679 022-097-307
680 WS-035-2 p.30
681 Dr Nesbitt T-03-09-13 p.228 line 19
ahead of his time. It was to take until December 2012 for the British National Formulary for Children\textsuperscript{682} to follow suit.

5.232 The update report also recorded the work of the CSM, the Clinical Effectiveness Co-ordinator and some of the nursing staff in relation to fluid balance issues.\textsuperscript{683} They had agreed detailed matters relating to the management of fluids,\textsuperscript{684} fluid balance sheets, quantification of vomit volume and the necessity to encourage doctors to record and document.\textsuperscript{685}

5.233 Additionally, they considered important organisational matters including the concern of “\textit{nursing staff that surgeons are unable to give a commitment to children on Ward 6}” and made a request that “\textit{paediatricians maintain overall responsibility for surgical children on Ward 6}?”\textsuperscript{686} The Director of Nursing took no part in these discussions.\textsuperscript{687} Dr Fulton “\textit{didn’t call a meeting but in retrospect, I should have because that seemed to be raising an increasing concern}.”\textsuperscript{688} This confirms that the Critical Incident Review should indeed have reconvened to finish its work.

### Arranging to meet Mr and Mrs Ferguson

5.234 Immediately after the Critical Incident Review, Mrs Burnside, having received her oral briefing and reviewed “\textit{the issues and actions identified from the analysis}”\textsuperscript{689} and “\textit{knowing the child should not have died}”\textsuperscript{690} and being conscious of a “\textit{duty of care to the parents and family}”\textsuperscript{691} wrote on 15\textsuperscript{th} June 2001 to Mr and Mrs Ferguson to “\textit{express to you my sincere sympathy following the death of your daughter Rachel [sic]. We are all deeply saddened and appreciate the loss you must be feeling. The medical and nursing staff who cared for Rachel would like to offer you both their sincere condolences and they would also like to offer you the opportunity}”
to meet with them if you feel this would be of any help. If you wish me to arrange this for you please contact my department..."  

5.235 Mrs Burnside acknowledged that “at the time I wrote the letter I really had very limited knowledge” – “but I did know that I would have to meet with the family because this family would want explanations.” Professor Swainson considered it “very good of the Chief Executive to take that lead in this particular circumstance.”

5.236 Mrs Ferguson remembers that “as time went on, I was getting more annoyed because at this stage Raychel had died and was buried and we still did not know what had happened... We got the letter on the 15th, I remember phoning Altnagelvin, it was a while after that, and I wanted to have a meeting.” The family quite simply “wanted to know why Raychel had died.”

5.237 Contact was made and a meeting arranged for Monday 3rd September 2001 at the hospital. Mrs Burnside explained that “it was our practice to be open with patients and their families if and when there was an untoward event.” This was therefore the opportunity for Altnagelvin to openly and honestly explain the circumstances of Raychel’s death to her family.

**Monday 3rd September meeting**

5.238 The meeting took place and was minuted by Altnagelvin’s ‘Patient Advocate’ Mrs Anne Doherty. Her note has been accepted as reliable. In attendance were Mrs Ferguson, her brother, her sister Kay Doherty, Dr Ashenhurst, the family GP, a family friend and Ms Helen Quigley of the WHSSC. Mrs Burnside attended with Drs Nesbitt and McCord, Sister Millar
and Staff Nurse Noble. Mrs Burnside explained it was the “staff who had been involved in Raychel’s care and who wished to meet the family [who] attended the meeting.”

On this occasion the Patient Advocate was not representing the interests of the Ferguson family, nor was she present as an independent advocate but attended at the request of the Chief Executive “to take minutes.” Notwithstanding that Mrs Burnside intended her “to make whatever notes [she] needed for her to be able to work with the family and support them in whatever way” she gave her no instructions to that effect. Accordingly, Mrs Anne Doherty did not introduce herself then or at any time to the Ferguson family and made no contribution to the meeting. Subsequently she did not share her minutes with Mrs Ferguson but sent them directly to Drs Nesbitt and McCord and Sister Millar and showed them to the Chief Executive. She did not support the family.

That was a mistake because as Professor Swainson observed “given the importance, given the sensitivity, given the high emotional state of some of the people participating in that meeting particularly from the family’s perspective, the Patient Advocate had a very important role, particularly if she’d had a pre-meeting with the family because that would have enabled her in advance to understand what the family’s complaints, concerns and enquiries were. It would have enabled her to help them frame them in a way that the senior people at the meeting would understand.”

Notably absent from the meeting were Mr Gilliland and his surgical team. He had been invited to attend but declined on the basis that he had not treated Raychel and thought there was little he could do to ease Mrs Ferguson’s grief. In so doing he acted against the express advice of his
Medical Director, Dr Fulton. Mr Gilliland explained that he “didn’t think there was a particular surgical issue. I understand now... that there were surgical issues and that there were questions that the family wished to have answers... if they feel that I have let them down at that particular moment in time then I am very sorry.” Raychel was a surgical patient and suffered from inadequate surgical care. I consider that Mr Gilliland’s failure to attend was a failure of both professional duty and hospital governance.

Neither the Medical Director nor the Director of Nursing attended the meeting. No external expert or independent figure of authority was in attendance. None of the doctors responsible for treating Raychel before her collapse was present. The meeting convened without Raychel’s medical notes. Furthermore, Mrs Burnside had no record of the Critical Incident Review and claimed not to know that there was disagreement between her nurses and the family about the extent of Raychel’s vomiting. The Chief Executive had neither prepared for nor been briefed for the meeting.

Nor were the other Altnagelvin representatives prepared. Dr McCord recalled “there was no agenda, no plan, no prior thought as to who was going to speak. The setting wasn’t good, we arranged ourselves... in a cold blue coloured room, it was an echoey Portakabin.” Sister Millar recalled she “didn’t know why [she] was attending or what [she] was supposed to do.” Professor Swainson considered a “pre-meeting would have been essential... a central part of the preparation.”

Mrs Burnside said “I look back now and think, why didn’t I postpone the meeting, why didn’t I structure it, why didn’t I see what state Mrs Ferguson was in, did we have all of the information that was available? All of those

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713 Mr Gilliland T-28-08-13 p. 91 line 6
714 Mr Gilliland T-14-03-13 p. 216-217
715 Mrs Burnside T-17-09-13 p.145 line 18
716 Mrs Burnside T-17-09-13 p.154 line 11
717 Dr McCord T-10-09-13 p.183 line 1
718 Sister Millar T-28-08-13 p.156 line 7
719 Professor Swainson T-19-09-13 p.113 line 19
are lessons that sadly I have learnt and sadly Mrs Ferguson has suffered with, and I’m profoundly sorry that that is so.”

5.245 The meeting cannot have been easy for any of the participants and obviously required care and sensitivity on the part of Altnagelvin. It was necessary for them to effectively communicate the harsh facts of Raychel’s death, meaningfully discuss failings in her care and at the same time support a deeply stressed family. Training and preparation for such a difficult meeting were essential.

5.246 A serious breakdown in communication and understanding seems to have occurred at the meeting because Mrs Ferguson recalled leaving “the meeting totally confused, believing it to be pointless. I remember feeling a sense of Raychel being blamed for her own death or that we were in some way responsible.” She said “I look back on this meeting now with some disgust, anger and annoyance, to me it was just a beginning of a cover-up by Altnagelvin Hospital...” “Even to this day I really do find it very hard not to get agitated and angry looking back at the behaviour of Altnagelvin at that meeting. Their behaviour was appalling as they knew, or must have known, full well what happened to Raychel by that stage.”

5.247 This impression of the meeting was not however shared by Mrs Burnside who said that they met “with the clear understanding that our hospital had not managed to care for that child in a way that would have prevented her dying.” She believed “Mrs Ferguson was given our honest understanding of the issues...” and recalled having offered “explanations around the following issues, namely the process of Critical Incident Review, the research findings on post-operative reaction leading to hyponatraemia, our subsequent actions to prevent risk of recurrence, and the measures in place to monitor improvement.”

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720 Mrs Burnside T-17-09-13 p.160 line 5
721 WS-020-1 p.20
722 WS-020-1 p.20
723 WS-020-1 p.21
724 Mrs Burnside T-17-09-13 p.114 line 8
725 WS-046-2 p.27
726 WS-046-1 p.7
5.248 Sister Millar supported this account and said that Dr Nesbitt acknowledged deficiencies, was very sympathetic and gave an apology.\footnote{Sister Millar T-01-03-13 p.79 line 23 \textit{et seq}} She recalled a “very long account... I thought it was very fair, I thought it was honest and I thought he was open.”\footnote{Sister Millar T-01-03-13 p.82 line 19} Dr Nesbitt agreed, thinking “we had been open and honest and helpful”\footnote{Dr Nesbitt T-03-09-13 p.240 line 18} and had “a clear memory of discussing the reason why I thought Raychel had died... this was not recorded”\footnote{WS-035-2 p.24} and Staff Nurse Noble specifically recalled “Dr Nesbitt saying that she had got a little bit too much fluid.”\footnote{WS-049-4 p.13}

5.249 However, the minute of the meeting records a very different conversation. It makes no reference to the Critical Incident Review, or of failings identified, actions taken or measures put in place. It records nothing about Altnagelvin’s “subsequent actions to prevent risk of recurrence,”\footnote{WS-046-1 p.7 & Mrs Burnside T-17-09-13 p.155 line 25} noting only that “Mrs Burnside said... the hospital would look at things and see if there were ways of improving care.”\footnote{022-084-221}

5.250 I found it telling that Raychel’s GP, Dr Ashenhurst, had “no recollection of deficiencies in the care of Raychel being mentioned at the meeting by the representatives.”\footnote{WS-333-1 p.3}

5.251 Furthermore, I do not consider Sister Millar a reliable witness given that even after she had learned of the many failings in Raychel’s care, she continued to assert to this Inquiry her confidence that Raychel had “received the highest standard of care from nursing staff in Ward 6”\footnote{WS-056-1 p.9} and that she “had been recovering very well on Friday the 8th.”\footnote{WS-056-1 p.9}

5.252 The minutes record some most unsatisfactory questions and answers:
(i) “Why did the nurses not look about her when she was so sick and had a sore head? Dr Nesbitt said that on the day following surgery, the first post op. day, people can be sick and have a sore head.”

(ii) “Raychel was bringing up blood when she vomited why was this? Dr Nesbitt said that when you are vomiting the back of your throat can become irritated and can bleed.”

(iii) “Mrs Doherty asked what were Raychel’s sodium levels the first time they were done? What is routine? What checks do you do? Dr McCord said bloods are checked routinely on admission. 36 hours prior to this Raychel’s bloods were normal.”

5.253 No sincere attempt was made to answer the family’s reasonable questions about the evaluation of Raychel’s sodium levels or her therapy. The minutes record Dr Nesbitt’s questionable explanations that “the reason why they were not done routinely is that it requires a needle into the vein to take the blood” and “the fluids used are the standard across the country... nothing we were doing was unusual.” Such understanding Mrs Ferguson may have had as to what happened to her daughter cannot have been assisted. Indeed as her sister Kay Doherty concluded “we had no more knowledge leaving than what we had when we went in.”

5.254 I am satisfied that the Altnagelvin representatives knew a very great deal more than they were prepared to tell the Ferguson family. Only weeks before Mrs Burnside had herself received background briefing on hyponatraemia and been informed that “the problem today of dilutional hyponatraemia is well recognised...”
5.255 In addition and at about the same time as the meeting Dr Nesbitt was preparing a PowerPoint presentation about Raychel’s case entitled “Fatal Hyponatraemia following surgery.” In this he identified shortcomings in her treatment and in particular noted that she was a risk patient for SIADH, had received excessive maintenance fluids, that her fluid balance documentation was deficient and that there had been a failure to test her U&Es. In addition, he made reference to the British Medical Journal “Lesson of the Week” which had appeared only two months before Raychel’s admission and specifically warned not to “infuse a hypotonic solution if the plasma sodium concentration is less than 138mmol/L.” These were matters which were not shared with Mrs Ferguson either at the meeting or indeed at any time thereafter as they could and should have been. Even Mrs Burnside “perceived... that the family was concerned that we weren’t telling everything.”

5.256 Mrs Kay Doherty suggested to this Inquiry that “if they had said openly, and told us... that they had a meeting and that they had discovered problems and they had found things weren’t done right, that simple care was not given to Raychel... I don’t think we’d all be sitting here today if they had been open and honest with us in that meeting.” Regrettably, the Altnagelvin approach demonstrated only limited understanding of what the meeting was really for and what the needs of the family were.

5.257 The meeting lasted one hour and fifteen minutes. Mrs Ferguson gave evidence that “Dr McCord has told us personally that the meeting was a disaster.” Unsurprisingly, the Ferguson family did not seek any further meeting with the Chief Executive or the doctors and nurses of Altnagelvin.

745 Dr Nesbitt T-03-09-13 p.115 line 10
746 095-010-046ag
747 021-054-120
748 021-054-128
749 021-054-124
750 021-054-124
751 070-023b-217
752 Mrs Burnside T-17-09-13 p.163 line 11
753 Ms Kay Doherty T-18-09-13 p.184 line 11
754 022-084-224
755 Mr and Mrs Ferguson T-26-03-13 p.177 line 14
5.258 Not only did the meeting achieve little that was useful but it actually gave rise to distrust, suspicion and anger, I attribute this to lack of preparation and transparency compounded by insensitivity and poor communication skills. Further, I conclude that relevant information was withheld from the Ferguson family. Such was a serious breach of trust and professional duty and violated Mrs Ferguson’s right to know. Mrs Burnside was present, in charge and responsible.

The Ferguson family contact RBHSC

5.259 The Ferguson family, having failed to obtain the answers they wanted from Altnagelvin, sought a meeting with Dr Crean of the RBHSC. This prompted him to contact the Coroner on 11th October 2001 to emphasise that “there was mismanagement of this case in the Altnagelvin Hospital... The fluid balance was the key to why her condition deteriorated – dilutional hyponatraemia.”

5.260 It was very proper that Dr Crean should have brought this to the Coroner’s attention. Nonetheless, there remains the question as to whether he should not also have brought it to the attention of Mr and Mrs Ferguson. He had been Raychel’s admitting Consultant to the RBHSC, had joint care of her and should have felt a general professional obligation, as well as a duty, under paragraph 23 of the GMC’s ‘Good Medical Practice,’ to tell them. However, the idea of a meeting was not pursued by the Fergusons and the opportunity was lost. It would be harsh to criticise in this regard but it is a matter which should have been considered.

Altnagelvin dissemination

5.261 By way of contrast to the way Altnagelvin communicated with the family, it made admirable, early and sustained efforts to bring her death and the risks
connected with the use of Solution No.18 to the attention of interested parties outside Altnagelvin.

5.262 On 18th June 2001, Dr Fulton attended a meeting of hospital Medical Directors in Belfast. It was chaired by Dr Carson, Medical Director of RGHT and Medical Advisor to the Chief Medical Officer (‘CMO’). Before the meeting and in conversation with Dr Jim Kelly, Medical Director of the Erne Hospital  Dr Fulton discovered that they had each in their respective hospitals experienced fluid balance problems associated with the use of Solution No.18 and that each had learnt from separate sources that Solution No.18 had been discontinued at the RBHSC.

5.263 Dr Kelly believes, in this context, that he told Dr Fulton about the death of a child patient (Lucy Crawford). Dr Fulton is very clear that he did not. The evidence does not convince that Dr Fulton knew about Lucy’s case at that time and indeed none of his subsequent actions or communications suggest that he did.

5.264 Drs Fulton and Kelly decided that the matter should be raised at the meeting. Dr Fulton recalled how he then outlined the circumstances of Raychel’s death and “told the medical directors present at the meeting that in my opinion there was evidence that Solution 18 was hazardous in post-operative children” and “that there should be regional guidelines.” He recalled other anaesthetists at the meeting acknowledging some ‘near misses’ in this context.

5.265 The meeting was un-minuted and whilst Dr Fulton believes that he referred to the discontinuance of Solution No.18 at the RBHSC, Dr Carson has no such recollection and could “nearly honestly say that was not raised with me.” In any event, Dr Carson acted promptly upon the matter and almost
immediately brought the issue of hyponatraemia and low saline solutions to the attention of Dr Henrietta Campbell, the CMO.

5.266 On 22nd June 2001 Dr Fulton telephoned Dr Campbell personally to inform “her of circumstances of the death [and] suggested she should publicise the dangers of Hyponatraemia when using low saline solutions in surgical children. I said there was a need for regional guidelines. Dr Campbell suggested that CREST (Regional Guidelines Group) might do this.”

5.267 Dr Fulton also telephoned Mr Martin Bradley, Chief Nursing Officer of the Western Area Health Board and notified him of Raychel’s death.

5.268 Additionally he made contact with Dr William McConnell, Director of Public Health WHSSB, about the case and forwarded the BMJ extracts about hyponatraemia. Dr McConnell in turn raised the matter at the next meeting of Northern Ireland’s Directors of Public Health on 2nd July 2001 in the presence of both the Chief and Deputy Chief Medical Officers. He described the “recent death in Altnagelvin Hospital of a child due to Hyponatraemia caused by fluid imbalance. Current evidence shows that certain fluids are used incorrectly post operatively. It was agreed that guidelines should be issued to all units.” Dr McConnell described this as “the usual method at that time of raising professional or clinical concerns which had arisen at any one Board, but which potentially, had wider relevance.”

5.269 On 5th July 2001, Dr McConnell also wrote to his fellow Directors of Public Health enclosing Dr Fulton’s extracts from the BMJ and recommending that the matter be brought to the attention of paediatricians generally. Dr McConnell suggested that for “more specific information... Dr Fulton would
be happy to discuss this with anyone.”⁷⁷¹ The issue was thus quickly and efficiently disseminated.

5.270 Dr Fulton kept his Chief Executive informed of these developments and she in turn reinforced his approach by writing to the CMO to emphasise her concern “to ensure that an overview of the research evidence is being undertaken. I believe that this is a regional, as opposed to a local hospital issue, and would emphasise the need for a critical review of evidence. I would be extremely grateful if you would ensure that the whole of the medical fraternity learned of the shared lesson.”⁷⁷² The CMO responded by setting up a working group to draft guidelines and indicated that Dr Nesbitt would be involved.

5.271 Taking the issue directly to the CMO was a central part of Altnagelvin’s alert to the medical profession about the risks of hyponatraemia and Solution No.18. They are to be praised particularly, because as Professor Swainson pointed out, “there was no explicit duty on the Trust to communicate a rare fatal event to the Board or to the Department or more generally.”⁷⁷³

5.272 These very public responses to Raychel’s death stand in disquieting contrast to the failure of the RGHT to share the information about dilutional hyponatraemia and Solution No.18 which had emerged from Adam’s inquest. It provides illustration of how rapid and widespread reporting of a clinical danger can stimulate rapid and meaningful response.

Chief Medical Officer’s Working Group on Hyponatraemia

5.273 Preparation of clinical guidelines did not normally come within the CMO’s remit⁷⁷⁴ but she made an exception for hyponatraemia and personally oversaw the process “because of the level of concern expressed by people at Altnagelvin.”⁷⁷⁵
5.274 Her Working Group first met on 26th September 2001 and drew on the specialism of Drs Taylor, Nesbitt, Loughrey, Crean and Jenkins, amongst others. These doctors had knowledge not only of hyponatraemia and of Raychel’s case but also individually of at least some of the other cases being scrutinised by this Inquiry. Dr Nesbitt confirmed that “Raychel was mentioned at the meeting because I kept on and on about it.”

5.275 The Working Group produced draft guidelines for the prevention of hyponatraemia in November 2001. However, the draft failed to address Dr Nesbitt’s concern that Solution No.18 was of itself a major factor in children’s post-operative hyponatraemia. Dr Nesbitt wrote again to the Chair of the Working Group to express disappointment that the guidance made no reference to Solution No.18 and asked “what evidence do you need exactly. We had a child who died and for that reason I feel strongly that No.18 Solution is an inappropriate fluid to use...You can be sure that it will remain highlighted as a risk in any protocol produced by Altnagelvin Hospital.” He was determined that “Solution No.18 should be named and shamed.”

5.276 However, when the Department published its guidance on the ‘Prevention of Hyponatraemia in Children’ in March 2002 it provided general advices only and did not warn specifically against the use of Solution No.18. The guidelines acknowledged the regional role of the RBHSC by indicating that “in the event of problems that cannot be resolved locally, help should be sought from Consultant Paediatricians/Anaesthetists at the PICU, RBHSC.”

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776 007-048-094
777 328-003-001
778 Dr Nesbitt T-03-09-13 p.161 line 8
779 007-003-005
780 Dr Nesbitt T-03-09-13 p.175 line 18
781 077-005-008
782 006-054-438
Post-mortem

5.277 Dr Brian Herron,\textsuperscript{783} Consultant Neuropathologist\textsuperscript{784} and Dr Al Husaini,\textsuperscript{785} Pathologist, conducted the post-mortem examination of Raychel at the request of the Coroner.\textsuperscript{786} They found diffuse cerebral oedema but no evidence of subarachnoid haemorrhage. They sought the additional opinion\textsuperscript{787} of Dr Clodagh Loughrey,\textsuperscript{788} Consultant Chemical Pathologist, as to the cause of Raychel’s hyponatraemia.\textsuperscript{789}

5.278 Incorporating her advices, Dr Herron then formally reported his opinion that the cause of death was cerebral oedema secondary to acute hyponatraemia.\textsuperscript{790} He attributed her “low sodium” to three factors as identified by Dr Loughrey,\textsuperscript{791} namely:

(i) Infusion of low sodium fluids post-operatively

(ii) Profuse vomiting in post-operative period

(iii) Secretion of anti-diuretic hormone.

Preparation for inquest

5.279 In the immediate aftermath of Raychel’s death, it had been clearly understood within Altnagelvin that the Coroner had been notified and there were questions of mismanagement. It must have seemed probable that an inquest would be held. Notwithstanding the necessity to gather statements for Critical Incident Review, there was then an even more onerous obligation to obtain statements for inquest.

5.280 Doctors were bound by section 7 of the Coroner’s Act (Northern Ireland) 1959 to notify the Coroner of the “facts and circumstances” of a death where the doctor had “reason to believe that the person died, either directly or
indirectly as a result of...negligence... or in such circumstances as may require investigation." Doctors were furthermore obligated by paragraph 32 of the GMC’s ‘Good Medical Practice’ code to “assist the Coroner... by offering all relevant information to an inquest.”

5.281 Mrs Brown collected statements for inquest and, although untrained, guided Altnagelvin and its personnel through the coronial process. She assisted the Coroner in gathering evidence for inquest. She played a central role liaising with clinicians, solicitors, the Coroner and the Trust Board.

5.282 Although Mrs Brown characterised herself as merely “a post-box in getting statements” she did in fact volunteer to the Coroner those she thought should provide statements and accordingly, had an input into who might give evidence. Additionally she checked the witness statements and suggested amendments allowing her an input into the evidence itself. She also forwarded statements to the Trust’s solicitors for approval.

5.283 In the week following the Critical Incident Review Staff Nurse Noble and Sister Millar submitted their written statements to Mrs Brown. Remarkably neither nurse made any reference to the consensus reached at the Critical Incident Review that Raychel had been given too much fluid or that her electrolytes had gone unmeasured in the context of prolonged vomiting. Such omission is troubling but that it should pass unquestioned by Mrs Brown is a matter of real concern because she too had been involved with the review. It hints at an understanding that substandard
treatment might be discussed within the hospital but not volunteered in writing to outsiders.

5.284 Scrutiny of Staff Nurse Noble’s statement bearing the date 14th June 2001 and intended for the Coroner reveals that small but significant changes have been made to her original statement also dated 14th June 2001. Whilst she offered no explanation for these amendments beyond the suggestion that they may have been made to improve readability, it is clear that her revisions serve to distance her nurses from the warning signals of Raychel’s deterioration. This was consistent with a general reluctance within Altnagelvin to concede any shortcomings in writing. Mrs Brown did nothing to discourage this approach.

5.285 Indeed, it appears to have been a part of Mrs Brown’s role to ensure that clinicians did not easily make personal admissions of error. The Altnagelvin ‘Junior Doctors’ Handbook’ specifically directed that doctors should “not release any report to the police or coroner without showing it first to the Trust RMCO. This is particularly important when the family of the deceased have employed a barrister to represent them in court, or if you feel that an allegation of medical negligence will be made in court.”

5.286 Dr McCord and Nurse Michaela Rice also provided statements in June 2001. Remarkably, no further statements were taken by Mrs Brown at that time, whether from the consultant responsible for Raychel’s care or the doctors who had treated her before collapse.

5.287 The Coroner wrote to Mrs Brown on 17th October 2001 advising “that questions must be asked regarding the management of this child whilst a patient at Altnagelvin Hospital... It would greatly assist me if you would arrange to let me have as soon as possible statements from all those concerned with the case...” Three weeks passed before Mrs Brown...
wrote to a small group of clinicians requesting statements with the reassurance that “your report will be forwarded to our solicitor prior to release to the Coroner.”\textsuperscript{810} She chose not to ask those doctors who had attended upon Raychel on 8\textsuperscript{th} June.\textsuperscript{811} The Coroner was thereafter obliged to repeatedly remind Mrs Brown on 29\textsuperscript{th} November,\textsuperscript{812} on 5\textsuperscript{th} December,\textsuperscript{813} and 11\textsuperscript{th} December 2001\textsuperscript{814} to forward the statements. When Mrs Brown received a statement from Dr Johnston, on 21\textsuperscript{st} December 2001,\textsuperscript{815} she noted his reference to Drs Curran and Zafar and wrote “I have not requested reports from these doctors, as they have not written in the notes.”\textsuperscript{816} I find it extraordinary that six months after Raychel’s death and the Critical Incident Review and even when confronted with a potentially controversial inquest that Mrs Brown should not have identified the clinicians involved. Dr Zafar was the most senior member of the surgical team to have seen Raychel on 8\textsuperscript{th} June\textsuperscript{817} and he saw her again after her collapse on 9\textsuperscript{th} June. Had a documented review been undertaken or had Mrs Brown been genuinely motivated she would have known who the relevant clinicians were and would have already held statements from them.

5.288 On 25\textsuperscript{th} January 2002, Mrs Brown purported to send nine witness statements to the Coroner\textsuperscript{818} but her letter enclosing the nine statements went “astray.”\textsuperscript{819} She did, however, forward her draft list of witnesses for the Coroner from which she omitted all the surgical doctors.

5.289 On 25\textsuperscript{th} March 2002, Mrs Brown finally received Dr Zafar’s statement.\textsuperscript{820} It was not her fault that all he could contribute was that “I saw Rachael [sic] Ferguson on 8\textsuperscript{th} June 2001, who had appendectomy operation on 7\textsuperscript{th} June

\textsuperscript{810} 022-079-207
\textsuperscript{811} Dr Devlin T-06-03-13 p.3 line 4 & Dr Curran T-07-03-13 p.1 line 18
\textsuperscript{812} 022-072-167
\textsuperscript{813} 022-070-170
\textsuperscript{814} 022-068-167
\textsuperscript{815} 012-013-114
\textsuperscript{816} 160-207-001
\textsuperscript{817} 020-007-013
\textsuperscript{818} 022-054-151
\textsuperscript{819} 012-050g-246
\textsuperscript{820} 160-239-001
2001. On my ward round she was free of pain and apyrexial, plane [sic] was to [sic] continuous observation."\textsuperscript{821}

5.290 The inquest was listed for 10\textsuperscript{th} April 2002. It was not, however, until 6\textsuperscript{th} March 2002 that a ‘complete’ set of Altnagelvin statements was forwarded the Coroner.\textsuperscript{822} The inquest hearing was adjourned.\textsuperscript{823} Mrs Brown wrote to Dr Zafar returning his “draft statement. Please amend. I enclose a statement from Dr Johnston.”\textsuperscript{824} Dr Zafar duly obliged adding a paragraph\textsuperscript{825} derived from Dr Johnston’s statement\textsuperscript{826} which was then sent unsigned to the Coroner.\textsuperscript{827}

5.291 The gathering of written statements for the Coroner lacked rigour and mirrored the collection of written evidence for Critical Incident Review. What was required was clear. That which was gathered in writing was not. I do not believe that was entirely accidental.

\textit{Altnagelvin writes to the Coroner}

5.292 On 11\textsuperscript{th} December 2001, the Coroner engaged Dr Edward Sumner to investigate Raychel’s death on his behalf.\textsuperscript{828} Dr Sumner reported in February 2002 that Raychel had died from coning in consequence of cerebral oedema caused by hyponatraemia\textsuperscript{829} and that the “\textit{hyponatraemia was caused by a combination of inadequate electrolyte replacement in the face of severe post-operative vomiting and the water retention always seen post-operatively from inappropriate secretion of ADH}”\textsuperscript{830} The Coroner forwarded this to Mrs Brown on 18 February 2002.\textsuperscript{831}

5.293 On 12\textsuperscript{th} March 2002, Mrs Brown advised the Chief Executive that “some of the clinical staff have come back and advised me that there are factual
inaccuracies in [Dr Sumner’s] Report.”832 It is remarkable that not even in these circumstances did Mrs Burnside insist on a written report of her own Critical Incident Review.

5.294 Mrs Brown drew those claimed inaccuracies to the attention of the Trust solicitor,833 who then wrote to the Coroner on 29th March stating that “the Trust has taken this tragic incident very seriously and has fully and promptly investigated this matter”834 and “fully accepts that the cause of death in this case was cerebral oedema due to hyponatraemia... It is also accepted that the vomiting experienced by the Deceased was a contributory factor in that it would have contributed to some extent to the net sodium loss from the extracellular fluid. Further, it is accepted that the use of Solution 18...in order to provide post-operative maintenance and replacement fluids was a contributory factor in bringing about a reduction in the concentration of sodium in the extracellular fluid.”835

5.295 However, the solicitor then proceeded to very pointedly question Dr Sumner’s opinion that Raychel had suffered very severe and prolonged vomiting. This had not been amongst those inaccuracies drawn to her attention by Mrs Brown. She wrote “this conclusion is strongly disputed by the Trust. The nurses who were caring for the Deceased during the relevant period have been interviewed in detail about this matter and they are all of the opinion that the vomiting suffered by the Deceased was neither severe nor prolonged.”836 She concluded her letter by claiming that “the Trust wished me to bring these matters to your attention well in advance of the hearing of the inquest.”837

5.296 Notwithstanding these assertions, Mrs Brown was very clear in her evidence that the nurses “were never interviewed in detail.”838 Furthermore, Sister Millar had “no recollection of being separately interviewed”839 and in
any event, Staff Nurse Noble considered Raychel’s vomiting to have been both severe and prolonged.\textsuperscript{840} I conclude that in respect of this claim alone the letter was factually incorrect and had therefore, as Mrs Brown put it “a potential to mislead.”\textsuperscript{841}

5.297 The Chief Executive maintained that she had not seen the letter\textsuperscript{842} and did not “believe the Trust would have sanctioned the letter. I think the Trust would have briefed the legal advisor about their concerns and the legal advisor would have, within their expertise, laid out those concerns as they interpreted them.”\textsuperscript{843} She said she took the “dimmest view” of any intention to mislead.\textsuperscript{844} So do I, not least because the Ferguson family had received Mrs Burnside’s personal assurances that they “could have confidence that their concerns would be addressed thoroughly through the Coroner’s court.”\textsuperscript{845}

5.298 The Coroner’s response to Altnagelvin’s solicitor’s letter was terse: “So far as the point you made regarding vomiting I have no objection to receiving evidence from any nurses who are in a position to give relevant evidence.”\textsuperscript{846} The Coroner met with the Ferguson family on 3\textsuperscript{rd} April 2002 and adjourned the inquest to allow them legal representation.\textsuperscript{847}

5.299 Efforts were then made to gather evidence to corroborate the solicitor’s assertions. Mrs Brown sought a statement from Staff Nurse Gilchrist in the following terms: “Dr. Nesbitt and I met with the barrister yesterday. The barrister feels it is important that we counteract the comments made by Dr. Sumner, the independent expert in relation to the allegation of excess vomiting. To do this he feels it is important that we bring along the nursing staff. If nursing staff do not attend then it would be difficult for anyone to explain what is meant by the ++ in the notes. The Barrister is endeavouring to get permission from the Coroner for the nurses to attend. I require a

\begin{itemize}
\item \textsuperscript{840} Staff Nurse Noble T-27-02-13 p.172 line 6 & Staff Nurse Noble T-27-08-13 p.202 line 2
\item \textsuperscript{841} Mrs Brown T-02-09-13 p.152 line 16
\item \textsuperscript{842} Mrs Burnside T-17-09-13 p.192 line 5
\item \textsuperscript{843} Mrs Burnside T-17-09-13 p.240 line 22
\item \textsuperscript{844} Mrs Burnside T-17-09-13 p.192 line 8
\item \textsuperscript{845} WS-046-1 p.7
\item \textsuperscript{846} 022-026-069
\item \textsuperscript{847} 098-137-425
\end{itemize}
statement from you on your involvement as soon as possible." Staff Nurse Gilchrist duly supplied a statement, purporting to have been "written on 10th June 2001" confirming that she had not been concerned by Raychel’s vomiting because it was not unusual in post-operative children. However, when she came to give evidence to this Inquiry she accepted that “Raychel’s vomiting was severe and prolonged.”

**Altnagelvin reviews progress and prepares for inquest**

5.300 Dr Fulton having retired from his post as medical director, nonetheless arranged a pre-inquest meeting on 9th April 2002 with the Altnagelvin witnesses, namely Mr Gilliland and Drs Nesbitt, McCord and Makar. On the same day he reviewed the implementation of his action plan. This was an important review and examined the plan in light of the Department’s Guidelines on Hyponatraemia and considered the availability of surgeons for paediatric patients and their responsibilities in respect of fluid therapy. It laid the basis for a new clinical protocol to be agreed in May 2002 between surgeons, anaesthetists and paediatricians in respect of paediatric IV fluid therapy. This was a local protocol of real value and provides demonstrable evidence of the sincerity of professional intent at Altnagelvin in almost everything except the open acceptance of error and the transparent provision of information and respect to the Ferguson family.

5.301 Meanwhile, Mrs Brown co-ordinated the Altnagelvin preparation for inquest. In addition to challenging any suggestion of a failure to respond to Raychel’s vomiting she started to bring together evidence to mitigate Altnagelvin’s position. To that end, Dr Fulton, having failed to prepare a written report of his Critical Incident Review for his Chief Executive, now provided a statement for the Coroner detailing his work investigating “the
circumstances of her death within the hospital and... recommendations for any action to prevent recurrence."\textsuperscript{858} Although Dr Fulton was not on the list of witnesses, his statement was forwarded to the Coroner who was asked to confirm that he would be called to give evidence.\textsuperscript{859} The Coroner replied that "so far as Dr. Fulton is concerned whilst it is not strictly necessary for him to give evidence, I can understand why the Trust might wish to put in evidence the response to the death of Rachel [sic]."\textsuperscript{860} The Coroner thus allowed him to be called as a witness.

5.302 In addition, on 1\textsuperscript{st} May 2002, Dr Nesbitt wrote to the CMO "to know if any... guidance was issued by the Department of Health following the death of a child in the RBHSC which occurred some five years ago and whose death the Belfast Coroner investigated. I was unaware of the case and am somewhat at a loss to explain why. I would be grateful if you could furnish me with any details of that particular case for I believe that questions will be asked as to why we did not learn from what appears to have been a similar event."\textsuperscript{861} The CMO responded by reassuring Dr Nesbitt that “This Department was not made aware of the case at the time either by the Royal Victoria Hospital or the Coroner. We only became aware of that particular case when we began the work of developing guidelines following the death at Altnagelvin.”\textsuperscript{862}

5.303 Mrs Brown was then able to advise the Chief Executive that “the positive aspects of the case are... the action taken following the death and again it is hoped that Dr. Fulton will be able to give evidence in relation to his actions following the tragic incident. The other positive note is the letter dated May of this year from Dr. Campbell to Dr. Nesbitt and the barrister is keen to
explore this issue." To that end Dr Nesbitt’s letter to the CMO and her reply were sent directly to the Coroner himself.

**Altnagelvin commissions independent expert opinion**

5.304 The inquest was re-listed for 26th November 2002. Counsel retained to act on behalf of the Trust directed that the Trust’s solicitor obtain a report “from an independent Consultant Paediatric Anaesthetist who should comment [on] management of this case, the contents of Dr. Sumner’s report and the steps taken by the Trust following this incident to ensure that such an incident could not occur again...”

5.305 On 1st November 2002 the Trust’s solicitor sought the independent expert opinion, not of a consultant paediatric anaesthetist, but of Dr John G. Jenkins, who was a consultant paediatrician. He was nonetheless well qualified, being a member of the CMO’s Working Group on Hyponatraemia and the same expert who had some months before provided the same solicitors with a report on the care, treatment and death of Lucy Crawford.

5.306 He was briefed with a full Schedule of Documents excepting only that Dr Fulton’s Critical Incident Review plan was omitted and disturbingly a copy of Altnagelvin’s ‘draft press statement’ for release after inquest, included. This statement asserted that “it is important to be aware that the procedures and practices put into effect in the care of Raychel following her operation were the same as those used in all other area hospitals in Northern Ireland.” This inclusion was inexcusable in that not only was it known to be untrue but it blatantly suggested Altnagelvin’s preferred opinion to the independent
witness. Although this was Dr Jenkins’ first experience of drafting a report for an inquest, he wisely “didn’t really take notice of it.”

Dr Jenkins’ initial view was that Raychel’s vomiting “needed to be looked at in more detail as a particularly important aspect” and “an area which required clarification. Dr Sumner had reached a view which differed from that of the staff who’d been providing care, so... it was important that this was something which needed to be elucidated.” Accordingly, he concluded his opinion dated 12th November 2002 by observing that “while it was possible in retrospect to form the opinion reached by Dr. Sumner that Raychel must have suffered severe and prolonged vomiting, this does not seem to have been the assessment of her condition made by experienced staff at the relevant time” and it was thus “important that further details are obtained of relevant nursing and medical procedures and management in relation to fluid administration and post-operative monitoring of fluid intake, urine output and other losses such as vomiting. In particular information needs to be obtained regarding the local policy for post-operative fluid administration in children. Was the prescribed regime in this case in keeping with this guidance?” However, no further information on these important matters was to be forthcoming to Dr Jenkins.

His opinion may not have been thought sufficient for Altnagelvin’s purposes because on 3rd December 2002 another report was commissioned, this time from Dr Declan Warde, of the Children’s University Hospital Dublin who was a Consultant Paediatric Anaesthetist. Dr Warde, having agreed to “attend the inquest hearing on behalf of the Trust” was specifically asked to “comment on the treatment provided and the issues raised by Dr. Sumner.” The inquest was further adjourned to 5th February 2003.
Dr Warde’s report was received by the Trust solicitor on 19th January 2003. He gave it as his opinion that Raychel had “died as a result of developing cerebral oedema secondary to acute hyponatraemia, which was itself caused by a combination of severe and protracted post-operative vomiting, SIADH and the administration of intravenous fluid with a low sodium content.” This was even less supportive of Altnagelvin’s position than Dr Jenkins’ opinion and flatly contradicted the contention that the vomiting was neither severe nor prolonged. The Report was sent to Dr Jenkins who was asked for “any further comments which you have which might assist the Trust.” The wording of this request is regrettable because it was open to misinterpretation and in any event, Dr Jenkins’ paramount responsibility was always to assist the Coroner.

Dr Jenkins commented on 27th January 2003 that “Dr. Warde again makes reference to the significance of the vomiting. I pointed out in my report of 12th November 2002 the importance of seeking further information regarding the frequency and severity of Raychel’s vomiting in the opinion of senior staff… I have also not been provided with any further details of relevant nursing and medical procedures and management in relation to fluid administration and post-operative monitoring of fluid intake, urine output and other losses such as vomiting.”

On 28th January 2003, the Trust’s solicitors informed Dr Warde that his services were not required at the inquest and Dr Jenkins’ attendance for 5th February was confirmed.

Dr Jenkins then produced his third and final report dated 30th January 2003 from which he omitted much that he had been included in his earlier reports. All reference to Raychel’s vomiting, the amount of fluid administered and his requests for further information was excised.
made no mention of Dr Warde’s report and concluded that “having carefully studied the statements provided by the doctors and nurses involved in Raychel’s care my opinion is that they acted in accordance with the established custom and practice in the Unit at that time.”

5.313 Dr Jenkins’ “best guess” as to how this came about was “that I was asked to re-format my report and to concentrate on the aspects of the development of guidance” and accordingly, “my third report, the report for the Coroner, was specifically addressing the broader issues.” This was regrettable because an independent expert can never be truly independent if placed under direction. Dr Jenkins having been asked for “an independent view re treatment for inquest hearing” and having agreed to prepare a report on the matter was perhaps naive in the circumstances to consider that the Trust “was within their rights to advise me as to what aspects of the matter I should provide a report on for the Coroner.” It appears likely that ‘editorial’ control was exerted by lawyers representing Altnagelvin. Entitlement to legal privilege was asserted by Altnagelvin which frustratingly precluded any further investigation of this important matter.

5.314 It was Dr Jenkins’ third report alone which was sent to the Coroner and subsequently incorporated into his deposition at inquest. The Coroner was thus led to believe that the sole expert opinion held by Altnagelvin was Dr Jenkins’ third report and that represented the totality of his relevant opinion.

5.315 Dr Jenkins was able “in retrospect” to appreciate that it would have been “very sensible” to include his own observations where relevant for the

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893 022-004-011
894 Dr Jenkins T-10-09-13 p.106 line 11
895 Dr Jenkins T-10-09-13 p.108 line 11
896 160-113-002
897 172-002-001
898 Dr Jenkins T-10-09-13 p.104 line 2
899 Dr Jenkins T-10-09-13 p.114 line 22
900 012-070b-386
901 012-030-153
902 012-070b-386
903 Dr Jenkins T-10-09-13 p.106 line 24
Coroner and recognised “in retrospect that it would have been a more sensible thing”\(^{904}\) not to omit comment previously considered relevant.

5.316 Significantly, the Trust did not share Dr Warde’s report with the Coroner either. Nor was it shared with the Ferguson family (or indeed later with the PSNI). The Coroner was not told that Altnagelvin was in possession of an opinion from a second consultant paediatric anaesthetist let alone one which supported Dr Sumner’s views. A decision must have been taken to withhold the report. Dr Nesbitt believes “that this would have been a decision made by the Chief Executive”\(^{905}\) but Mrs Burnside claimed “no knowledge of why and how it did not go to the Coroner.”\(^{906}\) Others said that this non-disclosure was upon the advice of the Altnagelvin’s legal advisors\(^{907}\) acting in liaison with Mrs Brown.\(^{908}\) It was not at all what the Coroner expected of them.\(^{909}\) Mr Leckey acknowledged that “there may be an issue raised of privilege. What I would say is, are we not investigating in this case the death of a child and let’s not dwell on legal niceties first. We want to get to the truth.”\(^{910}\)

5.317 Professor Swainson advised that “the principle I would adhere to is that you make a full disclosure of whatever information you have because of two reasons. One is it helps the process, it can only be helpful. Secondly, if you don’t, it’ll come out later anyway... So my overriding principle is that in these circumstances your duty is to assist the Court, or whatever, as far as you are able. I have been advised by my solicitors previously not to either submit a report or submit it in a different form and I’ve been happy to discuss that, but I have never agreed to not submitting a report that was available that would have been of clear relevance to court proceedings.”\(^{911}\)

5.318 Had Altnagelvin been sincerely motivated to assist the Coroner it would undoubtedly have shared Dr Warde’s publicly funded expert opinion with

\(^{904}\) Dr Jenkins T-10-09-13 p.109 line 6 
\(^{905}\) WS-035/2 p.31 
\(^{906}\) Mrs Burnside T-17-09-13 p.164 line 5 
\(^{907}\) Mrs Brown T-02-09-13 p.177 line 5 & Mrs Margaret Doherty T-09-09-13 p.43 et seq 
\(^{908}\) Dr Fulton T-04-09-13 p.112 line10 
\(^{909}\) Mr Leckey T-25-06-13 p.110 line 8 & p.109 line 23 
\(^{910}\) Mr Leckey T-25-06-12 p.109 line 23 
\(^{911}\) Professor Swainson T-19-09-13 p.134 line 17
him, just as the Coroner shares with the public those expert opinions commissioned by him.\textsuperscript{912} It is hard to understand what public interest is served by withholding such a report. Notwithstanding that Altnagelvin was not legally obliged to submit Dr Warde’s report – it is hard not to conclude that the wrong approach was taken.

5.319 The Altnagelvin preparation for inquest was calculated and defensive. I interpret the actions of those involved on behalf of Altnagelvin as having been primarily motivated by a misguided desire to avoid the risk of criticism and to portray the hospital in the best possible light. If a culture of defensiveness characterised the responses of the clinicians involved it also marked those engaged with this aspect of governance.

5.320 Additionally, I wish to record my disappointment that the Trust should have withheld documentation from this Inquiry on the basis of legal privilege. This has not assisted. It can only inflame suspicion of ‘cover-up’. Whilst I fully recognise the Trust’s legal right to assert privilege I do not necessarily consider it ethical. In this context, I am influenced by the contrast between Altnagelvin’s promises of unqualified co-operation with the work of the Inquiry and the reality. In November 2004, the Trust issued a statement to the press assuring that “Altnagelvin will co-operate fully and without equivocation with this Inquiry”\textsuperscript{913} and in addition Mrs Burnside wrote to me personally “that Altnagelvin will give its fullest co-operation to the Inquiry team.”\textsuperscript{914} Lest there could have been any doubt the Trust solicitors then also wrote to the Ferguson family solicitor on 30\textsuperscript{th} June 2005 to confirm “it is our client’s intention and duty to assist the Inquiry in every way possible and to participate fully in its investigations.”\textsuperscript{915} It is therefore a matter of regret that Altnagelvin should, for whatever reason, have failed to honour its pledges.

\textsuperscript{912} 012-070p-405
\textsuperscript{913} 021-010-025
\textsuperscript{914} 021-009-021
\textsuperscript{915} 326-002-001
Inquest

5.321 The inquest into Raychel’s death opened on 5th February 2003 before H.M. Coroner, Mr John Leckey, and heard evidence over the course of 4 days from 16 witnesses including Mrs Ferguson. Whilst there is no formal transcript of the proceedings, a very full note was taken by the Trust’s solicitor. Expert evidence was received from Drs Herron, Sumner and Jenkins.

5.322 Dr Heron’s autopsy findings were unchallenged and Dr Jenkins having listened to the evidence of Dr Sumner “suddenly realised that Dr Sumner and indeed Dr Warde had evidence [*18] to support their conclusions and I was content with that evidence.” Accordingly, he “stated that he concurred with all the views expressed by Dr. Sumner.” This was very proper, not least because the Coroner did not have the benefit of Dr Warde’s evidence.

5.323 Furthermore, Dr Jenkins made reference in his evidence to the “tragic death of two children in Northern Ireland” from hyponatraemia. This, which was an intended reference to Lucy Crawford’s death, was misunderstood as a reference to Adam Strain, and Lucy’s death remained unknown to the Coroner. This was unfortunate given that it was known to Altnagelvin’s legal advisors.

5.324 No evidence was given by the doctors who had actually seen Raychel on Ward 6 on 8th June 2001. Evidence was, however, received from Drs Gund, Jamison, Johnston and Trainor who neither cared for Raychel on the ward nor attended the Critical Incident Review. Drs McCord, Nesbitt and Fulton together with Mr Gilliland did however give evidence.

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916 328-001-005
917 160-010-001 et seq
918 160-010-015: i.e. the evidence relating to the abnormality of the electrolyte results which was interpreted as indicative that the vomiting must have been severe (Dr Jenkins T-10-09-13 p.116 line 6)
919 Dr Jenkins T-10-09-13 p.117 line 7
920 012-064-323
921 022-004-011
5.325 Mr Foster was concerned that two key members of the surgical team failed to attend. Dr Makar was on leave and Dr Zafar was sitting exams. This was regrettable but consistent with the established detachment of the surgical team from the case. It did not however unduly concern the Coroner or prevent him from reaching a finding.

5.326 Dr Nesbitt who was Altnagelvin’s new Medical Director, was the most senior Trust representative at the inquest. He chose not to tell the Coroner about those deficiencies in treatment identified by him and described in his PowerPoint presentation. Whilst he conceded that there were no blood tests on 8th June he did not indicate that he regarded this as relevant or a failing. Whilst he steadfastly maintained that he “did not withhold anything from the Coroner” it is clear that he could have volunteered more. Whilst it may not have made any difference I am of the view that he could and should have proffered more information to the Coroner about what he knew to be relevant.

5.327 The Coroner was given the perspective of the surgical team by Mr Gilliland who gave evidence that he was “not sure blood test should have been done as vomiting common and [Raychel was] being treated appropriately,” that it was “not commonplace to measure urine output in routine appendectomy”, that he “would not expect a member of surgical team to be told child vomited” and that Dr Curran, who had prescribed the second anti-emetic did not, as a junior, need to “pass decision to a senior.” Given what Mr Gilliland must have known about Dr Fulton’s action plan to address the clinical failings identified at Critical Incident Review, I consider his evidence to have been generally unhelpful and in some respects to have been misleading.
Both Dr Nesbitt and Mr Gilliland were subject to the GMC obligation to "assist the Coroner by... offering all relevant information to an inquest or inquiry into a patient’s death." I do not believe that they honoured that obligation.

Sister Millar and Staff Nurses McAuley and Noble gave the nursing evidence. Sister Millar said the "nurses [were] experienced, childrens’ trained" that Raychel’s case was not unusual, that she “was happy she would be fine” and she had “seen many children vomit post-appendectomy... have seen patients vomit more.” They agreed that Raychel’s vomiting had not been a cause for concern.

Sister Millar told the Coroner that the record of vomits was not unusual. She failed to mention that the fluid balance documentation was poor or that the Ferguson family had been concerned about its severity. Nor was the Coroner told that an internal Critical Incident Review had agreed that the vomiting was prolonged.

The Coroner was further led to believe by Sister Millar that junior surgical doctors were readily available for their surgical patients on Ward 6, notwithstanding that she had made their non-availability an issue at the Critical Incident Review. Sister Millar accepted that she ought to “have expanded” on these matters for the Coroner. I consider that her failure ‘to expand’ was disingenuous and a breach of her professional duty of truthfulness.

Staff Nurse McAuley also gave evidence that Raychel’s vomiting was not unusual and had given her no cause for concern. Staff Nurse Noble told
the Coroner that she had nursed patients who had vomited more and that it was “not unusual to have patients who vomited post-operatively.”

5.333 It is hard to conceive that these witnesses could have agreed one thing at Critical Incident Review and then said another at inquest had the Critical Incident Review been recorded and a report prepared.

5.334 Nonetheless, and having heard this evidence the Coroner seemed to have little difficulty in reaching the verdict that Raychel’s “hyponatraemia was caused by combination of inadequate electrolyte replacement in the face of severe post-operative vomiting and water retention resulting from the inappropriate secretion of ADH (anti-diuretic hormone).” He thus firmly rejected the Altnagelvin contention that the vomiting was “neither severe nor prolonged” and confirmed that the electrolyte replacement therapy was inadequate in the circumstances. It was a damning verdict on the care and treatment given Raychel at Altnagelvin.

**RBHSC engagement with inquest**

5.335 The RBHSC was also represented at the inquest and Dr Crean was its only witness. In preparation for the hearing Mr Brangam, its solicitor, wrote to Mr Walby of the RGHT Litigation Management Office that “At first blush I cannot see how the Trust can be implicated in the tragic circumstances surrounding the treatment given to the child and the subsequent demise at RBHSC. Dr. Crean has indicated to me that the facts surrounding an earlier matter (Adam Strain deceased) were not on all fours with the present case, but, I believe, it would be prudent for you to speak directly with Dr. Ian Carson in relation to this matter, particularly, given it would appear that the Department has some knowledge of the circumstances surrounding this particular incident.” Dr Carson was by then Deputy Chief Medical Officer.
5.336 The RGHT interest in distinguishing Raychel’s case from Adam’s might suggest that it considered itself vulnerable to the criticism that the cases were so similar that the lessons from Adam’s case ought to have been applied to Raychel’s. This mirrored Dr Nesbitt’s concern that Altnagelvin should avoid criticism for having failed to learn from Adam’s case.

5.337 Mr Walby advised the solicitor that he had “spoken to Dr. Crean and he will stick to his brief at the Inquest...” Dr Crean’s evidence at the inquest dealt only with the facts of Raychel’s case. He did not volunteer any criticism of Raychel’s care nor make any connection with Lucy’s case. He said it did not occur to him.

5.338 After the inquest Mr Brangam advised Mr Walby that “I cross examined Dr. Sumner in relation to the Adam Strain case and I asked him to distinguish and differentiate between the two cases.” In the event the RBHSC was not criticised by the Coroner and Mr Walby thanked Mr Brangam “very much for minding our back at this inquest.”

Altnagelvin’s public response to inquest

5.339 Before the inquest, Altnagelvin had declined to provide any meaningful comment to the press on the basis that it was inappropriate at that time. Mrs Burnside told her Board that “the Trust’s only comment to any media inquiry will be to again offer our sympathy and regret to the family.” However and inconsistently, Mrs Burnside also described how “we did try to brief the media off the record, trying to give them information that would be helpful. None of that information was ever used in the media. And one does not want to be standing up saying ‘this is our position’ when what you’re dealing with is a tragedy and absolute grief.” This has parallels with the quiet briefing given to Dr Jenkins of Altnagelvin’s press release and gives

950 064-019-054
951 Dr Crean T-11-09-13 p.99 line 5
952 064-016-050
953 064-014-046
954 023-002-002
955 321-058-011
956 Mrs Burnside T-17-09-13 p.200 line 24

207
rise to the uncomfortable sense that Altnagelvin was attempting a ‘damage limitation’ exercise.

5.340 After the inquest, Altnagelvin nonetheless issued the press statement as previously drafted proclaiming it “important to emphasise that the clinical practices used during Raychel’s care, following her operation, were at that time accepted practice in all other Area Hospitals in Northern Ireland.”\textsuperscript{957} This failed to reflect the evidence. It ignored the Coroner’s finding of inadequate electrolyte replacement and contradicted Altnagelvin’s own review findings.

5.341 The press release was drafted by the Altnagelvin Communications Manager, Ms Marie Dunne\textsuperscript{958} who “worked directly to the Chief Executive”.\textsuperscript{959} The Chief Executive herself approved the press release.\textsuperscript{960} It is a matter of the gravest concern that a formal public communication issued in the name of a HSC Trust should mislead.

5.342 The Chief Executive had been very aware that Raychel’s inquest might “attract substantial media attention”\textsuperscript{961} and her Communications Department circulated advice within the hospital entitled ‘Potential Media Questions (and some suggested answers) arising from the Raychel Ferguson inquest and our Statement.’ It included the following:

“How can the public be sure that there are no other ‘procedures and practices’ in Altnagelvin that might lead to this kind of tragedy happening again?

Suggested answer - The public should be reassured that Altnagelvin practices in accordance with the highest professional standards as required by the various Royal Colleges in the United Kingdom. We constantly audit
our work against these standards and ensure we keep up to date with the new developments and new treatment options.”

5.343 Fortunately, the public was not given this particular ‘reassurance’ because the evidence received revealed a very different reality within Altnagelvin. The relevant Royal College of Surgeons NCEPOD guidance was either unknown or ignored and far from auditing compliance with NCEPOD recommendation, the evidence suggested that it was unlikely that the Clinical Audit Committee at Altnagelvin was aware of the NCEPOD report. I received evidence that Altnagelvin had no “clear systems for ensuring compliance with relevant UK professional guidance,” no central library where Royal College guidelines were stored or assessed, and “no written protocols, guidelines, guidance or practice documents in relation to clinical audit.” Like many of Altnagelvin’s claims to clinical governance activity, this was unfounded. This cannot have been unknown to Mrs Burnside.

5.344 Accordingly, the Communications Department, and by extension the Chief Executive, is open to the criticism of encouraging Trust employees to make public statements which mislead. The Chief Executive was, at all times, bound by the code of public service values requiring that “public statements and reports issued by the Board should be clear, comprehensive and balanced, and should fully represent the facts.” Whilst public confidence in the Health Service is important, it must never be pursued without strict regard for the truth.

962 023-018-030
963 Miss Duddy T-29-08-13 p.107 line 11
964 Mrs Brown T-02-09-13 p.92 line 17
965 226-002-015
966 316-006e-002
967 321-004f-004
968 Mrs Brown T-02-09-13 p.95 line 15
969 Miss Duddy T-29-08-13 p.114 line 24
970 Mrs Burnside T-17-09-13 p.7 line 6
971 306-096-004
Meeting with WHSSC

5.345 After the inquest the WHSSC formally sought a meeting with Altnagelvin in order to “learn of the Altnagelvin perspective of the tragedy and... to be informed of the facts and to help members to restore public confidence, which I am informed has been damaged.” On 19th February 2003 Mr Stanley Millar, Chief Officer of the WHSSC and other members of the Council met with Mrs Burnside, Miss Duddy and Dr Nesbitt. It was noted that “The Trust provided a copy of a press statement” to the WHSSC. This was in fact the same misleading statement as released the previous week. Mrs Burnside was unable to give any satisfactory explanation for this. That it should be offered by the Chief Executive to the WHSSC gives rise to the profoundest disquiet.

5.346 Mrs Burnside maintained that the information given the WHSSC was “full and frank” and whilst Dr Nesbitt did provide his PowerPoint presentation explaining some of the shortcomings in Raychel’s case, Mrs Burnside nonetheless “explained the outcome of the Coroner's inquest which did not apportion blame to the Trust.” This was sadly yet another misrepresentation.

5.347 I find in the approach of Altnagelvin, whether it be to Mr and Mrs Ferguson, the Coroner, the WHSSC or this Inquiry, a defensiveness and willingness to mislead. It came from the top as this meeting demonstrated. Mrs Burnside, the Chief Executive, was responsible and implicated. She is to be criticised.

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972 014-012-022
973 328-001-005
974 014-016-028
975 014-016-028
976 023-003-003
977 Mrs Burnside T-17-09-13 p.217 line 21
978 Mrs Burnside T-17-09-13 p.219 line 13
979 021-054-117
980 014-016-028
Lucy Crawford

5.348 Mr Millar, having reflected upon what he had been told, wrote to the Coroner on 27th February 2003 about the death of Lucy Crawford: “following the Raychel Ferguson Inquest I, with other members of the WHSSC, received a briefing on the events which led up to Raychel’s death. I was struck by the similarities in the two tragedies... I am left with two questions which you may be able to answer. (1) Are there direct parallels in the events leading up to the death of both girls? (2) Would an Inquest... in 2000/2001 have led to... recommendations from the...? It is troubling that it should have been a lay person rather than a doctor who brought Lucy’s death to the attention of the Coroner.

5.349 The Coroner forwarded Mr Millar’s letter to the CMO and sought Dr Sumner’s opinion about Lucy’s case. The contribution made by the late Mr Millar was important and is to be praised.

Chief Medical Officer

5.350 In the aftermath of Raychel’s inquest Dr Campbell, the CMO gave media interviews, including one to UTV on 25th March 2004. In it she expressed regret for the tragedy of Lucy and Raychel’s deaths and said that “the rarity of these two events was the abnormal reaction which is seen in a very few children in the normal application [of fluids].” This was inconsistent with the Coroner’s finding.

5.351 Mr and Mrs Ferguson, already convinced that their daughter’s death would have been avoided but for a ‘cover up’ in Lucy’s case, then lodged a formal complaint about the CMO with the GMC on 6th November 2004. Amongst their grievances, they asserted that the CMO knew, or ought to

981 Words omitted to convey clearly intended meaning
982 013-056-320
983 006-010-294
984 006-037-375
985 006-037-377
986 068-013-022
987 068-013-022

211
have known, that the deaths of Lucy and Raychel were caused by the administration of the wrong type and volume of fluid and not by an "abnormal reaction" and that she had therefore misrepresented the facts to the media.

5.352 The CMO countered that she had been “completely clear in both interviews that both deaths were preventable and hence clearly accepted by implication that they were caused by clinical mistakes” and “there was no intention on her part to mislead or misrepresent the facts.”

5.353 The GMC having heard the matter found that the CMO’s reference to an “abnormal reaction” was “misleading” in that it “appeared to contradict” the Coroner’s finding, that the interviews were “open to misinterpretation” and that she had handled them “inappropriately”. However, the panel found no evidence that the CMO had engaged in ‘cover-up’ or that her actions warranted a formal warning. She was invited to reflect upon the finding and the concerns of Mr and Mrs Ferguson. The complaint was closed.

Litigation

5.354 Altnagelvin had a Clinical Negligence Scrutiny Committee in 2001 and a policy deeming it “extremely important that claims for negligence are managed appropriately to increase public confidence and respect.” Clear guidance on claims management was then available to it, not least from the 1996 ‘HPSS Complaints Procedure’ which advised that “where the Trust/Board accepts that there has been negligence a speedy settlement should be sought” and the HPSS Protocol on Claims Handling which “recommended that in each and every case where it is realised that defence

988 006-037-377
989 104-026-519
990 104-026-522
991 104-022-446
992 104-022-447
993 WS-323-1 p.14
994 321-004fd-004
995 314-016-017
996 317-037-001
will be difficult to sustain, consideration be given to admitting liability and attempting to reach settlement.”

5.355 From the outset, Altnagelvin thought it likely that the Fergusons would litigate. On 1st May 2003, Mr and Mrs Ferguson’s solicitors asserted by letter of claim “our client’s instructions that the death of their daughter was occasioned by the negligence, breach of duty and/or breach of statutory duty... in or about the provision of medical treatment.”

5.356 Given the findings at critical incident review, the consensus of expert opinion, the Coroner’s damning verdict and Mrs Burnside’s view that Altnagelvin “would be moving to settle this litigation at the soonest opportunity”, I cannot understand why liability was not then accepted and settlement pursued.

5.357 However, Altnagelvin responded with a comprehensive denial of liability. It’s solicitor wrote to Mr and Mrs Ferguson’s solicitor to state in the clearest terms that Altnagelvin did “not accept that it, or its staff, were negligent or that, if there was any failure to apply appropriate standards, that the failure caused or contributed to the death of Raychel Ferguson and therefore liability is denied.” This denial prompted the Fergusons to commence legal proceedings on 5th May 2004.

5.358 Mrs Brown, by then promoted to Risk Management Director, again liaised with the Trust’s solicitor about Raychel’s case but did not seek any further information or advices. Nonetheless, complete denial remained Altnagelvin’s response to the Ferguson claim then and for the many years thereafter and even when confronted by the PSNI and the process of this Inquiry.
5.359 It is not therefore surprising that Mr and Mrs Ferguson should have become incensed by Altnagelvin’s refusal to accept responsibility for their daughter’s death.\(^{1005}\) They thought it inexcusable\(^{1006}\) and I agree. The hospital’s response was unnecessary and caused additional anguish.

5.360 The Ferguson family had to listen to almost all the evidence given to this Inquiry before Altnagelvin finally conceded liability on 30\(^{th}\) August 2013. A formal statement was then made that “the Trust,\(^{1007}\) having taken into account the evidence heard during this Inquiry, including independent expert evidence and the interim comments of the Chairman, formally admits liability. The Trust apologises unreservedly for Raychel’s death and regrets any further hurt or distress that the delay in admitting liability has caused the family.”\(^{1008}\) Whilst very welcome, admission did not have to await this Inquiry but could have been made ten years earlier.

5.361 In my view the denial of liability was unjustified, contrary to guidance, contrary to policy and the product of entrenched defensiveness. It ran expressly counter to Altnagelvin’s own publically expressed desire “to encourage a culture of honesty and openness where mistakes and untoward incidents are identified quickly and dealt with in a positive and responsive way.”\(^{1009}\) It is a good example of how failure by a Trust Board to follow the clear guidance given it can erode the confidence and respect necessary for the efficient functioning of the Health Service.

5.362 No explanation was given as to why liability was not accepted earlier. Given the widespread public interest in Raychel’s case, whether at inquest, on TV, through the CMO or this Inquiry - the decision to deny liability must have been sanctioned by Mrs Burnside. As there was no basis upon which to contest the claim I can only conclude that the Trust repudiation of liability was made for tactical reasons. If so, the Trust was cynical in its disregard

\(^{1005}\) Mr and Mrs Ferguson T-26-03-13 p.179 line 13 et seq
\(^{1006}\) Mrs Ferguson T-26-03-13 p.179 line 16
\(^{1007}\) By August 2013 Altnagelvin had been included within the new Western Health & Social Care Trust
\(^{1008}\) Dr Carson T-30-08-13 p.1 et seq
\(^{1009}\) 321-004fd-002
of Mr and Mrs Ferguson and acted in violation of the values of public service. Responsibility would lie with the Chief Executive.

Conclusion

5.363 The introduction of clinical governance was complex, time consuming and expensive.\textsuperscript{1010} Resources were limited and the hospital was stressed. Miss Duddy had multiple roles to fulfil and Dr Fulton was a part-time Medical Director. Notwithstanding that the implementation of clinical governance was at a comparatively early stage, the Altnagelvin Annual Reports\textsuperscript{1011} and the Director of Nursing\textsuperscript{1012} both confidently described a developed and functioning hospital clinical governance system at the time of Raychel’s admission. The evidence convinced otherwise. The lack of functioning controls and the unstructured responses to Raychel’s death do not substantiate the claims.

5.364 Neither the Clinical Governance Committee\textsuperscript{1013} nor the Risk Management and Standards Committee actually came into existence until after Raychel’s death\textsuperscript{1014} and the Clinical Incident Committee met only quarterly.\textsuperscript{1015} It did not minute its transactions,\textsuperscript{1016} and did not review Raychel’s case because it was defined as a critical incident rather than a clinical one.\textsuperscript{1017} Needless to say, there was no Committee for Critical Incidents.\textsuperscript{1018} The claims for clinical governance far exceeded the reality.

5.365 In consequence, clinical governance controls were weak. This was well demonstrated by the repeated failure to remedy deficiencies identified in bench-marking exercises, to implement external guidance or even adhere to internal protocols. Quality assurance had decidedly not been achieved

\begin{footnotesize}
\textsuperscript{1010} Dr Carson T-30-08-13 p.5 line 18
\textsuperscript{1011} 321-004gj-042
\textsuperscript{1012} Miss Duddy T-29-08-13 p.11 line 20 et seq & p.87 line 7 & p.88 line 7
\textsuperscript{1013} 321-004gj-042
\textsuperscript{1014} Mrs Brown T-02-09-13 p.24 line 20 & p.23 line 9 & Dr Fulton T-04-09-13 p.2 line 5
\textsuperscript{1015} Mrs Brown T-02-09-13 p.14 line 3
\textsuperscript{1016} Mrs Brown T-02-09-13 p.14 line 13
\textsuperscript{1017} Mrs Brown T-02-09-13 p.17 line 20
\textsuperscript{1018} Mrs Brown T-02-09-13 p.20 line 9
\end{footnotesize}
at Altnagelvin. That was significant because such controls reveal frailties in a system before they can be revealed by tragedy.

5.366 At the same time, lax leadership and management problems characterised Altnagelvin’s paediatric surgical service from the ward up. Miss Duddy visited Ward 6 only sporadically\textsuperscript{1019} and although she met with her Clinical Services Manager and Clinical Effectiveness Co-ordinator\textsuperscript{1020} and believed that nursing issues would get to her and that she could assure the Trust Board as to nursing standards,\textsuperscript{1021} that was clearly not the case.

5.367 Nursing problems were not being addressed. Miss Duddy conceded that she was not even aware that her nurses had difficulties accessing surgical doctors “\textit{until after the Critical Incident Review by which time the Medical Director was already dealing with the issue}.”\textsuperscript{1022} Her nurses had no opportunity for “\textit{formal meeting between nursing staff, paediatric medical staff and surgical consultant staff}”\textsuperscript{1023} in order to address issues of joint concern.\textsuperscript{1024} The established management lines led them to the Clinical Services Manager and the Director of Nursing by-passing Dr Martin,\textsuperscript{1025} the Clinical Director, the consultant paediatricians and most particularly the Clinical Director of Surgery. A line management disconnect existed which did not facilitate escalation of such matters directly to Dr Fulton and he remained unaware of the situation.\textsuperscript{1026} This was a genuine systemic problem because “\textit{the medical director must be confident that effective systems and effective clinical leadership are in place for each and every clinical service within the Trust}.”\textsuperscript{1027}

5.368 Lack of consultant engagement and control was well illustrated by the multidisciplinary mismanagement of Raychel’s fluid therapy. The obvious necessity was that all should understand their role and responsibility in each

\textsuperscript{1019} Miss Duddy T-29-08-13 p.20 line 6 & Sister Millar T-28-08-13 p.114 line 11
\textsuperscript{1020} Miss Duddy T-29-08-13 p.17 line 18
\textsuperscript{1021} Miss Duddy T-29-08-13 p.17 line 23
\textsuperscript{1022} Miss Duddy T-29-08-13 p.26 line 17
\textsuperscript{1023} Mr Gilliland T-28-08-13 p.11 line 3
\textsuperscript{1024} Mr Gilliland T-28-08-13 p.7 line 8
\textsuperscript{1025} Mrs Burnside T-17-09-13 p.22 line 10
\textsuperscript{1026} Dr Fulton T-04-09-13 p.16 line 14
\textsuperscript{1027} 317-034-014 per Lugon
aspect of such patient care. That was a matter for the leadership of the
responsible consultant\textsuperscript{1028} as well as the consultants more generally. That
was not given. That medical and surgical patients on Ward 6 should be
subject to different blood test regimes points to a further obvious failure by
the consultants to engage and give direction.

5.369 Weak leadership of the surgical team was revealed, not least by the
complete absence of consultant or registrar from Raychel’s care from
admission to collapse, in circumstances where Mr Gilliland was largely
unaware of the competence of his junior doctors and had no means of
assessing the capability of the nurses upon whom his patients and doctors
were so dependent.\textsuperscript{1029}

5.370 These and other shortcomings in clinical governance, leadership and
consultant engagement permitted significant clinical vulnerabilities to
develop. Cumulatively this allowed clinical error and increased the risk of
catastrophic outcome. It is for these reasons that I do not believe that any
single individual can be blamed for the tragedy of Raychel’s death but rather
that the responsibility for what happened is collective.

\textbf{Concluding remarks}

5.371 After Raychel’s inquest the Coroner wrote to Dr Campbell on 11\textsuperscript{th} February
2003\textsuperscript{1030} to pass on Dr Sumner’s praise for the Department’s ‘Guidance on
the prevention of Hyponatraemia in Children’ and his view that in this
respect “Northern Ireland was ahead of the rest of the UK.” He expressed
his hope that the guidance might be drawn to the attention of the CMOs for
England and Wales, Scotland and the Republic of Ireland.

5.372 I have no doubt that the Department’s guidelines may have saved lives and
owe their existence, in no small measure, to the professional and
responsive actions of Drs Fulton and Nesbitt.\textsuperscript{1031} As Professor Swainson
recognised, theirs “was a significant and highly commendable set of actions

\begin{footnotes}
\footnote{1028}{314-014-015}
\footnote{1029}{Mr Gilliland T-28-08-13 p.20 line 14}
\footnote{1030}{006-002-156}
\footnote{1031}{Professor Swainson T-19-09-13 p.142 line 7}
\end{footnotes}
which have improved considerably the quality of care across the province and reduced the risk of hyponatraemia.”1032 The very fact that praise is so obviously due in this regard draws attention to the overall inconsistency of the governance response to Raychel’s death at Altnagelvin.

5.373 The timely Critical Incident Review and action plan together with the alert given the wider medical community as to the risks arising with Solution No.18 stand as good examples of clinical governance in action. However, there persisted an obdurate reluctance amongst clinicians to openly acknowledge specific failings in Raychel’s care, whether to her family, the Coroner or the public. That was wholly reprehensible. The inclination of clinicians to avoid criticism in this way conflicts with patient interest and must not be tolerated in the Health Service.

5.374 The proper approach should of course, and at all times have been, that which was suggested to Altnagelvin at the outset of its engagement with clinical governance, namely that “the actions of the organisation must be transparent and if negligence is identified during the investigation, this should not be hidden as it will serve no purpose and undoubtedly these facts will come to light during the legal process.”1033

1032 226-002-006
1033 317-034-004
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Introduction

6.1 Conor Mitchell was born on 12th October 1987. When he was 6 months old he was diagnosed with cerebral palsy, which limited his physical development. He also had a history of mild epilepsy. He was described as extremely intelligent with a great enthusiasm for sports and games and a determination for independence. In spite of his disability “Conor was extremely healthy…”

6.2 On 27th April 2003 Conor became unwell and complained of a sore throat. He vomited, was lethargic and suffered periodic discomfort. He failed to recover and over the course of the next 10 days was managed at home with antibiotics prescribed by his GP.

6.3 On 8th May 2003, Conor was seen by the family GP, Dr Doyle, who referred him to the Royal Belfast Hospital for Sick Children (‘RBHSC’). However Conor’s mother wanted him to be seen as soon as possible and took him to the Accident & Emergency Department (‘A&E’) of the Craigavon Area Hospital (‘Craigavon’).

6.4 On arrival Conor was examined by Senior House Officer (‘SHO’) Dr Suzie Budd, who took blood samples and, noting that he was pale, unresponsive and showing signs of dehydration gave him a bolus of IV fluids. Dr Budd then tried to refer Conor to the paediatric team but was advised that, because he was 15 years old, he was too old to be admitted to a paediatric ward.
6.5 Notwithstanding that he had the physiology of an 8 year old, Conor was admitted for observation into the Medical Admissions Unit (‘MAU’) which was an adult ward. He was given further IV fluids.

6.6 During the course of the afternoon and early evening, Conor’s condition seemingly deteriorated and at 20:30 he suffered two seizures in quick succession and stopped breathing. Conor was intubated and ventilated and admitted to the Intensive Care Unit (‘ICU’). A Computerised Tomography (‘CT’) scan was performed.

6.7 At approximately 12:00 the following day, 9th May, Dr Charles McAllister, Consultant in charge of ICU, requested that Conor be transferred to the Paediatric Intensive Care Unit (‘PICU’) at the RBHSC. The transfer was accepted by Dr Anthony Chisakuta, the RBHSC Consultant Paediatric Anaesthetist who had also treated Lucy after her transfer from the Erne Hospital in April 2000.

6.8 Upon admission to PICU, Conor was examined by Dr James McKaigue, Consultant Paediatric Anaesthetist. He was alert to the involvement of hyponatraemia in the deaths of Adam Strain and Claire Roberts and had had involvement with Lucy in April 2000. Thereafter, and on 12th May 2003, Conor was also examined by Dr Robert Taylor who by that time may be credited with significant expertise in hyponatraemia.

6.9 In light of the CT scan and findings on examination, brain stem death tests were conducted on 12th May 2003. There was no hope and the decision was taken to discontinue treatment. Conor was pronounced dead at 15:45.

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12 Dr Budd WS-352-1 p.6
13 087-014-079
14 087-015-082
15 087-024-114
16 087-024-115
17 327-003-004
18 087-043-181
19 327-003-006
20 327-003-006 & 092-017-039
21 092-017-057
22 092-017-058
6.10 Formal notification of the death was made to the Coroner and after due investigation, the cause of Conor’s death was found at inquest in June 2004 to have been:

“I (a) Brain stem failure.

(b) Cerebral oedema.

(c) Hypoxia, ischemia, seizures and infarction.

II Cerebral palsy.”

Conor’s Terms of Reference

6.11 Whilst hyponatraemia due to fluid mismanagement was not implicated in Conor’s death, I added Conor’s case to the remit of this Inquiry because of concern that his fluid therapy had not been managed in accordance with the Department of Health, Social Services & Patient Safety, Northern Ireland (‘the Department’) ‘Guidance on the Prevention of Hyponatraemia in Children’ (the ‘Guidelines’) issued only 14 months before.

6.12 The Minister authorised the inclusion of Conor’s death within this Inquiry. I explained in February 2010, that

“It is obviously a matter of concern if guidelines which have been introduced as a result of a previous death or deaths and which are aimed at avoiding similar events in the future, are not properly communicated to hospital staff and followed.

It is relevant to the investigation to be conducted by the Inquiry, whether and to what extent the guidelines were disseminated and followed in the period after 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 would appear that the guidelines were not followed.
Accordingly, the Inquiry will investigate the way in which the guidelines were circulated by the Department, the way in which they were made known to hospital staff and the steps, if any, which were 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 were introduced and followed in Craigavon Area Hospital in May 2003.”

6.13 Accordingly, in this chapter of the report, I examine Conor’s case with predominant focus on the extent to which the clinicians who cared for Conor at Craigavon complied with the published Guidelines. Other matters are dealt with for purposes of context only. I do so with reference to paragraph 4.2 of the List of Issues (excluding reference to the RBHSC), namely:

“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 fluid management issues raised by his condition.

(2) To what extent fluid management and record keeping was covered in the teaching/training 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 was relevant to whether the Guidelines were adhered to.”

6.14 I examine Conor’s fluid management at Craigavon from admission to respiratory arrest taking into account the procedures and advices set out in the Guidelines and consider whether Craigavon took appropriate steps to disseminate and implement the Guidelines into clinical practice. Unlike the other cases covered by this report, I do not make any findings as to the clinical aspects of care, save for fluid management and make no findings
as to the cause of death. While I am conscious that some other issues are very important to Conor’s family (for example the issues of seizures and communication), I do not make any findings in respect of these matters.

6.15 It is be acknowledged at the outset that the Southern Health and Social Care Trust (‘the Trust’)$^{27}$ and some Craigavon doctors and managers, made relevant concessions at public hearings in October 2013 which proved of considerable assistance to the Inquiry. I commend the Trust and the clinicians for taking such a sensible and constructive approach before this Inquiry.

**Expert reports**

6.16 The Inquiry was guided by the expert reports received from Dr Robert Scott-Jupp,$^{28}$ Consultant Paediatrician at Salisbury District Hospital and dated 19$^{th}$ September 2013$^{29}$ and 11$^{th}$ October 2013.$^{30}$

6.17 The Inquiry also had the benefit of the report of Dr Edward Sumner (Consultant Paediatric Anaesthetist at Great Ormond Street Childrens’ Hospital) who reported to the Coroner in November 2003.$^{31}$

**Schedules compiled by the Inquiry**

6.18 In an attempt to summarise the significant quantities of information received, the following schedules and charts were compiled:

(i) List of Persons involved in Conor’s case.$^{32}$

(ii) Chronology of Events (Clinical).$^{33}$

(iii) Schedule of Guideline Requirements and Conor’s Treatment.$^{34}$

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$^{27}$ As successor to the former Craigavon Area Hospital Group Trust.

$^{28}$ 327-003-008

$^{29}$ 260-002-001

$^{30}$ 260-004-001

$^{31}$ 087-056-213

$^{32}$ 327-003-001

$^{33}$ 327-002-001

$^{34}$ 327-008-001
Guidelines on the Prevention of Hyponatraemia

6.19 I have commended Altnagelvin hospital for bringing the death of Raychel Ferguson and the risks connected with the use of Solution No.18 to the attention of interested parties across Northern Ireland. Their response led to the creation of the CMO's Working Group on Hyponatraemia and the production of the Guidelines. It may be useful to recall how this came about as context for Conor's case.

6.20 In June 2001 Dr Raymond Fulton, Medical Director at Altnagelvin, disclosed the circumstances of Raychel Ferguson’s death to a meeting of Medical Directors and suggested that there should be guidance to regulate fluid management in paediatric cases. He indicated that he considered Solution No.18 to be hazardous for use with post-operative children. He also notified Dr Henrietta Campbell, the Chief Medical Officer ('CMO') and reiterated his belief that regional guidelines were required.

6.21 The CMO sought background information and received Dr Taylor's paper 'Hyponatraemia in Children' on 30th July 2001. She then directed her Deputy, Dr Paul Darragh to assemble a Working Group to examine the issue of hyponatraemia in children and to make recommendations in relation to paediatric fluid management. Dr Darragh asked Dr Miriam McCarthy, Senior Medical Officer, to convene the 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.”

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35 012-039-179
36 095-011-055
37 337-001-002
38 012-039-180
39 043-101-223
40 337-001-002
41 075-082-329
42 337-001-002
43 WS-080-1 p.2
44 007-050-099
6.22 A number of highly experienced clinicians were then invited to attend an initial meeting on 26th September 2001 to be chaired by Dr Darragh.\textsuperscript{45} It is to be noted that Dr Darrell Lowry,\textsuperscript{46} Consultant Anaesthetist at Craigavon, was present.\textsuperscript{47} It was agreed at that meeting that regional guidance was indeed required for paediatric fluid management and Drs Crean, Jenkins, McAloon and Loughrey undertook to draft the Guidelines.

6.23 Following further meetings involving the Department, Directors of Public Health, the Paediatric Anaesthetic Group, the Specialty Advisory Committees and the Clinical Resource Efficiency Support Team, the CMO published the Guidelines on 26th March 2002. They were drawn to the attention of a very wide range of practising clinicians and healthcare professionals in Northern Ireland, including medical and nursing directors and consultants\textsuperscript{48} on the basis that “Hyponatraemia can be extremely serious and has in the past few years been responsible for two deaths among children in Northern Ireland.”\textsuperscript{49}

6.24 The CMO issued the Guidelines with the specific instruction that they be “prominently displayed in all units that accommodate children”\textsuperscript{50} and that they should complement local protocols. Importantly, it was stressed that steps be taken to “audit compliance with the guidance and locally developed protocols…”\textsuperscript{51}

6.25 Published in the form of an A2 sized poster,\textsuperscript{52} the Guidelines provided advice in relation to baseline assessment, fluid requirements, fluid therapy, monitoring and advice. In terms they required that:

(i) Weight and serum sodium levels be measured and recorded before commencement of IV fluids.

\textsuperscript{45} 007-048-094
\textsuperscript{46} 327-003-004
\textsuperscript{47} WS-350-1 p.4
\textsuperscript{48} 007-001-001
\textsuperscript{49} 007-001-001
\textsuperscript{50} 007-001-002
\textsuperscript{51} 007-001-001
\textsuperscript{52} 007-003-004
(ii) Fluid needs be assessed by a doctor competent in determining the fluid requirements of a child patient.

(iii) Replacement fluids be considered and prescribed separately to reflect fluid loss, both in terms of volume and composition.

(iv) Maintenance fluids be dictated by sodium, potassium and glucose requirements.

(v) The clinical state of the patient be monitored and fluid balance assessed at least once every 12 hours and that biochemistry sampling be carried out at least once every day.

(vi) Advice and clinical input be obtained from a senior member of medical staff.53

6.26 It was unusual for the CMO to issue guidelines on clinical issues. Accordingly, it should have been very clear to healthcare trusts that particular attention should be paid to implementation.

6.27 Furthermore, and given that the CMO directed that the Guidelines be "prominently displayed in all units that may accommodate children",54 it was clear that each and every hospital should display the Guidelines in all areas, including A&E and adult wards, where children might receive treatment. It should have been obvious that it would not suffice to display the Guidelines in children’s wards alone and very evident that the Guidelines should be introduced to all clinical staff who might become engaged in the fluid management of children.

6.28 It is in this context that I examine how Craigavon responded to the publication of the Guidelines, what it did to implement them and how that was to influence the fluid therapy received by Conor.

53 007-003-004
54 007-001-001
Conor’s Treatment at Craigavon

A&E

6.29 Upon admission to A&E Conor underwent routine blood tests and was prescribed intravenous fluids.\(^{55}\) The fluids were documented on a fluid intake/output chart.\(^{56}\)

6.30 It was subsequently observed that he appeared to be having seizures.\(^{57}\)

6.31 Dr Scott-Jupp considered Conor’s A&E fluid management with reference to the Guidelines. He considered that the requirements of the Guidelines had been complied with in respect of baseline assessment but expressed the following concerns about Conor’s management in the A&E Department:

(i) That it was unclear whether it was Conor’s actual weight or an estimate that had been recorded.\(^{58}\)

(ii) That an arterial gas sample taken at 10:59 had been relied upon as an accurate indicator of Conor’s sodium levels for the purposes of his fluid management, when such tests were known to be potentially unreliable.\(^{59}\)

(iii) That the fluids administered to Conor in A&E were given “as a replacement not a resuscitation fluid”\(^{60}\) indicating confusion between resuscitation and replacement fluids.\(^{61}\)

(iv) That normal saline ought to have been administered in compliance with the Guidelines when Conor was thought to be in shock\(^{62}\) (notwithstanding that he considered Hartmann’s an acceptable fluid to use in the circumstances).\(^{63}\)

55 088-002-020
56 088-004-063
57 087-027-127
58 260-002-012
59 260-002-012
60 260-002-013
61 260-002-015
62 260-002-016
63 260-002-016
(v) That Conor’s “clinical state, particularly his degree of dehydration, was not well monitored” and that “no attempt was made to quantify his urine output prior to his arrival at hospital.”

(vi) That the monitoring of Conor’s clinical state did not adhere to the Guidelines in consequence of which there was “failure to make a more accurate assessment of his state of hydration [which] could have led to either excessive or inadequate fluid replacement, or to replacement with fluid that contained an inappropriate electrolyte content.”

(vii) That Conor did not have his fluid requirements assessed by a Paediatrician and that none of the doctors attending Conor in A&E were “likely to have had the necessary skills, particularly in assessing a disabled child.”

(viii) 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.”

6.32 Notwithstanding that the Trust rejected some of this criticism I share Dr Scott-Jupp’s concerns in respect of the management of Conor’s fluids within A&E.

Admission to MAU

6.33 Dr Budd had tried to refer Conor to the Paediatric team because she “...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...” However, and notwithstanding

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64 260-002-017
65 260-002-018
66 260-002-013
67 260-004-006
68 260-003-005
69 087-029-013
70 WS-352-1 p.6
referral of this issue to the Paediatric Consultant, the Paediatric Admissions SHO declined to admit Conor because he was over 13 years of age.71

6.34 Conor was therefore transferred to MAU and prescribed antibiotic medication and further fluids.72 It is to be noted that Dr Catherine Quinn,73 the Medical SHO, recognised that “... 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...”74

6.35 At that stage Conor’s mother Ms Mitchell expressed concern about Conor’s condition and made a request that he be transferred to the RBHSC.75 In response Dr Marian Williams,76 SHO, attended upon Conor at or about 20:30. She witnessed an episode of stiffening following by a prolonged seizure during which Conor stopped breathing.77 An urgent CT scan was undertaken which was thought suggestive of subarachnoid haemorrhage. However, Dr Cooke, the Consultant Neurologist in the Royal Victoria Hospital (‘RVH’) who also saw the scan, did not consider surgical intervention to be indicated.78

6.36 In the circumstances it is unsurprising that Conor’s mother should have expressed her unhappiness with the care given.79 Dr Scott-Jupp examined the management of Conor’s fluids in MAU with reference to the Guidelines and notwithstanding that the baseline assessment was properly conducted, he made the following criticisms in relation to the care given in MAU:

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71 WS-352-1 p.6
72 WS-356-1 p.4
73 327-003-005
74 WS-356-1 p.5-6
75 087-002-020
76 327-003-006
77 087-035-164
78 086-004-055
79 087-001-008
(i) It was clear that "the formula given in the Guideline was not used to calculate his maintenance fluids."\textsuperscript{80}

(ii) An adult medical SHO and Registrar were unlikely to have had the necessary skills to assess the fluid requirements of a disabled child.\textsuperscript{81}

(iii) There was a failure to distinguish between maintenance and replacement fluids.\textsuperscript{82}

(iv) There was no estimate of fluid output and no calculation of estimated replacement requirement.\textsuperscript{83} In particular "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."\textsuperscript{84}

(v) There is uncertainty as to the volume of fluid actually received by Conor between 11:20 and 19:40.\textsuperscript{85}

(vi) There was a failure to record the physical signs of dehydration.\textsuperscript{86}

(vii) There was a failure to take urine samples for the purpose of osmolarity or biochemistry analysis so as to assess whether fluid replacement was required.\textsuperscript{87}

(viii) The use of the antibiotic Ciproxin was inappropriate in the paediatric setting and contributed to Conor’s fluid load.\textsuperscript{88}

(ix) The rationale for this prescription was undocumented.
(x) There was failure to ensure that Conor was reviewed by a more senior member of staff, most particularly in order to determine whether Conor was experiencing seizure activity.\textsuperscript{89}

6.37 I share Dr Scott-Jupp’s concern about Conor’s fluid management in MAU. However it is important to note that Dr Scott-Jupp did not “consider that inappropriate fluid management was a contribution to [Conor’s] death.”\textsuperscript{90}

\textbf{Admission to the Intensive Care Unit and PICU}

6.38 Conor was transferred to Craigavon ICU at 22:00. Dr McAllister\textsuperscript{91} assessed Conor’s score on the Glasgow Coma Scale (‘GCS’) as 3/15, made a detailed examination and found almost no neurological response to stimulation.\textsuperscript{92} Conor’s basic brain stem responses were tested and Dr Richard Brady,\textsuperscript{93} SHO, recorded that “\textit{all appearances are that this unfortunate young fellow is brain stem dead}.”\textsuperscript{94}

6.39 After additional neurological examination, consultation with Dr Anthony Chisakuta\textsuperscript{95} at RBHSC and discussion with Conor’s family, the decision was made to request Conor’s transfer to PICU at the RBHSC\textsuperscript{96} “\textit{in view of weight and complex problems}.”\textsuperscript{97}

6.40 When Conor was admitted to PICU at 19:00 on 9\textsuperscript{th} May 2003 it was noted that his neurological condition remained unchanged. It was then that the Paediatric Anaesthetists took the view that Conor “\textit{cannot survive this episode}.”\textsuperscript{98} At 15:15 the decision was made to discontinue treatment and Conor was pronounced dead at 15:45 on 12\textsuperscript{th} May 2003.\textsuperscript{99}
Post-mortem and inquest

6.41 Dr Janice Bothwell,\textsuperscript{100} RBHSC Consultant Paediatrician, reported Conor’s death to the Coroner’s Office with a clinical assessment of “Brainstem dysfunction with cerebral oedema. Cause of cerebral Oedema related to (1) Viral illness (2) Over-rehydration/inapprop fluid management; (3) status epilepticus \(\rightarrow\) causing hypoxia.”\textsuperscript{101}

6.42 The Coroner directed a post-mortem examination which was conducted by Dr Brian Herron\textsuperscript{102} (who had likewise performed the post-mortems on Claire Roberts and Raychel Ferguson) and once again sought the opinion of Dr Edward Sumner.\textsuperscript{103} Dr Herron presented his autopsy report on 3\textsuperscript{rd} March 2004 and concluded that death had been caused by cerebral oedema.\textsuperscript{104} However, he expressed uncertainty as to the underlying cause of the cerebral oedema. He nonetheless suggested that the seizures may have been an important factor in the death.\textsuperscript{105}

6.43 The Coroner, Mr John Leckey, conducted an inquest on 9\textsuperscript{th} June 2004 and found the cause of Conor’s death to be:

“I (a) Brain stem failure.

(b) Cerebral oedema.

(c) Hypoxia, ischemia, seizures and infarction.

II Cerebral palsy.”\textsuperscript{106}

6.44 It is relevant to note that Mr Leckey concluded that “the fluid management at Craigavon Area Hospital was acceptable.”\textsuperscript{107} In this he was informed by Dr Sumner’s evidence that the fluid management in Conor’s case had indeed been “acceptable.”\textsuperscript{108} However, and notwithstanding his evidence,
Dr Sumner took the unusual post-inquest step of writing to the Coroner, the CMO and Dr John Jenkins\(^{109}\) to express misgivings about Craigavon’s approach to fluid management:

“Having got home from Conor Mitchell’s inquest, I feel I must communicate my great unease. This is the fourth inquest I have attended in Belfast where sub-optimal fluid management has been involved...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... there was a lapse in infusion for some hours... The basis of these amounts makes no sense to me at all. There was no note of volumes or urine passed, even though it was collected and I could not even find a basic TPR chart...My overall impression from these cases is that the basics of fluid management are neither well understood, nor properly carried out.”\(^{110}\)

6.45 It is therefore clear that there were significant failings in relation to Conor’s fluid management. The fluid record did not adhere to the Guidelines, there was confusion in respect of both prescription and appropriate fluid and there was a failure to ensure that Conor was reviewed by senior staff.

6.46 It is surprising that both Dr Sumner and the Coroner should have described Conor’s fluid management as “acceptable” when Conor’s fluids were clearly not managed in accordance with the Guidelines. However, I accept that the concerns expressed by Dr Sumner in private correspondence, were his considered appraisal, upon reflection, of the treatment given to Conor at Craigavon.

6.47 Whilst recognising Dr Scott-Jupp’s opinion that inappropriate fluid management did not contribute to Conor’s death, I nonetheless find that the treatment failed to comply with the Guidelines. Notwithstanding that the Trust does not accept all the criticisms levelled by Dr Scott-Jupp, I conclude

\(^{109}\) 327-003-007
\(^{110}\) 087-062i-247 to 248
that there was failure to assess Conor’s degree of dehydration and a failure to calculate maintenance fluids. Additionally there is uncertainty as to the rate and duration of infusion and a failure to document urine output. In short, the basics of fluid management were neither well understood nor well performed by clinicians in A&E and MAU.

6.48 It must therefore be asked how the clinicians in Craigavon could have so failed in these respects.

Implementation of the Guidance on the Prevention of Hyponatraemia

6.49 The CMO wrote to Trust Chief Executives on 4th March 2004 “…to ask you to assure me that… these guidelines have been incorporated into clinical practice in your Trust and that their implementation has been monitored. I would welcome this assurance and ask you to respond in writing before 16th April.”111 The Trust Medical Director, Dr Caroline Humphrey,112 replied to the CMO on 7th April 2004 to assure her that “The guidance on the prevention and management of hyponatraemia in children 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… have been adopted throughout the Trust including where children are treated by surgical teams.”113 Dr Humphrey also assured the CMO that the Guidelines were included in the induction given to junior doctors and had been subject to audit.114

6.50 Whilst the Trust has provided documentation to indicate that basic teaching was provided in relation to hyponatraemia and fluid management, no evidence has been forthcoming to indicate that anything was actually done in connection with the implementation of the Guidelines.115
6.51 Rather, Dr Humphrey gave evidence that she was in fact unclear as to who was responsible for the implementation of the Guidelines and did not actually know what was done about them. In light of this evidence, her assurances to the CMO are a matter of serious concern, most especially given that the Trust has conceded that the Guidelines were not properly implemented at Craigavon.

6.52 Whilst the Trust attempted to suggest that Dr Humphrey had based her responses to the CMO “on informal assurance mechanisms” it is clear that there was no basis for such assurances and they should not have been given. Whilst the failure to implement the Guidelines was an abrogation of responsibility, the deliberate attempt to mislead the CMO was a grave breach of professional duty and a failure in public service.

6.53 It would appear that the Chief Executive Mr John Templeton, the Medical Director Dr William McCaughey, and the Directors of Nursing Ms Bridie Foy and Mr John Mone, “had the key responsibility for dissemination, implementation and monitoring of the guidelines.” Dr McCaughey indicated “that details of implementation were appropriately delegated” to “Clinical Directors in all specialties.”

6.54 He identified Dr Martina Hogan as the consultant coordinating implementation within paediatrics. Dr Hogan “advised that Dr Bell initiated dissemination and implementation of Actions arising from the Guidelines…” Mr Ivan Sterling and Dr Jeff Lee, the Clinical Directors of A&E and MAU respectively could not recall any direction about the

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116 WS-354-1 p.6
117 340-001-009
118 327-003-008
119 327-003-004
120 327-003-002
121 327-003-003
122 329-018-007
123 WS-369-1 p.7
124 WS-369-1 p.4
125 327-003-003
126 WS-369-1 p.5
127 329-032a-001
128 329-032a-001 to 002
implementation of the Guidelines and the Trust was “unable to provide clarity on the units in which the 2002 Guidance was displayed...”

6.55 It would however seem at least possible that the Guidelines were displayed because it is recorded that the Clinical Services Manager, Mrs Eileen O’Rourke asked Nursing Sisters to check whether the Guidelines posters were on display on each ward. Unfortunately Mrs O’Rourke was unable to recall the response elicited and there is no record.

6.56 Irrespective of the Trust’s subsequent acknowledgment of failings in this regard, the evidence reveals a confused detachment amongst senior staff in Craigavon as to what was to be done with the Guidelines:

(i) Mr Templeton, the Chief Executive of the Trust, while conceding that he held a joint responsibility for implementing the Guidelines and that he was made aware of the Guidelines by the Medical Director, understood it to be managed “under the direction of the Chief Medical Officer.”

(ii) Dr McCaughey could not recall where the Guidelines were displayed or what was done to develop or introduce compliant protocols.

(iii) Ms Foy, Director of Nursing, accepting that she had joint responsibility for the implementation of the Guidelines, had no recollection of seeing the Guidelines let alone taking any steps to implement them.

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129 329-032a-001 to 002
130 329-018-007
131 329-014-122
132 327-003-007
133 329-014-122
134 WS-370-1 p.4
135 WS-371-1 p.3
136 WS-369-1 p.6
137 WS-369-1 p.6
138 WS-367-1 p.6
139 WS-367-1 p.4
140 WS-367-1 p.5
(iv) Mrs O’Rourke, the Clinical Services Manager, stated that she had “no recall of receiving this information”\textsuperscript{141} and could not remember if she “forwarded the posters or whether they were sent to the Sisters from the Director...”\textsuperscript{142}

(v) Mr Mone told the Inquiry that he had no recollection of the Guidelines.\textsuperscript{143}

6.57 This was a failure in both individual and collective leadership.

\textit{Evidence of the clinicians and nurses}

6.58 This unsatisfactory situation was confirmed by the evidence of the clinicians who cared for Conor in both A&E and MAU.

(i) Dr Budd, who was responsible for providing Conor’s initial intravenous fluids in A&E, told the Inquiry that she was not aware of the Guidelines at the time of Conor’s admission.\textsuperscript{144}

(ii) Dr Catherine Quinn, Medical SHO in MAU, said that she was not aware of the Guidelines before seeing Conor, was not aware of them on display in MAU and had received no formal training in the application of the Guidelines.\textsuperscript{145}

(iii) Dr Andrew Murdock,\textsuperscript{146} who as Specialist Registrar in Gastroenterology and General Internal Medicine had advised Dr Quinn in relation to managing Conor’s intravenous fluids,\textsuperscript{147} could not recall the Guidelines being brought to his attention or seeing the Guidelines on display in MAU or indeed in any other area of the hospital where he worked.\textsuperscript{148}

\begin{itemize}
\item \textsuperscript{141} WS-370-1 p.3
\item \textsuperscript{142} WS-370-1 p.4
\item \textsuperscript{143} WS-375-1 p.5
\item \textsuperscript{144} WS-352-1 p.10
\item \textsuperscript{145} WS-356-1 p.9
\item \textsuperscript{146} 327-003-005
\item \textsuperscript{147} 087-025-117
\item \textsuperscript{148} WS-355-1 p.14-15
\end{itemize}
(iv) Dr Marian Williams, SHO in Paediatrics who attended Conor, could not recall whether the Guidelines were brought to her attention at that time\(^{149}\) or indeed if they were on display in MAU.\(^{150}\)

(v) Sister Irene Brennan (née Dickey),\(^{151}\) the senior nurse on duty in MAU, acknowledged that the Guidelines were not followed in Conor’s case because the nurses in MAU were unaware of their existence.\(^{152}\) They had not been brought to their attention\(^{153}\) and were not on display.\(^{154}\)

(vi) Staff Nurse Francis Lavery\(^{155}\) who had been on duty, could not recall receiving any specific training in relation to the fluid management of paediatric patients.\(^{156}\) He stated that the Guidelines were not brought to his attention before Conor’s admission\(^{157}\) and confirmed that they were not on display in MAU.\(^{158}\)

(vii) Sister Lorna Cullen\(^{159}\) was the Ward Sister in MAU. She had no involvement in Conor’s case.\(^{160}\) Notwithstanding that she was the Ward Sister, she stated that the Guidelines were not brought to her attention\(^{161}\) and were not displayed in MAU.\(^{162}\) Nor was she aware of any other location within the hospital where the poster was displayed.\(^{163}\)

(viii) Staff Nurse Barbara Wilkinson\(^{164}\) was on duty in MAU. She was unaware of the Guidelines at that time and did not recall receiving
any training as to their use or application\textsuperscript{165} and confirmed that the poster was not on display.\textsuperscript{166}

(ix) Staff Nurse Ruth Bullas\textsuperscript{167}\textsuperscript{168} formally admitted Conor to MAU and likewise advised that she was unaware of the Guidelines at the time and could recall no training in respect of them.\textsuperscript{169}

6.59 The evidence is clear that the CMO’s instruction that the Guidelines be disseminated, implemented and developed was ignored. This was wholly unacceptable and a significant failure on the part of Trust. The acting Medical Director Dr McCaughey, the Directors of Nursing Ms Foy and Mr Mone, and the Chief Executive, Mr Templeton were in post and responsible.

\textbf{Decision to admit Conor to an adult ward}

6.60 The decision to admit Conor onto an adult ward was the subject of debate. Dr Scott-Jupp was of the view that Conor should have been managed in a paediatric setting which would have benefited his treatment in that:

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

(ii) A different antibiotic requiring less fluid would probably have been prescribed.

(iii) It is likely that he would have been treated throughout with normal saline.\textsuperscript{170}

6.61 Notwithstanding that the Trust took issue with Dr Scott-Jupp’s view as to the appropriateness of Conor’s admission onto an adult ward,\textsuperscript{171} Dr Scott-Jupp maintained that “it should have been obvious to all concerned that this

\textsuperscript{165} WS-377-1 p.7
\textsuperscript{166} WS-377-1 p.8
\textsuperscript{167} 327-003-002
\textsuperscript{168} Staff Nurse Bullas was subsequently removed from the nursing register by the Nursing and Midwifery Council following an upheld complaint raised by Ms Mitchell that she had failed to document concern about Conor’s seizures or to escalate them to a senior member of staff.
\textsuperscript{169} WS-376-1 p.8
\textsuperscript{170} 260-004-006
\textsuperscript{171} 260-003-006
was a very immature, child-like 15 year old.” He said he would “have expected greater flexibility both at Craigavon and in Belfast. I do not believe age cut-offs should have been so rigidly applied.” It is not without relevance that despite his age RBHSC took account of his physiology and admitted Conor into PICU.

6.62 The unfortunate result was that Conor was treated in A&E and in MAU by doctors and nurses who were ignorant of the Guidelines, in consequence of which:

(i) The management of Conor’s fluids, whilst not the cause of his deterioration or death, was non-compliant and sub-standard.

(ii) The appropriate formula for calculating maintenance fluids was not used.

(iii) Conor’s fluid output was neither measured nor recorded.

(iv) The entries in the fluid record are unclear to the point that they obscure how much fluid Conor received and when.

6.63 However, it is to be noted that within the Paediatric Department, Dr Michael Smith recalled that the Guidelines were displayed on the ward. Dr Hogan stated that she was trained in the use and application of the Guidelines. Dr Barbara Bell said that she received a copy of the Guidelines and had personally ensured that they were clearly visible in all paediatric clinical areas.

6.64 Whilst there was uncertainty as to whether protocol was developed to complement the Guidelines as requested by the CMO, it would nonetheless appear that a protocol for the management of intravenous fluids in children had been developed by Drs Smith and Lowry following

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172 260-002-021
173 088-004-073
174 327-003-006
175 WS-357-1 p.10
176 WS-368-1 p.5
177 327-003-003
178 WS-364-1 p.4
179 WS-354-1 p.11 & 329-018-006 & WS-369-1 p.6
Raychel Ferguson’s death and before the Guidelines were published.\textsuperscript{180} Their protocol emphasised the need to calculate maintenance fluids separately from replacement fluids and contained a table to aid the proper approach to fluid management.\textsuperscript{181}

6.65 I can only therefore conclude that had Conor been admitted to the paediatric ward as Dr Budd intended, he may very well have been cared for by medical staff familiar with the Guidelines and received appropriate fluid therapy. There might also then have been better engagement with Conor’s mother.

6.66 This was an inconsistency which effectively meant that different paediatric patients could receive different treatment in different parts of the same hospital with potentially different outcomes. Such variation in the potential for appropriate treatment within a major hospital is troubling. That such a situation could develop reveals dangerous systemic vulnerabilities for which the Chief Executive, Mr Templeton, must bear responsibility.

**Serious Adverse Incident Procedure**

6.67 Craigavon had policy and procedure in place in 2003 for adverse incident reporting. However, Conor’s death was not reported as an adverse incident\textsuperscript{182} notwithstanding that the RBHSC reported both the fact of his death and the fluid mismanagement to the Coroner.

6.68 The decision not to report Conor’s death as a Serious Adverse Incident (‘SAI’) was subsequently defended in correspondence by Dr Humphrey to Dr A.M. Telford, Director of Public Health, Southern Health and Social Services Board on the basis that fluid management issues were not in fact implicated in the cause of death.\textsuperscript{183} Ignoring the fact that Conor’s death was most unexpected and warranted investigation on that basis alone,
there was a failure to adequately review Ms Mitchell’s express dissatisfaction and the uncertainties in clinical diagnosis.

6.69 Ms Mitchell continued to express her concern about the fluid management in correspondence with Mr Templeton in 2004 and 2005. It was not until Conor’s case was added to the work of this Inquiry that the Trust belatedly acknowledged that it “can now be considered a serious adverse incident as defined in Circular HSS (PPM) 06/04.” This was an incident and a complaint which ought to have been thoroughly investigated. At the very least the Trust would then have been alerted to some of the many deficiencies now revealed.

**Admissions by the Trust**

6.70 The Trust properly issued the following apology in respect of its many failings in relation to the Guidelines:

“The Southern Health and Social Care Trust, which includes the legacy Craigavon Area Hospital Trust... accepts that the DHSSPS 2002 guidelines on the prevention of hyponatraemia in children were applicable to Conor Mitchell. The trust accepts that for various reasons, which will be the subject of this inquiry, the directions of the Chief Medical Officer as contained in these guidelines and accompanying correspondence were not properly implemented in the medical assessment unit or emergency department of Craigavon Area Hospital at this time and that staff in those areas were not made aware of or trained by the legacy trust in the implementation of these guidelines. We would contrast that situation with the Southern Trust's response to the DHSSPS 2007 guidelines. ‘The trust accepts that throughout his course of management in Craigavon Area Hospital in 2003, it was the trust's responsibility to ensure the clinicians and nurses who were looking after Conor Mitchell had the guidelines in the forefront of their minds when treating him and the trust accepts that these clinicians and nurses should have had this guidance available to them when treating Conor.”

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184 329-022-021 to 033
185 329-022-018
Although there is nothing to indicate that the failure to comply with the guidelines resulted in Conor’s death, the trust fully acknowledges its liability for the failures and shortcomings that occurred in the implementation of the DHSSPS 2002 guidelines on the prevention of hyponatraemia in children, both generally and specifically, in relation to Conor’s care. The trust apologises to Conor’s family for the failings referred to above and again offers our sincere sympathies to Conor’s family.”

6.71 The family welcomed this admission and apology and hoped that it would avoid “extensive investigations on certain issues” by the Inquiry and result in savings in public funds. It was agreed that the admissions rendered it unnecessary for the treating clinicians to give oral evidence.

6.72 Instead, I directed that the Trust provide written submissions detailing how and why it failed in Guidelines implementation and its omission to deal with the case as a SAI. In addition I sought particulars of those arrangements now in place in Craigavon to implement the Guidelines.

6.73 A paper was submitted by the Trust on 21st October 2013 indicating that:

(i) “There may have been a perception at the time of the dissemination of the 2002 Guidelines that the guidelines were not applicable to adult medicine and therefore appropriate dissemination and training in the guidelines was not highlighted...”

(ii) “Clear compliance and assurance processes should have been put in place to ensure that nurses and doctors in all areas where there was the potential for children to be treated were aware of and trained in the guidance.”

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186 T-17-10-13 p.6-7
187 T-24-10-13 p.7
188 T-17-10-13 p.7-8
189 T-18-10-13 p.2
190 340-001-004
191 340-001-004 to 005
(iii) “Assurance arrangements should have been agreed by both the Medical Director and Nursing Director...”

(iv) “There appears to have been a breakdown in communication in relation to individual’s roles and responsibilities regarding the dissemination of the guidelines.”

(v) “There appears to have been a perception by the Director of Nursing that it was the CSM's responsibility to implement the guidelines... in the absence of a clear assurance framework there was confusion of roles and responsibilities between the Director of Nursing and the CSM.”

(vi) “That the governance arrangements within the Trust had not matured sufficiently to ensure an integrated approach to Governance. This resulted in the risk that the guidelines would not be disseminated down both nursing and medical lines simultaneously.”

(vii) “There is no documented evidence or audit trail to evidence that Paediatric nurses were trained specifically on the 2002 fluid management guidelines.”

(viii) “In retrospect both Dr McCaughey and Dr Humphrey advised that they based their assurances [to the CMO] with regards to the implementation of the 2002 guidelines on informal assurance mechanisms.”

(ix) “It is evident in hindsight that Conor’s case would meet the criteria for review as a SAI with respect to point 8 of Circular HSS (PPM) 06/04 Reporting and Follow up on Serious Adverse Incidents: Interim Guidance... Therefore in not reporting Conor’s case as an SAI at the

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192 340-001-005
193 340-001-006
194 340-001-006 to 007
195 340-001-007
196 340-001-007
197 340-001-009
time there was a lost opportunity to identify and share learning across the region.”

6.74 On 23rd October 2013 I sought clarification on these submissions so as to confirm my interpretation of the Trust concessions. At public hearing on 24th October 2013 it was furthermore accepted by the Trust that:

(i) Clinicians in wards other than the paediatric ward were not made aware of or trained in the implementation of the Guidelines, including A&E and MAU where children would be treated.

(ii) The Guidelines were not implemented within nursing practice in Craigavon, including paediatric nursing.

(iii) That there was no basis for the Medical Director, Dr Humphrey, whether alone or with input from Mr McCaughey, to give assurance to the CMO that there had been implementation of the Guidelines at Craigavon.

(iv) That a SAI investigation should have been conducted into the unexpected death of Conor under Circular HSS (PPM) 06/04 or the Trust’s own policy.

Subsequent developments

6.75 The Trust approach was of assistance. The Mitchell family then responded and stated that they wanted “to see measures put in place that will prevent similar tragedies occurring in the future...”

6.76 It therefore became important to consider whether or not measures are now in place in Craigavon to ensure that paediatric fluid therapy is managed in accordance with the Guidelines.
6.77 I was informed that the Guidelines were superseded in 2007 by guidelines deriving from the NPSA Patient Safety Alert 22. The approach taken by the Trust in light of Safety Alert 22 was described as including the presentation of an action plan to the Trust Board, the creation of a Working Group led by the Medical Director, a training programme, compliance audits and an independent review of the Alert.

6.78 On 30th October 2007 the Trust reported that Solution No.18 had been removed from general use in Craigavon and new fluid balance and prescription sheets were under consideration. A “Hyponatraemia Meeting” was held in January 2008 to consider how all 14-16 year old patients would receive treatment in accordance with the Guidelines irrespective of where they were treated. Audits to ensure compliance were carried out in October 2007 and March 2008.

6.79 The Trust also adopted a ‘Paediatric Intravenous Infusion Policy’ in October 2009 detailing the medical procedures for prescription, monitoring and review of intravenous infusions for children and young people together with nursing procedures for the administration of fluids. Guidance was given as to the recognition of hospital acquired hyponatraemia. In terms, the policy directed that nurses should consult the chart to satisfy themselves that prescriptions complied with the 2007 Guidelines before administering IV fluid and that they should carry out appropriate assessments, report changes in the child’s condition and provide handover briefings to incoming staff.

6.80 The policy also contained an ‘incident trigger’ list with an associated reporting mechanism to alert clinicians to:

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202 303-028-367
203 329-020a-001
204 329-020a-012
205 329-020a-001
206 329-020a-042
207 329-020a-038
208 329-020a-125
209 329-020a-133
210 329-020a-145
211 329-020a-146
(i) Any episode of hospital acquired hyponatraemia in children receiving IV fluids.

(ii) Any failure to check electrolytes at least once in every 24 hours in children receiving intravenous fluids.

(iii) The use of any IV fluid other than as outlined in the 2007 Guidelines.

6.81 Mandatory training for all medical and nursing staff in the management of IV fluids for children and young people was also stipulated by the policy.212 The Inquiry has been provided with comprehensive documentation setting out these requirements. Moreover in relation to the clinical governance procedures set out in the policy, the evidence suggests that the Trust has undertaken audits every year since 2010 to assess compliance with the 2007 Guidelines213 together with an “Audit of Hyponatraemia.”214

6.82 The Trust advised that the audit results are shared within a multi-disciplinary team and discussed at clinical governance meetings.215 This in conjunction with developing external guidance has led to additional changes in practice including:

(i) The development and implementation of a revised fluid balance chart.

(ii) The development and implementation of guidelines for peri-operative fluid management in children to “provide guidance and reduce the risk of harm associated with intravenous fluid administration to the paediatric patient in the peri-operative phase.”216

(iii) Further review of the paediatric intravenous infusion policy.

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212 329-020a-173
213 329-020a-004
214 329-020a-122
215 329-020a-008
216 329-020a-163
6.83 A Review of the Trust’s ‘Incident Management Policy’ was completed in January 2013\(^{217}\) and found “clear guidance on incident reporting, investigation and the dissemination of learning from incidents and SAI’s.”\(^{218}\) Likewise, assurances were given that since April 2012 the Trust has had a procedure\(^{219}\) “in place to ensure the systematic and integrated approach for the implementation, monitoring and assurance of clinical standard and guidelines.”\(^{220}\)

6.84 Accordingly, the Trust expressed the hope that it had been able “… to demonstrate that they have reflected on their roles and responsibilities at this time and have identified and agreed on those factors which may have had an influence, or may have contributed to the failings in the dissemination and implementation of the guidelines in the Emergency Department and Medical Assessment Unit of CAH and furthermore the opportunities missed in the sharing of learning with regard these failings.”\(^{221}\)

6.85 On this basis I am of the view that the Trust has learned lessons and has implemented appropriate change in the years since Conor’s tragic death.

**Concluding remarks**

6.86 Whilst I welcome the Trust concession that clear compliance and assurance processes in respect of the Guidelines should have been agreed and put into operation by the Medical Director and Nursing Directors, such concession cannot serve to avoid the just and appropriate criticism that Conor’s treatment failed to comply with the Guidelines.

6.87 It is now acknowledged that there was a breakdown in communication between those in positions of governance as to their roles and responsibilities. This was a systemic failing for which the Chief Executive must bear responsibility.
6.88 There was potentially dangerous variation in the care and treatment afforded young people admitted to Craigavon which was a serious systemic weakness.

6.89 The false assurance given the CMO that the Guidelines had been adopted and audited was a serious breach of professional duty and public service values.

6.90 Had the Trust conducted the SAI investigation of Conor’s unexpected death, which it now accepts it should have done, it would have learned lessons to the benefit of all. That opportunity was lost.

6.91 Notwithstanding shortcomings and deficiency, the evidence as to policy, protocol, training, audit and review in the years since Conor’s death, has provided some reassurance that lessons have been learned from this tragedy. Appropriate measures have been taken within Craigavon.
THE DEPARTMENT OF HEALTH, SOCIAL SERVICES AND PUBLIC SAFETY FOR NORTHERN IRELAND

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Introduction

7.1 What happened immediately after Raychel’s death illustrates what can be achieved when such a death is reported promptly. The Department responded quickly and decisively to analyse and issue guidelines. However the deaths of Adam, Claire and Lucy were not formally reported to the Department and it remained seemingly unaware of them at the time. So why did the Department fail to ensure that it was notified about such serious adverse incidents?

Expert reports

7.2 The Inquiry was guided by the reports of:

(i) Professor Gabriel Scally¹ (Professor of Public Health and Planning, Director of WHO Collaborating Centre for Healthy Urban Environments, University of the West of England) who examined the responsibilities and accountabilities of HSC Trusts, Health Boards and the DHSSPS in Northern Ireland.²

(ii) Professor Charles Swainson³ (onetime Consultant Renal Physician and Medical Director, Lothian NHS Board, Edinburgh) who considered the issues of governance arising from Raychel Ferguson’s case.⁴

(iii) Professor Aiden Mullan⁵ (former acting Chief Executive Officer and Director of Nursing and Clinical Governance, North Tees & Hartlepool NHS Trust) who provided advices on governance matters relating to Adam Strain.⁶

7.3 The Inquiry was also assisted by expert background papers received from:

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¹ 337-001-005
² 341-002-001 & 341-003-001
³ 328-001-006
⁴ 226-002-001
⁵ 306-081-008
⁶ 210-003-001
(i) Dr Jan Keeling⁷ (Paediatric Pathologist) on systems and procedures for disseminating information derived from post-mortem examinations.⁸

(ii) Dr Bridget Dolan⁹ (Barrister and Assistant Deputy Coroner) on UK practice and procedure on the dissemination of information from inquests.¹⁰

Schedules compiled by the Inquiry

7.4 In an attempt to summarise all the information received, the following schedules were compiled:

(i) List of persons involved.¹¹

(ii) Chronology.¹²

(iii) Structure of the Health Service in Northern Ireland (pre-2007).¹³

(iv) HSC Trust areas in Northern Ireland.¹⁴

(v) Commissioning structure for HSC services in Northern Ireland.¹⁵

(vi) Membership of Chief Medical Officer’s Working Group on Hyponatraemia.¹⁶

⁷ 306-081-010
⁸ 308-020-295
⁹ 306-081-010
¹⁰ 303-052-715
¹¹ 337-001-001
¹² 337-003-001
¹³ 303-039-505
¹⁴ 300-001-001
¹⁵ 303-040-506
¹⁶ 328-003-001
Department’s responsibility for clinical services

7.5 At the time of the children’s deaths, as now, the Department and the Minister bore ultimate responsibility and accountability for the healthcare provided to patients in Trust hospitals.\(^{17}\)

7.6 Article 16(1) of the Health & Personal Social Services (Northern Ireland) Order 1972\(^{18}\) created 4 Health and Social Services Boards, namely the Northern, Southern, Eastern and Western. The Department made provision for and oversaw the Health Service through those four regional Boards. Subsequent re-structuring was undertaken, broadly following that in the rest of the UK, to re-constitute the Boards as commissioning bodies, responsible for assessing local requirements and purchasing healthcare and social services from the hospitals, which re-emerged as Trusts.

7.7 Article 10 of the Health and Personal Social Services (Northern Ireland) Order 1991\(^ {19}\) created the new Health and Social Services Trusts to provide the health services. The Chair of each Trust was appointed by the Minister and was directly accountable to the Minister.\(^ {20}\) The Trusts were established as ‘autonomous self-governing’ bodies, independent of the Boards but with ‘arms-length’ accountability to the Department.

7.8 The Department described this re-ordering in ‘HSS Trusts: A Working Guide,’ 1991 noting that “A key element of the changes is the introduction of HSS Trusts. They are hospitals and other units which are run by their own Boards of Directors; are independent of Health and Social Services Board Management; … Trusts differ in one fundamental respect from directly managed units – they are operationally independent…”

7.9 The understanding at the time was that, whilst standards of clinical care remained primarily the responsibility of consultants within the Trusts,\(^ {21}\) the

\(^{17}\) 333-001-003 & 306-083-003
\(^{20}\) Mr Hunter T-04-11-13 p.50 line 2
\(^{21}\) WS-348-1 p.3
Trusts were accountable to the Boards and the Department retained a leadership role in respect of the whole Health Service.\textsuperscript{22}

7.10 The Department was responsible for articulating the directions of its Minister and the Permanent Secretary was accountable for the management and organisation of the Department. He was supported by the Departmental Board which included a Chief Medical Officer (‘CMO’), a Chief Nursing Officer (‘CNO’) and his most senior officials. The Department formulated and implemented policy, allocated resources and established the context and objectives for the Health and Personal Social Services (‘HPSS’).

7.11 The CMO led the medical service within the Civil Service and was responsible for advising the Minister and the Department on matters relating to public health. The CMO from 1995-2006 was Dr Henrietta Campbell.\textsuperscript{23} It was envisaged that she would provide a link between the Minister and the medical profession.\textsuperscript{24} Ultimate responsibility for the Department lay with the Permanent Secretary.

7.12 The Department did not assume general operational responsibility in relation to the HPSS but did on occasion issue guidance and instruction for HSS Trusts. The Department created a Management Executive to oversee performance of the HSS Trusts.\textsuperscript{25} One of the main objectives of the Management Executive was to ensure that standards were raised and quality improved in accordance with Departmental policy.\textsuperscript{26} Until 2000 it was responsible for the communication of Departmental policy and instruction to the Trusts.

7.13 The relationship of accountability between the Management Executive and the Trusts was set out in an ‘Accountability Framework for Trusts’ (1993).\textsuperscript{27} It indicated that whilst the “primary accountability of Trusts is for the

\textsuperscript{22} Mr Elliott T-05-11-13 p.70 line 16
\textsuperscript{23} 337-001-002
\textsuperscript{24} WS-075-2 p.2
\textsuperscript{25} WS-062-2 p.3
\textsuperscript{26} WS-002-2 p.3
\textsuperscript{27} 323-001a-002 - Circular METL 2/93
quantity, quality, efficiency of the service they provide” (and this lay to the Boards) the Department was to retain “ultimate legal responsibility for the functions and will wish to ensure that both Boards and Trusts are discharging their responsibilities.” In broad terms, the Department planned to appraise itself of patient care issues and hold the Trusts to account through their relationship with the Boards. This was to be “a light touch” approach. However, the Management Executive retained a degree of direct management accountability in relation to the Trusts and reserved the right, in certain and exceptional circumstances (including those relating to patient care), to intervene in the affairs of a Trust. In short, the Department was responsible for holding the whole system to account.

7.14 However, in respect of the specifics of Departmental monitoring of the performance of the Trusts, Professor Scally noted that the ‘Accountability Framework’ did not indicate any particular focus on patient care issues. The question therefore arose as to how the Department ensured that the Trusts discharged their responsibilities in respect of the quality of healthcare and in particular why it did not know about the hospital related deaths from hyponatraemia in the very hospitals for which it was responsible? Accordingly, Professor Scally examined the question of how the Department knew what was going on in hospitals prior to 2003 in terms of the quality of care.

Serious Adverse Incident reporting to Department

7.15 Professor Scally advised that there was no requirement during the period under review for Boards or Trusts to notify the Department about “potentially avoidable deaths or other instances of serious clinical failure.”

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28 323-001a-003
29 323-001a-003
30 Mr Simpson T-08-11-13 p.6 line 20 & WS-349-1 p.5
31 WS-084-2 p.4
32 306-083-003
33 WS-348-1 p.14
34 WS-348-1 p.4 & WS-308-1 p.11
35 341-002-002
36 341-002-002
37 341-002-004
Whilst there had hitherto been formal requests that hospitals report untoward incidents to their Board,\textsuperscript{38} he noted that the “changes in accountability that took place with the creation of Trusts altered the position whereby the Boards had been responsible for occurrences within their directly managed units. It appears that once hospitals became Trusts they ceased to report serious untoward incidents to the Boards.”\textsuperscript{39}

7.16 Even though Trust lines of accountability remained initially to the Boards, there would appear to have been no attempt at that time to develop alternative replacement notification systems. Further and importantly, given that the Boards no longer received reports, no requirement was introduced to ensure reporting to the Department.\textsuperscript{40} This was a vulnerability and not without consequence.

7.17 Professor Swainson considered it: “regrettable in hindsight that there was not a clear framework that would have ensured that serious clinical incidents were reported by Trusts and disseminated to the other Trusts. Wide sharing of serious incidents can stimulate quicker and national efforts to reduce harm.”\textsuperscript{41}

7.18 This omission is to be seen in a context where functioning systems already existed to notify the Department of adverse incidents relating to equipment, supplies,\textsuperscript{42} food, buildings and plant\textsuperscript{43} or affecting patients\textsuperscript{44} in psychiatric or special care hospitals.\textsuperscript{45} The Department was part funding\textsuperscript{46} a number of national reporting systems for deaths including National Confidential Enquiry into Perioperative Deaths (‘NCEPOD’)\textsuperscript{47} and systematically receiving reports of maternal deaths, stillbirths and deaths in infancy for
inclusion in the UK Confidential Enquiry into Stillbirths and Deaths in Infancy.48

7.19 However, the absence of any formal reporting requirements to the Department was, in the view of Mr Clive Gowdy (Permanent Secretary in the Department 1997-2005)49 consistent with the intention that Trusts should operate with maximum freedom and autonomy.50 Notwithstanding external developments, including the disturbing 1994 Report into the Deaths of Children in the Grantham and Kesteven General Hospital (the Beverley Allitt inquiry), which stressed that "reports of serious untoward incidents to District and Regional Health Authorities should be made in writing and through a single channel which is known to all involved,"51 nothing substantive was done.

7.20 By comparison, Regional Directors of the National Health Service Executive in England were directed in 1995 to establish notification systems for serious untoward incidents.52 The English regions, all of which were significantly larger than Northern Ireland, proceeded to put systems, albeit imperfect, into place. Within Northern Ireland, and notwithstanding that the Management Executive “received a constant flow of documentation, particularly from England, in respect of initiatives that were being taken there,”53 the then Permanent Secretary Mr Alan Elliott54 indicated that “it didn’t occur to anyone to say that there should be a system.”55 Mr John Hunter,56 Chief Executive of the HPSS Management Executive, was unable to advance any explanation as to why this was so.57

48 WS-075-1 p.13
49 337-001-001 & 323-027e-003
50 WS-062-1 p.3
51 341-002-007 & Mr Elliott T-05-11-13 p.21 line 14
52 341-003-009
53 Mr Hunter T-04-11-13 p.10 line 20 & p.27 line 5. Documentation included the ‘Risk Management in the NHS’ manual (1994) (211-003-001) recommending a comprehensive incident reporting system as the foundation of a good tracking system. This was forwarded by the Management Executive to the RGHT (Dr Carson T-16-01-13 p.4 to 5).
54 337-001-003
55 Mr Elliott T-05-11-13 p.66 line 19
56 337-001-003
57 Mr Hunter T-04-11-13 p.31 line 19
7.21 In 1998 the Department commissioned the consultants ‘Healthcare Risk Resources International’ to survey risk management in the HPSS. Mr Gowdy recalled that it reported ‘a general perception that there might have been a significant level of under-reporting of adverse incidents.’ In the light of such intelligence, the Department could not safely assume that it would be informed of potentially serious patient care issues. Notwithstanding, it made no policy change and gave no direction for adverse incident reporting.

7.22 In 2000 the Department of Health (‘DoH’) in London published ‘An Organisation with a Memory’ specifically recommending more comprehensive systems for reporting and analysis of adverse events. The Department did not follow suit but did publish for consultation ‘Confidence in the Future’ in relation to the problem of poor medical performance. It recommended, amongst other things, Serious Adverse Incidents (‘SAI’s’) recording as an aid to the identification of the under-performing doctor. Additionally, the Department published for consultation ‘Best Practice, Best Care’ in 2001 noting in particular the necessity for “a clear line of accountability from front line delivery back to the Executive” and the requirement to monitor adverse events. Formal reporting requirements were not however introduced until 2004.

7.23 In the absence of a formal system, informal channels of communication were used. Trust Chief Executives and Clinical Directors could bring significant untoward clinical incidents to the attention of the CMO at any time. Indeed, Raychel’s death was reported in just such a way. It was in this context that Mr Gowdy said that he “would certainly have expected the

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58 338-006-107
59 WS-062-1 p.4 – “The major deficiency relates to the very limited and therefore probably significant under-reporting of clinical incidents and near misses.”
60 Professor Scally noted that the NHS 1995 Regional serious untoward incident reporting scheme had informed the recommendations of ‘An Organisation with a Memory’. (341-003-004).
61 333-184-001
62 WS-068-1 p.49
63 WS-062-1 p.321 - Circular HSS (PPM) 06/04. Professor Mullan pointed out that ‘An Organisation with a Memory’ referred to Department of Health guidance for untoward incident reporting in England issued in 1955, which was still current in 2000.(210-003-038).
64 010-023-150 & WS-075-1 p.3
Trusts to have informed the Department of all of them."⁶⁵ Moreover he "assumed that the informal system was working effectively because [he] was being told of serious things"⁶⁶ estimating that he had been informed of approximately two deaths during his eight years as Permanent Secretary.⁶⁷ Upon reflection he recognised that he had been "lulled into a false sense of security by the fact that [he] was getting reports about serious incidents from some of the Chief Executives and chairs."⁶⁸ Both Mr Paul Simpson,⁶⁹ former Chief Executive of HSS Executive,⁷⁰ and Mr Gowdy accepted with hindsight that it was not an effective system.⁷¹

7.24 Dr Campbell acknowledged that the informal mechanisms of adverse incident reporting “were found to be totally inadequate and recognised by myself as such in 1999."⁷² She fairly conceded that she could not “defend the fact that it took until 2004 to put a proper system in place.”⁷³ As Mr Gowdy observed “you don’t know what you don’t know, so you need to have a system to find out.”⁷⁴ The Department did not know, did not have a system and did not find out.

7.25 While Trusts and Boards were clearly accountable to the Department and the Department had a clear role in overseeing the functioning of the Health Service, Professor Scally nonetheless believed that the Trusts did not generally understand that the Department might have had an interest in the occurrence of these deaths.⁷⁵ It was not made clear. He concluded “that there was no effective system in place in Northern Ireland prior to 2003 and …no significant efforts had been made at any stage to develop comprehensive and effective notification systems. This would appear to be borne out by a briefing for the Minister prepared within the Department in

⁶⁵ WS-062-2 p.10  
⁶⁶ Mr Gowdy T-06-11-13 p.100 line 2  
⁶⁷ Mr Gowdy T-06-11-13 p.96 line 19  
⁶⁸ Mr Gowdy T-06-11-13 p.96 line 8  
⁶⁹ 337-001-003  
⁷⁰ Mr Simpson T-08-11-13 p.14 line 19  
⁷¹ Mr Gowdy T-06-11-13 p.112 line 17  
⁷² Dr Campbell T-07-11-13 p.62 line 3  
⁷³ Dr Campbell T-07-11-13 p.74 line 4  
⁷⁴ Mr Gowdy T-06-11-13 p.111 line 2  
⁷⁵ 341-002-018 & Dr Jenkins T-10-09-13 p.73 line 25
2004. The opening sentence reads: ‘There is no unified reporting of untoward incidents in the HPSS to the Department.’ Indeed it was noted within the Department at that time that reporting of adverse incidents was “patchy” and the Minister was thought to be “somewhat vulnerable to the accusation that the Department is not aware what is going on as regards serious incidents.”

7.26 I consider that in the circumstances it should have been obvious to the Permanent Secretary Mr Gowdy, his predecessor Mr Alan Elliott, the Chief Executive of the Management Executive, the CMO and the other senior Departmental officials, that untoward clinical events were not being routinely reported to the Department. I do not understand how they could have thought otherwise. Professor Scally characterised the approach to adverse incident reporting as “fragmented and incoherent” and the evidence confirmed that. In such circumstances it was foreseeable that hospital related child deaths might not be brought to the Department’s attention. The Department appeared to proceed on the basis of ‘hear no evil, see no evil’.

Other channels of information

7.27 It has to be recognised that even had a structured system of SAI reporting been in place, there is no absolute certainty that the deaths of Adam, Claire or Lucy would have been formally notified to the Department.

7.28 There were however other means whereby the Department might have hoped to gain some information about what was happening in Trust hospitals and to learn whether things were going wrong. Mr Elliott expected that the Department would have been informed of those deaths where

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76 341-002-006
77 010-025-180
78 Permanent Secretary 1987-1997
79 341-002-006
medical mismanagement was implicated, through complaints, inquests and legal action.\textsuperscript{80} There were also other sources of information.

\textit{Complaints}

7.29 The Department was clearly interested in complaints as part of its wider interest in Risk Management, not least because they could inform as to the nature of those risks. In 1992 the Government published ‘The Citizen’s Charter for Patients and Clients’\textsuperscript{81} setting out the standards of treatment to be expected from the HPSS and indicating what to do if those standards were not met. The section entitled ‘If Things Go Wrong’ outlined a patient complaints procedure and indicated that final referral lay to the Chief Executive of the HPSS Management Executive.\textsuperscript{82}

7.30 In 1995-1996 the Department published the HPSS Complaints Procedure\textsuperscript{83} and followed it up with further ‘Guidance on Handling HPSS Complaints.’\textsuperscript{84} It reviewed the HPSS Complaints Procedure in 2002 and established a Regional Complaints Review Group.

7.31 Whilst Mr Crawford did attempt to invoke the HPSS Complaints Procedure in relation to Lucy, the system was not engaged in the cases of Adam, Claire or Raychel. Accordingly, and although the complaints procedure represented an important part of the Department’s ‘quality agenda’, it was not always used and could not therefore have been relied upon to alert the Department to particular issues of patient safety.

\textit{Inquests}

7.32 Dr Campbell expressed the view that the inquest system in Northern Ireland was “\textit{another way of bringing into the open issues which are of concern}” and “\textit{is one that I feel that people should have been using properly}.”\textsuperscript{85}

\textsuperscript{80} WS-348-1 p.7
\textsuperscript{81} 306-085-001
\textsuperscript{82} 306-085-014
\textsuperscript{83} 126-004-001
\textsuperscript{84} 333-294-001
\textsuperscript{85} 069a-033-084
However there was no formal mechanism to inform the Department about Coroner’s findings in healthcare related inquests. Nor were patient safety matters arising from inquests routinely notified to the Department or circulated to the HPSS.

7.33 This lack of procedure became evident at Adam’s inquest. The Royal Group of Hospitals Trust (‘RGHT’) ‘recommendations’ which Mr Gowdy considered “of such general application as to be of interest and significance to other hospitals likely to be treating young patients” and which he expected to be “at least copied” to the Department and “ideally” to have been the subject of prior discussion with the CMO, were not seen by the Department at all. There was no mechanism for communication, which was why, as the Coroner was later obliged to point out to Dr Campbell “an inquest should not be seen as the means of disseminating medical knowledge.”

7.34 That inquests were not used to gather or share information is to be regretted. Their value as a resource for learning was very clearly demonstrated in April 2005 by Dr Angela Jordan, Specialist Registrar in Public Health Medicine, when she presented an analysis of the “key learning points” deriving from the evidence given at the inquests of Adam, Raychel and Lucy.

**Litigation**

7.35 During the period under review claims administration was managed by individual Trusts and Boards. There was no centralised approach and the Department played no active role in the management of litigation or claims. The detail and outcome of individual cases was not collated by the Department and the potential for monitoring HPSS failings not exploited. Whilst the Department did issue a HPSS Protocol on Claims Handling this

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86 WS-062-1 p.4  
87 WS-062-1 p.10  
88 006-004-282  
89 320-126-114  
90 320-126-124  
91 317-039-001 - Circular HSS (F) 20/98
did not stimulate much more than a “few examples of a claims management policy.” In 2002 the Northern Ireland Audit Office (‘NIAO’) published an assessment of the medical negligence system and expressed surprise at the absence of central collection of data. When rather later, attempts were made to collect the information offered, difficulties were encountered and a Departmental memo of July 2005 records concern about “the quality and accuracy of this data.” This did not therefore constitute a reliable channel of information.

Meetings

7.36 The Department held formal accountability reviews with the Boards but not with the Trusts. The CMO did however meet Trust Medical Directors on a regular basis and there were other less formal discussions with Board and Trust officers. Routine meetings were also held with organisational, educational and professional leaders including Directors of Public Health and representatives of the Health and Social Care Councils. Dr Campbell described this as “a fairly well trampled pathway in that the Directors of Public Health quite often brought issues to me of concern, not just of serious clinical incidents …” The CNO used a ‘Nurse Leaders Network’ to communicate directly with senior nurses.

7.37 Individual committees provided direct clinical advice to the Department. They included the Central Medical Advisory Committee (CMAC) and the CMO’s Special Advisory Committees (SACs). Their meetings mixed formal and informal business but did provide a useful means whereby

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92 127-004-098
93 341-002-009
94 330-108-006
95 WS-084-2 p.6 & WS-066/1 p.63
96 WS-362-1 p.10-11
97 021-018-037
98 WS-348-1 p.5 & Mr Hunter T-04-11-13 p.89
99 WS-361-1 p.8
100 Dr Campbell T-07-11-13 p.54 line 20
101 WS-082-2 p.13
102 320-104-009
103 Mr Hunter T-04-11-13 p.36 line 2
104 Mr Hunter T-04-11-13 p.19 line 7 & 320-110-001
clinical information could pass from Trusts to Department. However, they were unstructured and had no secretarial support. It was in the context of such a meeting that the initial report of Raychel’s death was made. Notwithstanding that the meeting enabled effective reporting in that case, the arrangement of committees and meetings failed to convey any hint to the Department of the other deaths from hyponatraemia.

**Audit**

7.38 The routine collection and systematic analysis of data by audit reveals incidents of note and is an invaluable source of information. The 1989 NCEPOD Report, which was part-funded by the Department, stressed the importance of information systems and audit for clinical quality assurance. The Department recognised clinical audit as an integral part of a functioning healthcare system and emphasised the importance of clinical audit programmes in its Management Plans from 1995/96. The Management Executive sought to encourage multi-professional audit. However, in practice audit took a very long time to become established and Professor Scally noted the absence of a generalised culture of participation in structured systems of clinical audit. Indeed, the evidence repeatedly revealed deficiencies in the systems of audit as implemented and little indication that the Department was receiving regular audit analysis.

**Other**

7.39 The Department also received information directly from members of the public, elected representatives and special interest groups. The CMO was lobbied by practitioners in relation to specific issues and the Department
sought to be attentive to media coverage and public debate.\textsuperscript{114} There were also diverse Health Service statistics and confidential reports from whistle-blowers.\textsuperscript{115} However useful, these were random conduits of information.

**Risk Management, Clinical Governance and the Statutory Duty of Quality**

7.40 The absence of any reliable system whereby the Department might learn of catastrophic clinical mismanagement reflected the broader reality that care quality was not being adequately monitored in the hospitals themselves. Professor Scally observed that there is little “to indicate that there was a firm expectation that either Health and Social Services Boards or Trusts would be subject to any systematic monitoring of the quality of care provided to patients or in respect of their handling of adverse clinical events.”\textsuperscript{116}

7.41 The HPSS ‘Charter for Patients and Clients’ published in 1992 contained the personal pledge of the Minister for Health and Social Services “to all citizens that services in Northern Ireland will continue to match the very best available in the rest of the United Kingdom.”\textsuperscript{117} During the 1990s and early 2000s the Department did act to promote risk management controls and clinical governance. In so doing it almost always followed, at some remove, the lead of the DoH in London. For example, the DoH published ‘Working for Patients’ in 1989 to introduce a comprehensive system of medical audit\textsuperscript{118} and in Northern Ireland, the HPSS Management Executive published its plans for audit in the Management Plan for 1995/6–1997/8.\textsuperscript{119}

7.42 In 1997 the DoH published ‘The New NHS – Modern and Dependable’ introducing clinical governance to the rest of the UK. Within Northern Ireland, and notwithstanding the findings of ‘Healthcare Risk Resources International’\textsuperscript{120} the Department did not move to introduce a system of

\textsuperscript{114} Mr Gowdy T-06-11-13 p.104 line 13
\textsuperscript{115} 403-019-001
\textsuperscript{116} 341-002-003
\textsuperscript{117} 306-085-003 & Mr Hunter T-04-11-13 p.22 line 20
\textsuperscript{118} 210-003-012
\textsuperscript{119} 306-083-001
\textsuperscript{120} WS-062-1 p.4
clinical governance in Northern Ireland until 2001 when it published ‘Best Practice, Best Care’ for consultation. Whilst it did not then give any particulars, it did propose “a system of clinical and social care governance, backed by a statutory duty of quality…”\textsuperscript{121}

7.43 In 2002 a NIAO report\textsuperscript{122} noted the limited progress actually achieved in the implementation of risk management\textsuperscript{123} and indicated that “We would therefore expect the department to be able to provide positive assurance of substantial progress in risk management within HPSS bodies by 2003 at the latest.”\textsuperscript{124} The Department sent out a circular requiring HPSS organisations to adopt the model of risk management used in Australia and New Zealand.\textsuperscript{125}

7.44 Early in 2003 the Department published ‘Clinical and Social Care Governance: Guidelines for implementation.’\textsuperscript{126} The Northern Ireland guidelines for clinical governance emerged some four years after their NHS counterpart.

7.45 In addition HPSS organisations became subject to the statutory duty of quality in April 2003. The introduction of the statutory duty was to allow Mr William McKee,\textsuperscript{127} former Chief Executive of the RGHT to claim that as Chief Executive of a Trust Hospital he bore no responsibility for the quality of care in his hospital prior to the enactment of the statutory duty. He said that “in 1993/1994… and subsequently for many years I was specifically not held responsible for clinical safety, clinical quality, clinical matters.”\textsuperscript{128} He maintained furthermore that the Board of the Trust had no such responsibility either\textsuperscript{129} and that the Trust only became responsible for clinical quality when the statutory duty was enacted.\textsuperscript{130}

\textsuperscript{121} WS-068- p.14  
\textsuperscript{122} 338-006-062  
\textsuperscript{123} Mr Gowdy T-06-11-13 p.48 line 1  
\textsuperscript{124} 338-006-091  
\textsuperscript{125} WS-075-1 p.56  
\textsuperscript{126} 306-119-001  
\textsuperscript{127} 306-081-006  
\textsuperscript{128} Mr McKee T-17-01-13 p.6 lines 1-4  
\textsuperscript{129} Mr McKee T-17-01-13 p.16 line 4  
\textsuperscript{130} Mr McKee T-17-01-13 p.7 line 13
Mr Gowdy was however most firmly of the view that both the Chief Executive and the Trusts were responsible for clinical care and clinical outcomes before the 2003 Order. He observed that “the raison d'être of the Trusts concerned was to deliver effective clinical care to sick or injured people and it is rather difficult to see how they might argue that they had no interest in, or responsibility for, the quality of the service they were providing.”

He understood the legislation to formalise the existing position as set out by the Accountability Framework, namely that ‘the primary accountability of Trusts is with the quantity, quality, efficiency of the service they provide’.

As Senior Counsel for the Department put it “we simply don’t accept that any person or anybody involved in the Health service can walk away and say ‘I have no responsibility’.” I consider that self-evidently correct.

The introduction of clinical governance in Northern Ireland required an understanding of the arrangements already in place. To that end Deloitte & Touche were commissioned to evaluate existing clinical and social care governance. Its report in 2003 identified a lack of both understanding and implementation of clinical and social care governance and noted in particular a lack of co-ordinated activity in relation to risk, risk registers and risk audits. Mr Gowdy acknowledged that the report “certainly would have suggested that we didn’t know enough about how they were progressing…” The consultants indicated that the position in Northern Ireland was comparable to that pertaining in England a few years before.

Whilst Professor Scally did recognise some positive and timely Trust activity in relation to the introduction of clinical governance, he nonetheless singled out the Department’s very clear leadership role and identified a departmental failure to provide the necessary impetus to progress clinical governance at anything other than a very slow pace. He observed that by
2003 “there was a significant gap between the progress in Northern Ireland and that achieved in England and Scotland” and argued that “given the size of the province it would be a reasonable assumption that it would have been possible, if the will and competence had existed, to put in place within a short period of time a comprehensive clinical governance structure.”

7.50 Mr Hunter acknowledged that the responsibility for “driving those changes rested with the Department from the Minister down.” Dr Campbell accepted “it as a corporate responsibility across the Department” and Mr Paul Simpson (from 1997 Chief Executive HSS Executive and Deputy Secretary HPSS Management Group) conceded that leadership within the Department could have been better.

7.51 Mr Gowdy maintained that “there was no lack of will, there was no lack of direction. There was a very clear desire to move this agenda forward and, unfortunately, it didn’t happen and I find that disappointing.” The Department contended that comparisons with progress in England and Scotland were misleading and that there was no proper evidence base for such an exercise. It was suggested that because the Department was responsible for social care in addition to healthcare, that the extra responsibility made comparison inappropriate and furthermore, it advised that the alternation of direct rule with devolution in the 1990s and 2000s, had hindered progress.

7.52 Whilst I accept these broad distinctions and recognise constant financial constraint, I do not accept that circumstances in Northern Ireland should have unduly delayed the implementation of systems to improve the quality of care, still less the introduction of reporting procedures whereby the Department might have learned what was happening in the hospitals for

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136 341-002-023
137 Mr Hunter T-04-11-13 p.92 line 25
138 Dr Campbell T-07-11-13 p.12 line 9
139 Mr Simpson T-08-11-13 p.24 line 12
140 Mr Gowdy T-06-11-13 p.83 line 15
141 Mr Gowdy T-06-11-13 p.82 line 1
142 Mr Gowdy T-06-11-13 p.48 line 1 & Dr Campbell T-07-11-13 p.21 line 18
143 Mr Gowdy T-06-11-13 p.72 line 20 & Mr Simpson T-08-11-13 p.18 line 22
which it was responsible.\textsuperscript{144} I do not suggest that the Department should have introduced comprehensive SAI reporting in the mid-1990s, but do consider that the absence of any reliable means of learning about hospital related child deaths indicates a serious failure on the part of the Department.\textsuperscript{145}

\textbf{Quality of Care}

7.53 Departmental engagement with issues of quality of care appeared to lack constancy in terms of focus. Whilst the Department did, for example, issue important guidance in relation to standards and quality of healthcare, it did not maintain proper checks to ensure that its guidance was being heeded. Notwithstanding that the Department would request confirmation of compliance in respect of its more important guidance, Mr Gowdy indicated that many of the directions and guidelines issued \textit{“were not subject to any specific monitoring.”}\textsuperscript{146} The Department proceeded on the assumption that HPSS organisations would comply.

7.54 Such an assumption was unwise because the evidence disclosed failures to comply with Departmental guidance. Guidelines for Consent were issued on 6th October 1995 with explicit instruction that \textit{“Health and Social Service Boards/HSS Trusts are asked to ensure that procedures are put in place to ensure the consent is obtained along the lines set out in the Handbook...”}\textsuperscript{147} and that \textit{“Boards/HSS Trusts …confirm by 31 December 1995 that this has been done.”}\textsuperscript{148} In this instance Mr Gowdy \textit{“expected that it would have been followed up and followed up fairly quickly.”}\textsuperscript{149} However, this specific direction was ignored by RGHT and almost five years passed before this important\textsuperscript{150} guidance was adopted at RBHSC.\textsuperscript{151} The Department did not know because it had failed to follow-up either confirmation or

\textsuperscript{144} Mr Hunter T-04-11-13 p.31 line 19 & Dr Campbell T-07-11-13 p.30 line 19
\textsuperscript{145} Professor Dame Judith Hill T-04-11-13 p.140 line 24
\textsuperscript{146} WS-062-2 p.11
\textsuperscript{147} 305-002-003
\textsuperscript{148} 305-002-004
\textsuperscript{149} Mr Gowdy T-06-11-13 p.131 line 25
\textsuperscript{150} Mr Hunter T-04-11-13 p.102 line 17
\textsuperscript{151} 210-003-022
implementation. Overall it was apparent that the Department did not accord particular priority to the quality of care in the Health Service.

7.55 Those charged with leadership within the Department were aware of the importance of quality of care and the DoH commitment to introduce clinical governance. To achieve such slow progress on such key government patient care policies indicates failure in Departmental leadership. The failure was corporate and so too is the responsibility.

Professor Scally’s Conclusion

7.56 Overall, and in answer to the primary question, Professor Scally concluded that the “Department had no effective means of knowing what was going on in hospitals prior to 2003 in terms of quality of care” given the absence of:

“a. a culture of universal participation in a structured system of clinical audit,

b. a broad based system of surveillance and analysis of serious untoward incidents/adverse events,

c. quality of care as a major focus for the Department and its professional advisory systems, and

d. the timely implementation of clinical governance from 1998 onwards…”

Accordingly he did not find it surprising “that the series of deaths from hyponatraemia did not come to the attention of the department in a systematic fashion.”

Knowledge of the deaths

7.57 Whether by systematic means or otherwise, the deaths of all the children should have been reported. Mr Gowdy indicated that he would “certainly”
have expected the Department to have been informed of them all\textsuperscript{154} and Mr Colm Donaghy, Chief Executive of the Belfast Health and Social Care Trust, on behalf of the former RGHT, apologised for the lack of communication with the Department.\textsuperscript{155}

7.58 However, as the evidence unfolded, and despite Departmental denials, it became necessary to consider whether the Department might not in fact have known about the deaths of Adam, Claire and Lucy prior to Raychel’s death in 2001.

\textit{Adam Strain}

7.59 Just as Adam’s death was not formally reported within the RGHT, it was not formally reported to the Department. The findings at inquest were not shared and there was no other obvious communication of information. The CMO stated that the “Department was not made aware of the case at the time by either the RVH or the Coroner. We only became aware of that particular case when we began the work of developing guidelines following the death at Altnagelvin.”\textsuperscript{156} However, this assertion came to be questioned.

7.60 During Adam Strain’s inquest on 21\textsuperscript{st} June 1996 the RGHT provided the Coroner with draft ‘Recommendations for the Prevention and Management of Hyponatraemia arising during Paediatric Surgery.’\textsuperscript{157} They were drafted by Dr Joseph Gaston,\textsuperscript{158} approved by Dr Peter Crean\textsuperscript{159} and signed by Dr Robert Taylor.\textsuperscript{160} Notwithstanding that they purported to indicate how such cases might be managed in the future,\textsuperscript{161} they were not circulated among other clinicians or submitted to the Department. Mr Gowdy observed that the references to hyponatraemia in the recommendations “\textit{was of such general application as to be of interest and significance to other}”

\textsuperscript{154} WS-062-2 p.10
\textsuperscript{155} Mr Donaghy T-12-11-13 p.6 line 13
\textsuperscript{156} 006-002-117
\textsuperscript{157} 060-018-036
\textsuperscript{158} 306-081-003, 060-018-035 & WS-013-2 p.4
\textsuperscript{159} 303-001-007 & 060-014-025
\textsuperscript{160} 303-001-003 & 011-014-107a
\textsuperscript{161} 122-044-048
and that he would have expected a copy to be sent to the Department because of the regional implication.

7.61 The CMO herself believed that had they been brought to her attention she would have regarded them as an appropriate matter for consideration by her Specialty Advisory Committees for Anaesthetics and Paediatrics. In this connection it is to be noted that Drs Gaston, Crean and Taylor had all been one-time members of these committees and Dr Crean accepted that the case for guidelines on fluid management and hyponatraemia would have been an appropriate matter for discussion.

7.62 I do not however consider it likely, given their earlier disinclination to share their recommendations, that they notified the Department’s SACs about Adam. The committees were not well suited for the purposes of such communication. Dr Miriam McCarthy indicated the “view among Departmental colleagues and SAC members was that the frequency of meetings (most were annual) meant the meetings were not designed to facilitate a response to the wide range of issues arising between meetings and for which alternative mechanisms were needed.”

7.63 It also became apparent that Dr Gaston had involved the senior hospital anaesthetist, Dr Samuel Morrell Lyons, in the aftermath of Adam’s death. He was, amongst other things, Chairman of the Central Medical Advisory Committee of the Department. Whilst this could speculatively be interpreted as some form of indirect ‘reporting’ to the Department, I do not believe that to have been the case. Dr Lyons had very little engagement with the facts of the case and there is nothing to suggest that he understood matters much beyond what Dr George Murnaghan and Dr

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162 WS-062-2 p.10
163 WS-075-2 p.8 & 320-110-001
164 075-076-287
165 Dr Crean T-11-09-13 p.12 line 22
166 337-001-002
167 WS-080-2 p.19
168 306-081-006
169 Dr Gaston T-19-06-12 p.2 line 8
170 306-081-006 & 093-024-066
171 093-024-067
172 306-081-005
Gaston were telling him and there is no reason to suppose that they told him more than they told anyone else in a position of governance. I do not consider that the Department was thereby informed about Adam’s case.

Claire Roberts

7.64 Claire’s death was not formally reported to the Department until 28th March 2006\(^{173}\) when the Trust reported it as a SAI pursuant to interim guidance HSS (PPM) 06/04.\(^{174}\) Notwithstanding that the report could and should have been made in 2004, her case had already come within the scope of this Inquiry and the Department was therefore on notice. This was however another example of RGHT failure to follow guidance and Departmental failure to check that its requirements were being met.

Lucy Crawford

7.65 There is no evidence that Lucy’s death was reported at the time to the Department. In February 2003 Mr Stanley Millar\(^{175}\) Chief Officer of the WHSSC notified the Coroner of Lucy’s death.\(^{176}\) The Coroner copied Mr Millar’s letter to the CMO on 3rd March.\(^{177}\) The Department therefore maintained that it did not become aware of Lucy’s case until March 2003.

7.66 However, Dr Campbell wrote an article about Lucy’s death for the ‘Irish News’ on 21st May 2004 in which she stated that “In fact, the Coroner referred Lucy’s case to me as long ago as June 2001…”\(^{178}\) Whilst she quickly corrected this to read ‘March 2003’,\(^{179}\) it nonetheless gave rise to suspicion that the Department was in possession of information earlier than claimed and at a date before the death had been properly explained to Lucy’s parents.

\(^{173}\) 322-070-003  
\(^{174}\) 322-070-001  
\(^{175}\) 325-002-011  
\(^{176}\) 013-056-320  
\(^{177}\) 006-010-294  
\(^{178}\) 004-010-154 – Dr Campbell made a similar assertion in an interview with UTV on 25-03-04 (006-037-376).  
\(^{179}\) 004-010-155
7.67 Relevant in this context was the suggestion by Dr William McConnell\textsuperscript{180} that Mr Hugh Mills\textsuperscript{181} had telephoned the Department about Lucy.\textsuperscript{182} Mr Mills was very clear that he had not\textsuperscript{183} and Dr McConnell could provide no further detail. Notwithstanding that Mr Thomas Frawley\textsuperscript{184} of the WHSSB "would have expected the Trust to notify the DHSSPS of an 'untoward death' such as that of Lucy Crawford"\textsuperscript{185} he did not believe that the Trust had reported Lucy’s death to the Department.\textsuperscript{186} There is no evidence that any other member of the Sperrin Lakeland Trust’s senior management reported Lucy’s death and Mr Mills confirmed that the Trust’s review of the case was not drawn to the Department’s attention either.

7.68 It is difficult therefore to conclude that the Department was aware of either the facts or import of Lucy’s case before it was drawn to the Dr Campbell’s attention by the Coroner and the Coroner could not have done so before he himself was informed in February 2003. The fact that Dr Campbell had always been clear that it was the Coroner who informed her about Lucy and this had always been capable of corroboration, suggests to me that her statements were simply confused as to dates. She is unlikely to have known about Lucy in 2001.

**Chief Medical Officer’s Working Group on Hyponatraemia**

7.69 In 2001, Dr Ian Carson,\textsuperscript{187} Medical Director of RGHT, was also serving as Special Advisor to the CMO.\textsuperscript{188} It was in this capacity that he was informed on 18\textsuperscript{th} June 2001 that Raychel had died of hyponatraemia and that her death was linked to fluid management with low saline solution.\textsuperscript{189} He brought the matter to the immediate attention of Dr Campbell and
suggested that in the circumstances, it might be appropriate to provide regional guidance.

7.70 On 27th July 2001 Dr Campbell sought background information and asked if there was "anyone at RBHSC who could put together a short paper on this?" Dr Taylor was asked and his paper entitled 'Hyponatraemia in Children' was e-mailed by Dr Carson to the CMO on 30th July 2001 with the observation that “The problem today of ‘dilutional hyponatraemia’ is well recognised (See reference to BMJ Editorial). The anaesthetists in RBHSC would have approximately one referral from within the hospital per month. There was also a previous death approx. six years ago in a child from the Mid Ulster. Bob Taylor thinks that there have been 5-6 deaths over a 10 year period of children with seizures..."

7.71 Dr Campbell was assisted within the Department by Senior Medical Officer Dr McCarthy. She considered Dr Taylor’s briefing and thought it “very helpful” but did not attempt to learn any more about the deaths referred to. Nor does it seem that Dr Campbell or Dr Carson, or anyone else in the Department asked any questions about the alarming numbers of deaths from dilutional hyponatraemia thus brought to their attention.

7.72 Dr Carson interpreted the deaths to have occurred in the UK, not least because “if there’d been five or six deaths over a ten year period in the Royal Belfast Hospital for Sick Children, I would have known about it.” Taking account of the deaths now known and another referenced by Dr Taylor, it is possible that there were five deaths within ten years in RBHSC. Notwithstanding, I fully accept that Dr Carson did not know about those deaths. In any event, the Department had clearly been informed that the
problem of dilutional hyponatraemia was implicated in more than a single death in Northern Ireland.

7.73 Dr Campbell then gave direction that a Working Group should develop and provide guidelines for safe paediatric fluid management and the avoidance of hyponatraemia. On 14th August 2001 the task of co-ordinating production of the guidelines was delegated to Dr McCarthy. It was, she indicated, “a task and finish group established only to develop guidance on the prevention of hyponatraemia.”

7.74 The Working Group assembled on 26th September 2001 and included a number of clinicians, familiar not only with hyponatraemia but also with some of the other deaths concerning this Inquiry, including Claire and Lucy. The question therefore arose as to whether their work within a Departmental group placed the Department on notice of the other deaths known to them. Of particular interest was whether group members discussed amongst themselves the deaths known to them. If they did, they might have been sharing information about the deaths of Claire and Lucy within a Departmental context which had not been disclosed to their grieving families or the Coroner and which would not be disclosed for some considerable time to come.

7.75 Of particular interest was the involvement of Drs Taylor, Nesbitt, Crean, Jenkins and Loughrey. Dr Taylor was more than fully aware of Adam’s case and had examined Claire in PICU. As Paediatric Audit Co-ordinator he may possibly have learned of Lucy’s death. Dr Crean treated both Lucy and Raychel and was aware of the fluid issues in Adam’s case.

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200 075-082-329
201 WS-080-1 p.2 & WS-075-1 p.6
202 WS-080-2 p.5
203 007-048-094
204 328-003-001
205 328-003-001
206 328-003-001
207 328-003-001
208 WS-157-1 p.2
209 061-038-123
210 013-021-071
211 012-032-159
212 060-014-025
His name appears as Claire’s Consultant in her Discharge Summary.\textsuperscript{213} Dr Nesbitt not only knew about Raychel's case but had advised his Medical Director on 14\textsuperscript{th} June 2001 of “... several deaths involving No.18 Solution.”\textsuperscript{214} Dr Loughrey was the Chemical Pathologist who advised the Coroner about the cause of hyponatraemia in Raychel’s case and Dr Jenkins was known for his particular interest in fluid and electrolyte management and was to be asked in February 2002 to provide expert opinion in Lucy’s case.\textsuperscript{215} Mr G Marshall FRCS was also included. He was from the Erne Hospital where Lucy had been treated.

7.76 When asked whether the Working Group considered the deaths of Adam, Claire or Lucy, the Department maintained that “the CMO’s Hyponatraemia Working Group was set up to develop guidance on the prevention of hyponatraemia and not to consider the case of any specific child.”\textsuperscript{216}

7.77 Professor Swainson nonetheless considered that it would have been logical for the group to consider those deaths specifically known by group members to be due to hyponatraemia because he did not “think you can divorce the context in which you are doing the work from the work itself. And I still think you’d want to test the assumptions and the conclusions you are coming to against your experience of those cases.”\textsuperscript{217}

7.78 Further suspicion arose because Dr Jenkins told UTV that the Working Group had been set up after it was recognised that both Raychel and Lucy had died with hyponatraemia.\textsuperscript{218} Dr Jenkins corrected himself, explaining that he had become confused as to when he had found out about the deaths and that he had not in fact known about Lucy’s death at the time of his contribution to the Working Group.\textsuperscript{219}

\textsuperscript{213} 090-009-011
\textsuperscript{214} 022-102-317
\textsuperscript{215} Dr Jenkins T-10-09-13 p.25 line 5
\textsuperscript{216} 009-014-022
\textsuperscript{217} Professor Swainson T-19-09-13 p.127 line 15
\textsuperscript{218} 069a-056-181
\textsuperscript{219} 074-016-071 & Dr Jenkins T-10-09-13 p.19 line 18
In preparation for the first meeting of the group, Dr Taylor prepared a presentation on “Hyponatraemia in Children” which he sent to the Department on 18th September 2001. Dr McCarthy noted the content of the presentation. It placed hyponatraemia in the context of the administration of excessive maintenance fluids and incorporated detailed information on the ‘Incidence of Hyponatraemia at RBHSC.’ Remarkably it omitted the deaths of Adam, Claire and Lucy. In the event, his presentation was not given, perhaps because, as Dr Taylor explained, his figures were based on incomplete data.

The Deputy CMO Dr Paul Darragh chaired the first meeting of the Working Group on 26th September 2001. Dr Taylor described those patients most at risk and advised that it was “a problem that has been present for many years.” Dr McCarthy recalled “Dr Taylor advising attendees of the increased identification of cases of hyponatraemia in the RBHSC, including 2 cases resulting in fatality.”

Dr Taylor undertook to report Raychel’s case to the Medicines Control Agency (MCA). He wrote to the MCA on 23rd October that he was: “conducting an audit of all infants and children admitted to the PICU with hyponatraemia. My initial results indicate at least two other deaths attributed to the use of 0.18NACL/4% glucose” (emphasis added). This correspondence was then shared with Drs Jenkins, Nesbitt and McCarthy and may thus have been the origin of Dr Jenkins’ belief that the working group had been set up after the deaths of two children in Northern Ireland. If so, his confusion is then more readily understood.

220 007-051-101
221 007-051-100
222 WS-080-2 p.7
223 007-051-106
224 Dr Taylor T-11-12-12 p.151 line 8
225 337-001-002
226 007-048-094
227 Dr Taylor T-18-09-13 p38 line 10
228 WS-080-2 p.13
229 WS-008-1p.18
230 012-071e-412 nb emphasis added
231 007-032-059
within the Department the correspondence “would have been noted and filed.” Throughout work on the guidelines, Dr McCarthy regularly discussed progress with Dr Campbell, providing her with updates and drafts as appropriate.

It is clear that Raychel’s death was discussed and whilst discussion of broader incidence may have been vague, it is also clear that the group knew that it was addressing a problem that extended beyond Raychel’s death alone. It is in this context that it might be thought to have been natural for individual members to discuss the overall incidence of deaths and compare and contrast the rather different cases of Adam and Raychel, and possibly also Claire and Lucy, to better understand the issues arising. Even Dr Campbell agreed that it “would be unnatural for them not to put that into the pot.” As Dr Darragh put it “all doctors always talk about their individual experiences.”

In the event, Dr Darragh noted that “given Dr Taylor’s presentation … there were clearly likely to be other cases emerging but the important step of producing guidelines was the appropriate step to be taking at regional level at that time.” Accordingly, it was agreed that simple guidelines were required and that in order to move quickly, a small sub-group would undertake the drafting of the guidelines together with an audit protocol.

Notwithstanding Dr Taylor’s contribution, he was not included in the drafting sub-group. Instead, Drs McCarthy, Jenkins and Crean met on 10th October 2001 with Dr Jarlath McAloon who was co-opted for additional paediatric perspective. The sub-group decided to proceed by way of e-mail communication as a “virtual group” in order “to facilitate more rapid
progress in developing the guidance." This limited the scope for group discussion and indeed subsequent communication does not appear to have been general. As Dr McAlloon recalled his "responses were channelled through Dr McCarthy’s office and I am not aware of who saw them."

Dr McAlloon considered that his role “was to provide comments from the perspective of a general paediatrician who would be expected to implement the guidance once produced” and recalled “the initial face-to-face brainstorming meeting to help identify key components needing to be addressed in the guideline.” Notwithstanding that Dr Jenkins “regarded it as [his] responsibility to test the guidance against the knowledge that [he] had” he did not expect others in the group to mention individual cases or test the draft against such cases. He acknowledged that “it would have been easier, for doctors to have shared that type of information in a face-to-face meeting other than in e-mails.” The focus, he said “was on the guidelines, not on any individual case.” The guidance was intended for the generalist junior doctor and not the specialist and accordingly the drafting group concentrated on the key general principles to be applied to all children receiving IV fluids.

Dr Crean thought that “we probably were all drawing on our own expertise with children we had managed.” It is to be noted that apart from Dr Crean, no other member of the drafting sub-group had managed any of the children known to have died. Notwithstanding that Dr Crean could have drawn on his own expertise, there is no indication that he shared his knowledge in respect of individual cases. Indeed, the evidence of Drs Jenkins,
Crean, Nesbitt and Taylor agreed that the Working Group did not at any time discuss or consider the deaths of Adam, Claire or Lucy.

7.88 This does seem odd, not least because there were some within the group who were interested in other cases. On 30th November 2001 Dr Loughrey e-mailed Dr McCarthy to enquire whether she was aware of “the death of a four year child in what sound like very similar circumstances in Northern Ireland in 1996.” Dr McCarthy then discussed the cases of Adam and Raychel with the Coroner and received copies of Adam’s autopsy report and Dr Edward Sumner’s report which were relayed to Dr Campbell. There is however no reference to either Claire or Lucy in any of the extended threads of e-mail correspondence seen by this Inquiry.

7.89 Dr McCarthy circulated a “final draft” of the guidelines to the group on 7th November. Dr Loughrey expressed disappointment that it did not positively discourage the use of hypotonic fluids because she believed this was “a major (if not the major) factor in the demise of the child in Altnagelvin.” Dr Crean did not agree, arguing that advice on specific IV fluids should not be given when “there is not really any evidence to suggest that one solution is more or less harmful than another.” Dr Loughrey countered that she felt so strongly about referencing the risk associated with Solution No.18, that if it was not included, she would wish to be disassociated from the guidelines. This was an issue that was discussed in detail and given the genuine disagreement it would seem to have presented an obvious opportunity to test the draft guidelines against known cases. Indeed, Dr McCarthy recognised that “the patient’s illness, condition, age, post-op status and serum sodium all play a role in dictating
the choice of fluid." whilst Dr Darragh conceded that this would have been both useful and obvious, it was seemingly not done. In this context, I consider it very likely that had the known deaths been referred to, then some reference would appear in at least one of the multiple threads of e-mail correspondence. However there is no such reference.

7.90 Dr McCarthy said that “information on previous deaths was absolutely not shared in that group. When I now see what people knew, it is a surprise to me that that wasn’t, but that is the reality.” Indeed she said she found it "inexplicable more than anything".

7.91 On the evidence before me I cannot therefore be persuaded that the Department can be fixed with notice of the deaths of Claire or Lucy in this context. A combination of urgency to complete the guidelines, the distancing effect of individual communication by e-mail, the obscuring effect of Dr Taylor’s purported ‘Incidence of Hyponatraemia at RBHSC’, Dr Crean’s silence and the busy professional lives of all concerned probably inhibited the sort of exchanges that might have been thought obvious. The absence of any evidence to the contrary supports this conclusion.

7.92 The Department issued its ‘Guidance on the Prevention of Hyponatraemia in Children’ in March 2002. Dr Campbell published it with her direction that “Fluid protocols should be developed locally to compliment the Guidance and provide more specific direction to junior staff... It will be important to audit compliance with the Guidance and locally developed protocols and to learn from clinical experiences.” The Working Group ceased to exist on publication and did not produce the “audit protocol” agreed at its first meeting. Nor did it offer any guidance as to how fluid protocols might be developed locally. Dr McCarthy thought that they “would probably follow
They did not and with hindsight that is a matter for regret.

Notwithstanding, it is to be recognised that the CMO’s guidelines placed Northern Ireland, in the view of Dr Sumner, “ahead of the rest of the UK.” This was achieved with speed and efficiency. It was a significant achievement and properly worthy of praise because, as Professor Swainson observed, the guidelines “have improved considerably the quality of care across the province and reduced the risk of Hyponatraemia.”

Chief Medical Officer

Unfortunately, and undermining her important work in publishing the guidelines, Dr Campbell gave a series of extraordinary interviews to the media in the aftermath of the inquests into the deaths of Raychel and Lucy. Rather than communicating in order to inform and reassure, she made statements which so inflamed the suspicion and distrust of Mr and Mrs Ferguson and Mr & Mrs Slavin that they called for her resignation in December 2004. Such was Mr & Mrs Ferguson’s disquiet at what she had said that they asserted that she was engaged in a cover-up and referred her conduct to the GMC.

Transcripts of two BBC and two UTV interviews, together with another given to a journalist, reveal carelessness as to facts and an inappropriate defensiveness about clinical treatment. Whilst they mislead and are troubling in their lack of professionalism, they do not constitute a cover-up. In this regard it is to be emphasised that Dr Campbell made clear her view that “the deaths of Lucy and Raychel may indeed have been entirely preventable,” that “if we’d had an early inquest into Lucy’s death, then it

270 Dr McCarthy T-31-10-13 p.79 line 13
271 006-002-156
272 226-002-006
273 073-037-162
274 068-013-022
276 034-151-407
might have been that the death of Raychel might never have happened,”\textsuperscript{277} that “anybody reading those [Coroner’s] reports would say and agree with the coroner that the management of the fluids could have been much much better and that it was inadequate.”\textsuperscript{278}

7.96 In addition she stated on the record that “It’s quite clear that there was no process for the reporting of Lucy’s death to me, nor indeed the outcome of any investigation,”\textsuperscript{279} “I absolutely agree that if we had in place a system for the reporting of all …untoward deaths, that we could have begun to learn lessons earlier”\textsuperscript{280} and “Our role as the Department is development of strategy and policy and a strategy and policy on proper investigation is what we need to do.”\textsuperscript{281}

7.97 However and at the same time she repeatedly misinformed her interviewers and the public. She appeared intent on distancing the Health Service from responsibility and understating the known risks of hyponatraemia so as appear an apologist for much that had happened. That she repeatedly allowed herself to be exposed in this way for interview was an error of judgement and what she said is a cause for concern.

7.98 Amongst other things she claimed:

(i) “…when untoward and rare events happen we need to find a way of learning from them. Now they only happen every 5 or every 10 years.”\textsuperscript{282} This can only have been invented. Not only was there no reliable system to inform her of such events, but an internal Departmental e-mail from the following year records Dr Campbell as estimating the “numbers of serious untoward incident deaths reported to her…about 3-4 annually”\textsuperscript{283}
(ii) That Adam “was an entirely different clinical situation”\textsuperscript{284} to Raychel – “From what I know of the clinical details the case 7 years ago was of a child who was already very ill...I think it is important to recognise that in this case here we had a normal healthy child so therefore something had to be looked at...they needed to consider what measures needed to be put into place in order to prevent that happening again.”\textsuperscript{285} The suggestions that Adam was a victim of his pre-existing condition and not blatant clinical error, that he was not sufficiently normal or that his case was less deserving of investigation in order to prevent recurrence are erroneous and insulting.

(iii) “with Lucy we saw the first case of what was a very rare occurrence written up in the medical journals only recently...”\textsuperscript{286} Dr Campbell was fully aware of the earlier case of Adam, had been briefed with Professor Alan Arieff’s paper published 12 years before and had been advised by Dr Carson of the previous incidence of death.

(iv) Speaking of Lucy and Raychel she said “The rarity in this event and you do have to return to the medicine, the physiology behind these 2 events... was the abnormal reaction which is seen in a very few children to the normal application...”\textsuperscript{287} Asked to comment on this assertion, Dr Dewi Evans\textsuperscript{288} indicated that the statement was wrong and it would worry him that it was made by the CMO for Northern Ireland.\textsuperscript{289}

(v) “What we now know is, that the fluids which were given to Lucy were the ones that were being used in ordinary custom and practice throughout the whole of the National Health Service except for one or two practitioners who’d begun to recognise this issue of
hyponatraemia where the body goes through this abnormal response in just a very few cases and you begin to get oedema or swelling of the brain. Now in retrospect, and knowing all the evidence that has been published since Lucy’s case and over the last four years, we now know that that condition exists, that it can happen, albeit in a very few patients…”

Dr Campbell appeared to reject the Coroner’s findings at inquest. Lucy’s death resulted from clinical error not abnormal response. It was disingenuous of her to suggest that the excessive fluids given Lucy were standard because she was more than fully aware of the distinction between type and volume of fluid. It was misleading to assert that only one or two practitioners were alert to the issue, given that she knew Professor Arieff’s paper had been published in the British Medical Journal. Further and in any event it was quite wrong to characterise hyponatraemia as an abnormal response and dishonest to suggest that the condition was not known to exist in 2000.

(vi) That this was not inadvertent error is clear from the CMO’s repeated assertions that the mismanaged fluid therapy was somehow normal and the risks negligible “…the fluids that we are talking about, that Lucy got, were in general use and …one in 300 of children who were getting those fluids would develop hyponatraemia…and ten percent of those would go on to have a fatal reaction.”

(vii) When asked whether an investigation or inquest should not have been held earlier in Lucy’s case she said that “the coroner did not feel at that time that an inquest was required…” Later the same day she said that “on looking back at the issues, I think if we’d had an early inquest into Lucy’s death, then it might have been that the death of Raychel might never have happened…What the coroner
has now agreed is that he will draw to our attention very early on those deaths about which he has concern.”

This suggested that the lack of a timely inquest was the responsibility of the Coroner rather than of the clinicians themselves and furthermore carried the implication that, but for the Coroner’s decision, Raychel might have lived. The Coroner immediately wrote to her and protested that “in the interview you gave on BBC television you mentioned that the death of Raychel Ferguson could have been prevented if the full circumstances of the death of Lucy Crawford had been known sooner and you mentioned the desirability of there having been an earlier inquest into Lucy’s death. I believe the papers I have provided you with explain what happened when Lucy’s death was reported to my office and why a coroner’s post-mortem examination was not then ordered.”

Further and by way of additional information he added “When he gave evidence in the inquests into the deaths of Adam Strain, Raychel Ferguson and Lucy Crawford, Dr Sumner was at pains to state that his views on fluid management of children did not constitute ‘new’ medical knowledge.”

7.99 Dr Campbell has since indicated her deep regret for what she said and for causing the Ferguson family additional distress. She said that “on reflection I realise -- I realised much after the interviews -- that some of the things that I said could have been misunderstood in terms of what I was trying to say. They were very poorly crafted.” She accepted that she “was ill-prepared” and took “full responsibility for saying things in a way which could have been misinterpreted. That was never my intention and it has cast a shadow over my life since.”

7.100 Dr Campbell’s approach bore many of the same characteristics as marred those meetings arranged by clinicians with Mr and Mrs Ferguson and Mr
and Mrs Roberts. Defensiveness continued even after mismanagement had been revealed and when inaccuracy and evasion could only exacerbate suspicion. Whilst such failures in communication may be ascribed to lack of preparation and a desire to deflect criticism, it must be stated that in my view they also proceed from arrogance and complacency. The CMO’s public statements were a further manifestation of a culture which has revealed itself to this inquiry at every level of the Health Service.
CURRENT POSITION

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Introduction

8.1 In order to discover whether the many deficiencies uncovered by this Inquiry have been addressed, and to understand what the relevant statutory bodies have done and could still do to improve matters, I decided upon a different approach for inquiry. I convened forum sessions for opinion and discussion, with representatives from the Department of Health (‘the Department’), the Belfast Health & Social Care Trust (‘BHSCT’), the Health and Social Care Board (‘HSCB’), the Public Health Agency (‘PHA’), the Patient and Client Council (‘PCC’), Action against Medical Accidents¹ (‘AvMA’) and others. Exchanges of opinion were encouraged from the evidence received, the agenda for discussion and questions arising. Participants were immune from criticism. Statutory bodies and others were asked for up-to-date position papers to detail current systems and problems. In particular, submissions were invited in respect of my more significant concerns, including the reporting and investigation of Serious Adverse Incidents (‘SAI’s’), the involvement of families, the handling of complaints and the introduction of a legally enforceable duty of candour. The responses and position papers received were shared with interested parties and are to be found on the Inquiry website.

8.2 Formulation of relevant recommendations is dependent upon an understanding of systems as they are today, notwithstanding that some problems appear constant. The Inquiry sought relevant up-to-date information and has attempted to note the changes occurring in the years since the deaths examined. Given the pace of procedural reform in the years since, this has been no easy task. For this reason this chapter of the Report is not to be understood as intending a comprehensive and up-to-the-minute account of the current position.

8.3 In Chapter 9 of this Report I set out my recommendations to strengthen and improve both practice and system. Although much has been achieved, much remains to be done. I recognise the obvious difficulties inherent in

¹ A UK charity offering independent advice and support to people affected by medical accidents.
translating recommendation into effective change and have come to believe that the best prospect for continued improvement rests with the focused involvement of families and a Health Service leadership which is zealous about learning from error.

8.4 Even brief analysis of this Report will reveal the recurrent themes so clearly marking the cases examined. I believe that the issues of competency in fluid management, honesty in reporting, professionalism in investigation, focus in leadership and respect for parental involvement to be the most obvious raised. They are also the most important because they are individually and collectively critical to learning from error.

8.5 Ultimate accountability for learning from error in the healthcare service rests with the Department and the Minister. The Department must ensure that, having issued standards, the policies of the ‘arms-length’ HSC organisations are compliant and quality assured. The key question is, as posed by Permanent Secretary Dr Andrew McCormick, “How can we know if arms-length bodies are actually fulfilling the guidance and directions issued by the Department?”\(^2\) With so large and complex a system, quality assurance must come from active oversight, audit and review.

8.6 It is in this context that I have considered, in so far as I have been able, the steps taken by the Department and other statutory bodies to minimise the likelihood of recurrence. By drawing on the evidence received, weaknesses can be identified and recommendations made to further protect the patient interest. In this respect the evidence received and the frank views expressed during panel session discussions have been of real assistance.

**Progress in hyponatraemia practice and guidance**

8.7 In April 2007 the Department circulated ‘Safety Alert 22’ from the National Patient Safety Agency (‘NPSA’) about the risk of hyponatraemia to children receiving IV infusions.\(^3\) The removal of Solution No. 18 from general use

\(^2\) Dr Andrew McCormick T-15-11-13 p.10 line 21

\(^3\) 330-167-001
was directed and warning posters placed in all paediatric units. Trusts were instructed to develop local protocol and audit their own compliance. Alert 22 guidance was then issued by the Department in September 2007 as ‘Parenteral Fluid Therapy (1 month – 16 years): Initial Management guideline’. The BHSCT was able to confirm that Solution No 18 had been removed from all general areas where children were treated.

8.8 The Regulation & Quality Improvement Authority (‘RQIA’) reviewed compliance with ‘Safety Alert 22’ in June 2008 and found it wanting. It reviewed and reported again in May 2010 on the ‘Implementation of recommended actions outlined within NPSA Alert 22 throughout HSC Trusts and independent hospitals in Northern Ireland’ and concluded that compliance with Alert 22 had, by then, been substantially achieved and that there was good operational control of IV fluid administration to children. It concluded that clinicians were aware of the Guidelines and that nursing staff had received training in paediatric fluid administration. Notwithstanding, it made recommendations to consolidate progress. The Guidelines were amended in 2010 and the Department requested the Northern Ireland Medical & Dental Training Agency (‘NIMDTA’) provide the relevant training for medical undergraduates and junior doctors.

8.9 There were also Guideline and Implementation Network (‘GAIN’) audits in 2012 and 2014 measuring adherence with the IV fluid guidance developed from Alert 22. The 2012 report found that the IV fluids in use were compliant with recommendations even if some further improvement

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4 303-026-350
5 330-135-002
6 330-167-002
7 303-059-817
8 330-134-001
9 303-058-776
10 303-031-415
11 303-060-818 - Guidance on Parenteral Fluid Therapy for Children & Young Persons (Aged over 4 weeks and under 16 years)
12 330-152-003
13 GAIN was established as a partnership body of the Department in 2007. It works closely with the Department’s Standards and Guidelines Quality Unit. It receives programme funding to conduct regional audits and where necessary produce local guidelines for the HSC.
14 333-165-001
15 303-060-818
was required to achieve 100% overall compliance. Progress was maintained in 2013 with a revised ‘Regional Fluid Balance and Prescription Chart for Children and Adults’ and the wall chart for ‘Parenteral Fluid Therapy for Children and Adults (aged over 4 weeks and under 16 years)’ was updated in September 2014.

8.10 GAIN conducted a follow-up audit in 2014 “to examine whether the administration of IV Fluids to children and young people (aged over 4 weeks and under 16 years) is safe and meets quality standards.” Overall compliance was again found to have improved but adherence was not yet 100%. Nonetheless and importantly it found “that the prescription of fluid type, particularly to those deemed to be at particular risk of developing hyponatraemia was always found to be appropriate…” and that “young people being cared for in an adult ward appear to have received the same standard of care as children being cared for in paediatric wards.”

8.11 However, the report did make some recommendations concerning regularity of assessment and the proper completion of documentation. The HSCB/PHA then published further guidelines for use with the chart in 2015 and BHSCT issued its own ‘Policy for recording fluid prescriptions and balance charts.’

8.12 GAIN recommended additional hospital auditing of IV fluid management in children. To that end a Paediatric IV Fluid Audit Improvement Tool (‘PIVFAIT’) has now been devised and introduced to all HSC Trusts to provide local assurance in relation to the administration of IV fluids to children and young people.

8.13 National Institute for Health and Care Excellence (‘NICE’) has since published ‘Clinical Guideline NG 29’ for ‘Intravenous fluid therapy for children and young people in hospital’ which received the endorsement of

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16 403-011-009
17 403-011-003
18 403-011-006
19 401-001an-001
20 401-001ao-001 & 404-001i-011
21 404-001e-001
the Department in September 2017.\textsuperscript{22} The regional Fluid Balance and Prescription Chart for children and young people has now been revised in line with NG 29\textsuperscript{23} and amended wall charts detailing parenteral fluid therapy for those aged over 4 weeks and under 16 years have been circulated for display in all areas where such patients are treated. Trusts have been requested to disseminate these charts and, given their regional importance, have been required to formally advise the Department as to anticipated dates of implementation and assure HSCB/PHA as to implementation. BHSCT intermittently updates its ‘Policy for Recording Fluid Prescription and Balance Charts.’ It is due for further review in 2018.

8.14 The Chief Medical Officer (‘CMO’) has requested the RQIA undertake ‘a snapshot review/audit’ of paediatric IV fluid practice. Such a review will examine the implementation of NG 29 together with the effectiveness of the wall-charts, Fluid Balance & Prescription Charts (‘FB&PC’s’) and PIVFAIT. RQIA has indicated that the review “\textit{will take place in spring 2018}”.\textsuperscript{24}

8.15 This may be timely because, in November 2017 the RQIA published an ‘Unannounced Hospital Inspection Report - Royal Belfast Hospital for Sick Children – 3-5 May 2017’.\textsuperscript{25} Whilst generally reassuring it did identify some ongoing deficiencies. It specifically recommended that \textit{“assurance audits should be carried out to ensure fluid balance charts are appropriately completed in line with best practice.”}\textsuperscript{26} It also noted a lack of clear nursing leadership.\textsuperscript{27}

8.16 It is clear that very considerable professional attention has been devoted to protecting children undergoing fluid therapy and significant progress has been made. However, there can be no room for complacency because total patient safety cannot be assured. I consider that such therapy must therefore always be subject to scrutiny, which is why I recommend that all

\begin{footnotesize}
\textsuperscript{22} 403-001-001 & 404-001k-001
\textsuperscript{23} 403-001-006
\textsuperscript{24} 404-002b-008
\textsuperscript{25} 403-028-001
\textsuperscript{26} 403-028-038
\textsuperscript{27} 403-028-014
\end{footnotesize}
children’s wards should have a senior lead nurse to provide the active leadership necessary to reinforce nursing standards and to audit and enforce compliance with guidance.

**Training in fluid management and the prevention of hyponatraemia**

8.17 In 2015 the HBSC/PHA assimilated all up-to-date regional IV fluid guidance and training packages into one document to ensure consistency in both competency assessment and training. The ‘Competency Framework for Reducing the Risk of Hyponatraemia’\(^{28}\) specifies that “All prescribers caring for children are required to be competent in prescribing IV fluids appropriately and safely.”\(^{29}\) Competency in fluid management is reliant upon training.

8.18 Within Belfast, the current BH&SCT induction process for relevant trainee doctors requires that they provide “evidence of completion of the BMJ Learning Module on Hyponatraemia.”\(^{30}\) The British Medical Journal (‘BMJ’) e-learning module ‘Reducing the risk of Hyponatraemia when administering intravenous fluids to children’\(^{31}\) is designed to teach “the dangers of hypotonic fluids in children, and how to diagnose and treat acute hyponatraemic encephalopathy” and is based on the 2015 NICE guidelines. It usefully incorporates four clinical case studies referencing the regional paediatric fluid balance chart. Whether this training is sufficiently focussed on paediatric fluid prescribing has recently been questioned by foundation doctors at RBHSC.\(^{32}\) The RQIA has recommended that BHSCT review and improve the induction programme to ensure training is appropriate.\(^{33}\)

8.19 Importantly present learning is available to all medical staff in Northern Ireland, just as most of the required training material is now available online. In terms of continuing professional education, the Competency Framework requires that “all staff… should revisit the module, once every

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\(^{28}\) 403-006-001 (reviewed September 2017)
\(^{29}\) 403-006-006
\(^{30}\) [http://www.belfasttrust.hscni.net/about/Inductionfortraineedoctors.htm](http://www.belfasttrust.hscni.net/about/Inductionfortraineedoctors.htm) - Point 3
\(^{32}\) 403-028-019
\(^{33}\) 403-028-020
three years as a minimum. Evidence of completion should be submitted …
during annual appraisal.” Relevant training presentations are also posted
on the BHSCT intranet, including ‘How to prescribe IV medicine infusions
on a medicines kardex and/or daily fluid balance and prescription sheet’.

8.20 It is recognised that these programmes are for doctors in Northern Ireland
as opposed to those clinicians who have trained outside the UK (as was the
case with some doctors treating Raychel at Altnagelvin and both Raychel
and Lucy at the Royal Belfast Hospital for Sick Children (‘RBHSC’). The
General Medical Council (‘GMC’) has sought to address this issue and
continues to scrutinise the content and quality of induction and continuous
professional development programmes.

8.21 With regard to the training of nurses in fluid management, Professor
Hanratty found that the RQIA reviews brought focus to both training and
practice. She noted a “flurry of activity to include training and policy
development…evident from the number of new documents and training
materials during 2008/09. The universities have included sessions in pre-
registration programmes. In-service training records demonstrate that
nurse managers are requesting training sessions on the topic. Discussions
with nurse managers indicate that there have been shared learning
sessions on both hyponatraemia and record keeping attended by junior
doctors and nurses.”

8.22 Professor Charlotte McArdle, the Chief Nursing Officer (‘CNO’), stressed
that training is now within the undergraduate programme and that the
Northern Ireland Practice & Education Council for Nursing & Midwifery
(‘NIPEC’) is conducting a quality assurance review of the paediatric fluid
management training course. Within the Trusts, and as early as 2010, the
Southern Health & Social Care Trust (‘SHSCT’) developed a nursing

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34 403-006-005
35 308-004-086
Competency Framework ‘For the Prescription, Administration, Monitoring and Review of IV Fluids for Children and Young People.’

8.23 There is additional ongoing education by way of induction programmes, shared learning and continuing professional development. BHSCT has introduced both an e-learning module and specific ‘awareness’ training for all RBHSC nursing staff, with a ‘Hyponatraemia – How to complete a Paediatric Fluid Balance Chart’ module. It can be accessed on the BHSCT intranet. I would recommend that all Health & Social Care (‘HSC’) Trusts ensure that relevant nursing staff access such e-learning.

8.24 A repository of HSC resources relating to hyponatraemia has been made available on the PHA website at [www.publichealth.hscni.net/directorate-nursing-and-allied-health-professions/nursing/central-repository-hsc-resources-relating](http://www.publichealth.hscni.net/directorate-nursing-and-allied-health-professions/nursing/central-repository-hsc-resources-relating). This webpage brings together both regional and national guidance relating to hyponatraemia, including links to NPSA Patient Safety Alert 22, BMJ e-Learning module, competency framework, regional wall chart, FB&PC and associated training, RQIA reports, GAIN audit reports, NG29 and advice on how to prescribe IV medicines.

Some progress in matters of clinical relevance

8.25 Just as poor record keeping emerged as a recurrent theme in the cases examined by this Inquiry, so too was it identified as an issue in 5 out of 11 public healthcare Inquiries during the period 2003-08. It was therefore very important that the CNO should have launched a ‘Recording Care Project’ (‘the Project’) to raise the standard of nursing records. The project has been extended to encompass all acute paediatric wards in Northern Ireland. Through a process of audit, benchmarking and professional review the Project has successfully demonstrated improvement in specific areas of practice. In conjunction, NIPEC has actively supported

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36 330-016-004
37 401-001-an-003
38 401-002i-001
39 330-022-025
40 330-018-001
improvement and developed tools for audit. The Department has promoted benchmarking through its ‘Essence of Care’ programme. The Nursing and Midwifery Council (‘NMC’) issued updated and detailed guidance on ‘Record Keeping’ in 2010\textsuperscript{41} and the BHSCT has since published ‘Good Record Keeping – a Simple Guide’ with Guideline posters.\textsuperscript{42}

8.26 Also of relevance is the recent development by the HSC Safety Forum (Paediatric Collaborative) of a standardised Physiological Early Warning Scores System (‘PEWS’) to assist in the early identification of deterioration in the child patient and to encourage the timely escalation of concern. A regional protocol has been agreed for its use.\textsuperscript{43} The same collaborative has also worked with parent representatives to design a safety poster ‘You Know Your Child Best’ to encourage greater parental collaboration in care. In 2014 a small multi-disciplinary group within RBHSC instituted the practice of daily PICU Safety Briefings. This innovation has proved useful and the practice has now been adopted within other clinical areas of RBHSC including Allen Ward.

8.27 Notwithstanding, the RQIA unannounced inspection of RBHSC in 2017 found “…completion of paediatric early warning scores was not always present. Robust systems to assure that best practice is followed are not in place and …limited documented evidence of communication with parents…”\textsuperscript{44} Whilst improvement has been achieved, shortcomings in documentation and communication persist. Rigorous audit must become routine.

8.28 In developing its ‘Strategy for Paediatric Healthcare Services (2016-2026)’ the Department specifically recognised some important interdependencies between paediatric services and other healthcare services, for example access to laboratory and diagnostic services, anaesthetic services and intensive care.\textsuperscript{45} Focus on interaction is important for patient safety and
the identification of systemic weakness. It is encouraging that it should inform strategy.

8.29 Importantly, the Department Strategy has also made it a Key Strategic Objective that “every child who is admitted to a paediatric department should be seen by a paediatric practitioner at ST4 or equivalent (including advanced children’s nurse practitioner) within four hours of admission and by a consultant within 24 hours of admission” It is Departmental intention that this very important objective be kept under review. I consider it should also be subject to routine audit.

Age appropriate care

8.30 In 2012 RQIA carried out a Baseline Assessment of the Care of Children under 18 Admitted to Adult Wards in Northern Ireland and found that in 2009-2010, 3,933 children aged under 18 were cared for on adult wards. Whilst these patients were mostly adolescents and could, on occasion, be justifiably cared for in an adult setting, the figures are nonetheless disquieting given what was disclosed by Conor Mitchell’s case. The RQIA Report noted inconsistent age limits for admission onto paediatric wards and recommended regional agreement in this regard.

8.31 In 2012 HSCB issued guidelines on ‘Delivering Age Appropriate Care’ to ensure that children up to their sixteenth birthday would almost always “be cared for in a paediatric environment.” All HSC Trusts must satisfy the HSCB Director of Commissioning as to compliance with this important patient care requirement. However, difficulties have been experienced with physical infrastructure, staffing levels and the lack of available beds. Some Trusts have indicated that they are ‘working on it’ and the RQIA has

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46 Assessment by ST4 or equivalent within 4 hours of admission means that in practical terms there should be a ST4 practitioner or higher, resident in the hospital.
47 Advanced nurse practitioner, staff grade or associate specialist doctor or doctor in training at ST4 or higher.
48 260-003g-001
49 403-020-041
50 401-001i-001
51 401-001i-001
52 403-028-028
53 401-001a-018
54 401-001a-018
suggested that BHSCT “work with key stakeholders to address these issues”.55

8.32 There remains inconsistency between HSC Trusts as to the age limit for paediatric admission to hospital. The RBHSC admits children up to 13 years on to the paediatric medical/surgical wards and up to 14 years from the emergency department. Most other regional hospital paediatric units in Northern Ireland admit up to the 16th birthday. Recognising that some clinical conditions necessitate flexibility, the Department has now made it a key strategic objective within the Paediatric Strategy that “Children (from birth up to 16th birthday) should usually be cared for by the paediatric team in paediatric settings, and those aged 16-17 years should be managed in age-appropriate settings within either paediatric or adult settings. In all cases, children and young people should have treatment and care delivered to them in an age-appropriate environment”56

8.33 The HSCB Commissioning plan for 2016-201757 requires that HSC Trusts make effective arrangements to ensure that children and young people receive age-appropriate care and that the regional upper age limit for paediatric services of 16th birthday is implemented. Trusts are required to demonstrate how the upper age limit of 16th birthday is actually operated in practice and those arrangements in place to ensure that children admitted to hospital up to their 16th birthday are cared for in an age-appropriate environment, by staff with paediatric expertise and with input from paediatricians where necessary.58 The new Children’s Hospital to be built in Belfast is planned to provide care for children up to the age of 18 years.59

8.34 This is an important patient safety issue and clearly not one that has been forgotten. HSCB and PHA have established forums with both professional and managerial representation to discuss just such issues arising in paediatric service provision. HSCB and HSC Trusts must continue to

55 401-028-029
56 403-020-036
57 403-021-001
58 403-021-053
59 403-020-014
pursue solutions. I recommend that HSC Trusts should publish their policy and arrangements for ensuring that children admitted to hospital are cared for in age-appropriate settings and the RQIA should review progress on implementation of the regional guidelines.

Importation of external guidance

8.35 Given the relative size of Northern Ireland it is important that it learns from the experience of other healthcare systems. To that end, the Department has maintained contact with the former NPSA and has arranged with the Health Care Quality Improvement Partnership to share in the Confidential Inquiries programme. In 2006 the Department introduced procedure to review and endorse healthcare guidance and patient safety alerts from NICE and NPSA.

8.36 External guidelines and NCEPOD Reports are received by the Department for consideration and the Department directs HSC Trusts to implement recommendations as appropriate and within stated periods. Confirmation of implementation is almost always required. In 2007, the CMO instituted the HSC Safety Forum to assist Trusts in the implementation of patient safety recommendations. It is for the HSCB to assess the implementation and provide assurance to the Department that the HSC Trusts have acted as required.60

8.37 The Department created the Guideline and Audit Implementation Network (‘GAIN’) in 2007 by amalgamating CREST, the Regional Multi-Professional Audit Group and the Northern Ireland Regional Audit Advisory Committee. GAIN has an important scrutiny and quality improvement role through auditing. It promotes good practice by publishing the results and facilitating the implementation of regional guidelines. It also promotes operational standards not yet covered by NICE. Importantly, GAIN also trains HSC staff in clinical audit and systematic review.

60 401-002w-012
BHSCT also has a Standards and Guidelines Committee to ensure the timely implementation and monitoring of external guidance. It was this committee that responded to NPSA advices by issuing policy on ‘the administration of IV fluids to children aged from one month until the 16th birthday’. The BHSCT has also formed a Therapeutic Review Steering Group to audit compliance with NICE. These systems ought to allow the BHSC Trust Board assurance that external guidelines are both implemented and monitored.

The Department identified external evidence of good practice as a “key driver for change in paediatric healthcare service provision” in its ‘Strategy for Paediatric Healthcare Services Provided in Hospitals and in the Community (2016-2026)’. In November 2011 the Department announced the development of a ten-year strategy ‘Quality 2020’ to raise standards, measure improvement and transform culture. Coincidently, much work has also recently been completed in England relevant to the ‘Quality 2020’ project which will prove of considerable assistance.

In October 2016 the Department launched a ten year ‘transformation’ programme ‘Health and Wellbeing 2026: Delivering Together’ which encompasses the concept of a Regional Improvement Institute. A 12 month progress report on this initiative was published in October 2017.
Serious Adverse Incidents

8.41 Consideration of the reporting and investigation of Serious Adverse Incidents (‘SAIs’) has been central to the work of this Inquiry.

8.42 The Department issued the first regional guidance for SAI management in 2004. This was consolidated by ‘Reporting and Follow-up on Serious Adverse Incidents’ in March 2006.69 Further advices followed on ‘How to Classify Adverse Incidents and Risk’70 and additional procedure was then introduced to promote learning from SAIs71 and guidance with templates for incident investigation reports was published in September 2007.72 Individual trusts then introduced their own protocols.73

8.43 Overall, Departmental strategy was set out in ‘Safety First: A framework for sustainable Improvement in the HPSS’ (2006)74 which emphasised the objective of an open and fair culture within HPSS. The promotion of adverse incident reporting together with improved investigation and sharing of learning were accorded particular importance in this context.

8.44 In 2013 the Department published ‘Investigating Patient or Client Safety Incidents’ outlining the Memorandum of Understanding entered into with the Coroners Service and the Health and Safety Executive for Northern Ireland in relation to liaison arrangements for joint or simultaneous SAI investigations.75

8.45 Responsibility for the management and follow-up of SAIs was transferred in 2010 from the Department to HSCB and PHA working collaboratively with RQIA. The HSCB/PHA became responsible for monitoring Trust responses to adverse incidents and providing assurance to the Department on the application of procedure. Importantly, it became responsible for ensuring that Trusts were implementing recommendations from SAI reviews. The
HSCB published an ‘Assurance Framework’ to formally articulate the quality assurance available to Trust Boards.

8.46 A regional system for the reporting of all SAIs to the HSCB was established and a ‘Procedure for the Reporting and Follow-Up of SAIs’ was issued by HSCB to all Trusts in 2010. It was reviewed and revised in 2013 and again in November 2016. It remains under ‘continuous review.’ The Procedure outlines a process which, if followed, would answer many of the concerns raised by the findings of this Inquiry.

8.47 The Procedure and guidance are informed by the NPSA ‘Being Open Framework’ (2009) and the Health Service Executive ‘Open Disclosure National Guidelines’ (2013) and are expressly based on the principles of openness, responsibility to share learning and necessity to continually review both reporting and investigation. In order to provide regional consistency it provides clear procedures for reporting, reviewing and the implementation of learning. It sets out necessary definitions, roles and responsibilities. There are model SAI notification forms and forms for use in both ‘interface’ incidents and ‘never events’. Criteria are given for proportionality in investigation and provision is made for the involvement of families and ‘lay people’. There is guidance on post-incident debriefing, independence in investigation, root cause analysis, significant event audit, Datix coding forms, joint investigations and timescales. The form and content of an Incident Review Report and Action Plan are set out. Guidelines and checklists for engagement with families are appended. Completion of these checklists is mandatory. Advice is given on meeting a family after a death and examples of open communication are helpfully appended. The Guide for HSC Staff on ‘Engagement/Communication with the Service User/Family/Carers following a serious adverse Incident’ is attached and updated to November 2016. Guidelines to ensure best
practice are given and truthfulness, timeliness and clarity are emphasised. Assistance for families is suggested and details are given of the help available from the PCC. An information leaflet designed to advise families about the SAI process is now available.\footnote{401-001aa-001}

8.48 The Procedure introduced the role of the HSCB ‘Designated Review Officer’ (‘DRO’) to oversee Trust SAI procedures, scrutinise findings and identify regional learning.\footnote{331-009-001} The DRO, in the case of a child death where fluid mismanagement or nursing failure is suspected, would be a Consultant in Public Health who would work with a Nurse Consultant and a Pharmacist.\footnote{331-013-002} A new practice protocol for DROs was issued in April 2017.\footnote{http://insight.hscb.hscni.net/information-for-designated-review-officers-dros/}

8.49 The terms of reference for an investigation, timescales for reporting, extent of family involvement and identity of those investigating must all be agreed with the DRO. The DRO will then consider the SAI report and, if content with both investigation and recommendations, will formally conclude the SAI process. The DRO consults other relevant organisations including RQIA to ensure that reasonable action has been taken to reduce the risk of recurrence and that learning of broader implication has been disseminated. Thereafter further action is to be monitored by the Trust itself.

8.50 Workshops were organised to discuss implementation of the new SAI process attended by governance leads from HSCB/PHA, the six HSC Trusts and the Department.\footnote{404-001j-007} HSCB also organise SAI follow-up exercises with checklists for systematic monitoring.

8.51 HSCB/PHA seeks to maintain focus on the central problem of learning from SAIs with a weekly HSCB Senior Management Team review of Trust SAI reports and healthcare related Coroner’s reports. Regular and formal liaison is maintained with other relevant organisations including RQIA, NIMDTA and NIPEC. ‘Learning Reports’ on SAIs are published bi-
annually.86 The most senior level of management is involved so as to provide assurance. In an attempt to enhance learning from less serious incidents, a project within the ‘Quality 2020’ programme is examining different methods of sharing the analysis of investigation.87

8.52 The Regional SAI Review Group considers individual SAI investigations and decides if further action is necessary. Specific advice can be given Trusts by way of a ‘Learning Letter’. Notwithstanding “judicious use” of learning letters, the Review Group still “issues around one learning letter a month.”88 Thereafter it requires appropriate assurance that the trust has acted as required.89

8.53 SAI s, complaints and the reports of the regional SAI review group are considered by the HSCB/PHA Quality Safety and Experience Group which seeks to identify broader regional concerns. Although RQIA does not receive acute hospital SAI reports it does provide two members of the HSCB Regional Adverse Incident Steering Group which also reviews a selection of investigation reports to assure appropriate scrutiny of themes, trends, practice and learning. Thereafter, the Safety Quality and Alerts Team (‘SQUAT’) implements and quality assures the Alerts, Guidance and Learning Letters arising from SAI s.

8.54 HSCB/PHA have developed a newsletter, in addition to other channels of regional communication, to disseminate SAI learning to all levels of healthcare staff. ‘Learning Matters’ is accessible on line.90 Learning is also shared through SAI regional training events, Trust SAI workshops, Regional Governance Leads workshops, good practice letters and the implementation of specific recommendations. HSCB also publishes standardised hospital mortality rates benchmarked against rates in

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86 401-001n-001 & 404-001j-001
87 404-002b-001 – ‘Testing methods to learn from adverse incidents.’
88 Dr Carolyn Harper T-14-11-13 p.42 line 24
89 Dr Carolyn Harper T-14-11-13 p.45 line 5
90 The 5th edition of Learning Matters, April 2016 covered, amongst other topics, the Prescription of IV Fluids. http://www.publichealth.hscni.net/sites/default/files/Learning_Matters_Issue_5.pdf page 4
England. These would appear to indicate that death rates in Northern Ireland are comparable to or lower than those in England.

8.55 Whilst many of the deficiencies and vulnerabilities exposed in the course of this Inquiry have thus seemingly been addressed by changes in guidance, practice and procedure, it must nonetheless be observed, that the ultimate effectiveness of the learning derived from SAIs remains largely unknown.

HSC Trust SAI process

8.56 HSC Trusts have now developed individual protocols to guide reporting, review and learning from adverse incidents. All were found to be comparatively up-to-date when listed in the Regional Learning System Project Report in May 2015. Nonetheless there was clear disparity as and between the HSCT Trusts in relation to the breadth and depth of policy and guidance. Development of procedures for more uniform adoption across HSC Trusts was therefore recommended in the interests of regional consistency. The Department advised in November 2017 that “work is ongoing to develop and agree regional adverse incident guidelines and procedures for adoption across the HSC.” I consider this to be work of great importance.

8.57 It is to be noted that BHSCT procedures are both comprehensive and subject to oversight. The Trust approved its ‘Serious Adverse Incident Procedure’ in 2016. Within the RBHSC every child death is to be assessed and in each instance of unexpected death, a SAI investigation is initiated and the families advised. The Trust in such circumstances will meet with the Medical Officer from the Coroner’s Office to examine the potential for shared learning and all such deaths are discussed at the monthly Morbidity and Mortality meeting. The Procedure provides for family input and feedback with opportunity given to discuss concerns and make contact with a bereavement co-ordinator. The BHSCT Coroner Liaison

91 401-002w-026
92 401-002w-009
93 404-002b-002
94 401-001ab-001
Office collaborates with the Bereavement Co-ordinator to support families involved with inquests.

8.58 BHSCT has also set out a ‘Board Assurance Framework’ incorporating SAI procedures, complaints, patient experience and the processes for the identification and dissemination of learning. It is encouraging that the Assurance framework specifically references “the three landmark reports in 2013 on quality and safety in the NHS (Francis Report, Keogh Review and the Berwick Report) all recommended the development of an organisational culture which prioritises patients and quality care above all else…”

8.59 The RBHSC has an Assurance Sub-Committee and a Governance Group reviewing SAI, complaints, audit, quality improvement and policy. In addition BHSCT has established specific responsibility groups to consider, supervise and provide assurance. These include the SAI Group, Claims Review Group, Complaints Review Group, Outcomes Review Group, Standards and Guidelines Committee, Safety and Quality Steering Group, Safety Improvement Team, Strategic Group for Quality, Improvement and Development, Deteriorating Patient Group, External Reports Review Group, Patient and Public Involvement Group, Quality Improvement Strategy Group, Learning from Experience Steering Group, Patient and Client Experience Working Group and the Bereavement Fora.

8.60 The Department has instituted an ‘Early Alert System’ whereby Trusts can notify the Department directly of incidents for immediate attention. The Permanent Secretary said “that happens quite regularly…that’s normal practice now.”

8.61 Importantly, I have now been assured that all deaths in the RBHSC are “reviewed irrespective of whether there have been any concerns about the quality of care” Whilst ostensibly reassuring, it must be observed that the same was misleadingly claimed in relation to RBHSC at the time of the

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95 401-001aw-001 (2016-17)
96 401-001aw-011
97 Dr Andrew McCormick T-15-11-13 p.16 line 2
98 Mr Colm Donaghy T-12-11-13 p.9 line 9
deaths of Adam, Claire and Lucy. Their deaths were not reviewed. Notwithstanding that review meetings are now minuted, they are not recorded.\textsuperscript{99} Given the value of accurately recording clinical response to patient death and given the very modest cost, I would recommend that all such reviews be digitally recorded.

\section*{Adverse incident database}

8.62 Each Trust maintains its own adverse incident database using DATIX risk management software to record and manage relevant information about incidents, claims, complaints, risks, alerts, inquests and requests. However, it was reported that even though the same software is used, different Datix adverse incident classification codes are employed by different HSC Trusts.\textsuperscript{100} The resultant inconsistency in classification\textsuperscript{101} means that the system cannot constitute a conventional database or permit easy regional analysis.

8.63 The Department chairs a Regional Information Group which exercises oversight of data standards and has an ICT Implementation Plan.\textsuperscript{102} It has recognised that “\textit{much remains to be done in order to have a truly connected and e-enabled service.}”\textsuperscript{103} Presumably to that end and in response to the May 2015 recommendations of the ‘Regional Learning System Project Report’,\textsuperscript{104} it has recently carried out a ‘scoping exercise’ to “\textit{review and agree datasets, including classifications within services and then regionally to ensure consistency of reporting.}”\textsuperscript{105}

8.64 If it has not already done so, it should act with despatch to fully merge data and intelligence so as to permit scrutiny of overall performance and the identification of emerging patient safety issues. HSC organisations should synchronize electronic patient safety incident and risk management

\textsuperscript{99} Mr Colm Donaghy T-12-11-13 p.69 line 7
\textsuperscript{100} 401-001a-022
\textsuperscript{101} 323-037f-001
\textsuperscript{102} 403-020-052
\textsuperscript{103} 403-020-052
\textsuperscript{104} 401-002w-044
\textsuperscript{105} 404-002b-002
software systems, codes and classifications to enable plain oversight of regional patient safety information.

Familiar problems

8.65 Notwithstanding that SAI reporting is mandatory, it would be unwise not to assume that there is still under-reporting. There are a number of obvious explanations for non-reporting, including failure to recognise the SAI, poor understanding of how and what to report and time pressures. However, individuals fear blame and the system is not proof against avoidance and manipulation. The SAI Procedure presents a number of critical decision making points open to ‘subjective interpretation’ and the exercise of ‘discretion’. These include whether to report, who should investigate, what the investigation should pursue, the appropriate level of investigation and whether the level of investigation should be raised in response to evidence.

8.66 Notwithstanding considerable efforts to change hospital culture, familiar problems persist. For example the RQIA review of 2008 found “little evidence of a reporting culture for incidents relating to intravenous fluids and hyponatraemia.”\(^\text{106}\) The HSC Staff Survey of 2012 reported that “only 42% of staff agree that their organisation does not blame or punish people involved in errors, near misses or incidents.”\(^\text{107}\) The PAC reported that “Whistle blowers still face real problems in speaking out … a ‘culture of fear’ still exists in many parts of the HSC sector”\(^\text{108}\) The NIAO reported in 2014 that “given the experience of the Turnaround Team in the Northern Trust and the RQIA inspection findings in the Belfast Trust, the culture within HSC bodies is still one of concern.”\(^\text{109}\) The Regional Learning System Project Report of May 2015\(^\text{110}\) noted staff reporting “that they would be concerned that there would be a risk to their professional reputation or registration as a result of reporting and that they might be blamed.” Indeed clinicians
themselves acknowledged in 2015 that “When dealing with SAIs there is a culture of blame which needs to be changed.”  

8.67 In April 2014 the Minister, responding to criticism of the Health Service, instructed HSC Trusts to review their handling of all SAIs reported between 2009 and 2013. As a part of this ‘look-back exercise’ the Minister requested that the RQIA scrutinise each of those reviews. It did so and reported in December 2014.  

8.68 In general terms, its review was rigorous and its findings encouraging. However during the exercise, Trusts uncovered cases which should have been classified and reported as SAIs but which were not. Included was one death which required retrospective notification to the Coroner. Amongst other specific issues identified and relating to SAI management was difficulty experienced in obtaining independent expertise for the more complex investigations and staff who wished “to examine potential legal issues with their advisors before becoming involved in an investigation.” The RQIA report was provided to Sir Liam Donaldson to inform his subsequent review of HSC governance arrangements.  

8.69 Current guidance indicates that an SAI investigation will take up to twelve weeks depending on the seriousness and complexity of the case. More significant cases reviewed by root cause analysis may take longer with the agreement of the DRO. HSCB advise that “in most instances SAI reports will have been finalised by the time the Coroner investigation is underway. However, the timing of SAI reviews and Coroner investigations may mean that it is a draft SAI report that is available to the Coroner. Any future review of the SAI procedure will continue to emphasise timeframes.”  

8.70 It is reassuring that there will continue to be an emphasis on timeframes because when investigative journalists filed a Freedom of Information

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111 403-017-013  
112 401-003b-001  
113 401-003e-044  
114 401-003e-039  
115 404-001a-004  
116 http://www.thedetail.tv/articles/healthcare-investigations-face-serious-delays
request of HSC Trusts as to the “longest time periods taken to complete SAI\vs within their catchment areas?” responses indicated that some SAI reviews by BH\&SCT took up to 3 years to complete. Whilst the quality of investigation remains the paramount objective, timeliness is important for both learning and public confidence. The Department is aware that there is scope for improvement and has asked GAIN to advise on the basis of an “examination of good practice on SAI\vs (or SI\vs) elsewhere in the UK and internationally.” Notwithstanding, it remains most probable that improved resources and training could improve the efficiency of investigation.

8.71 In order to obtain assurance that current SAI procedures are working, continuous audit and review is required of reporting, investigation, analysis and response. In order to measure the engagement of Trust Boards, the involvement of families and the effectiveness of remedial action, it will be necessary to monitor practice. Since late 2015 RQIA has conducted unannounced inspections of acute hospitals in order to assess the quality of services. The report of its 2017 inspection of RBHSC gives valuable insight. Such inspections are an important development and because I believe that there should be additional and increased external monitoring of the entire SAI process, I would propose that the scope and remit of the RQIA be extended to encompass this important work.

**Adverse incident investigation**

8.72 The work of this Inquiry has shown that vulnerabilities in patient care systems are more likely to be the cause of a SAI than individual error. For that reason, I consider that improvement in investigation would be meaningfully assisted by further and advanced training in Root Cause Analysis. This would intensify the search for the underlying and interconnected causes of adverse incidents rather than fuelling fears of individual blame.

8.73 Investigation is sensitive to human input and the oversight provided by individual DROs may not always be consistent. Accordingly the independence of investigators is essential to achieve satisfactory
investigation and ensure that it is seen as such. I consider that the most serious AIs should therefore be investigated by wholly independent teams from outside Northern Ireland because, as Dr Carson on behalf of RQIA observed, “Northern Ireland is quite a small community, everybody has worked with everybody else at some stage or another.” Mr Peter Walsh, Chief Executive of AvMA, thought that would add a “tremendous amount to the process” so that there could be “no perception of, let alone real, conflict of interest.” I agree and believe that it would engender public confidence in the findings. An investigation team, independent of individuals, Trusts, the HSCB and the Department, would be able to investigate all parts of the Northern Ireland healthcare system without any taint of conflict of interest. Such an approach might be pursued with the newly established Healthcare Safety Investigation Branch from England. Collaboration could prove instructive for all concerned.

8.74 The wisdom of involving families in review and investigation has been amply confirmed by evidence before this Inquiry. Parents are experts in respect of their own children and often close observers of the care given. Ms Slavin had real understanding of the nature of Adam’s renal problems, Mrs Crawford was an eye witness to a key event, Ms Mitchell was the first to voice concern about Conor, Mr Roberts’ attention to detail identified an overdose and Mr and Mrs Ferguson could have accurately described the deterioration of their daughter’s condition. In addition, all could have given invaluable advice about how not to communicate. In terms of reviewing care and contributing to improved patient safety the value of their potential contribution was too obvious not to have been actively pursued.

8.75 Whilst I was assured by Dr Carolyn Harper, Executive Medical Director of PHA, that there is increasing involvement of families at all stages of the investigation process, I nonetheless make several recommendations to

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117 Dr Carson T-13-11-13 p.17 line 3
118 Mr Peter Walsh T-11-11-13 p.82 line 16
119 Mr Peter Walsh T-11-11-13 p.83 line 22
120 087-002-020
121 Dr Harper T-14-11-13 p.46 line 5
ensure that families are accorded all proper respect and managed for the potential they offer. Indeed, some families may even wish to maintain involvement after the conclusion of an investigation in order to satisfy themselves fully that lessons have been learned. Such might make a further and valuable contribution.

**Translation of learning into improvement**

8.76 Systems designed to translate learning from SAIs into improved practice were said to have been strengthened in recent years. In 2012, the PHA advised the Department that all trusts had confirmed “robust systems in place for the dissemination of learning from adverse incidents.”122 However, what was wanting was reliable evidence about the current monitoring and effectiveness of these systems. This issue lies at the heart of the Inquiry’s work and the requirement of families to know that the tragedy of their child’s death cannot happen again.

8.77 In October 2012 the Northern Ireland Audit Office reported on ‘The Safety of Services Provided by Health and Social Care Trusts.’123 It noted the absence of a monitoring system to collate patient safety information from across the HSC service and concluded that the regional sharing of ‘lessons learned’ was not as structured or as comprehensive as it could be. The Comptroller and Auditor General told the Northern Ireland Public Accounts Committee in November 2012 that “the Department still lacks a reliable means of tracking the progress of health and social care services in improving the safety of those receiving care or in holding service providers accountable for minimising preventable harm.”

8.78 Inability to demonstrate effective dissemination of learning from the SAI process is not a problem unique to Northern Ireland. The House of Commons Public Administration Select Committee received evidence in

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122 330-057-001
123 403-026-001
2014-15 that the “failure to learn from incidents and disseminate lessons has been a longstanding weakness of the NHS.”

8.79 In 2013 RBHSC attempted to address this issue by publishing a strategy indicating by means of flow-chart the distribution of relevant learning within the Children’s hospital. In 2016 BHSCT introduced its ‘Policy for Sharing Learning’ particularising the communication of learning and providing templates for dissemination.\textsuperscript{125} It encompasses learning from complaints, mortality reviews, audit, litigation and SAIs. The SAI Review Board provides evidence to the Assurance Committee that risks revealed by the process are addressed. Importantly the Policy describes a regional process for information sharing through HSCB as well as the Department and proposes a central repository of learning on the intranet.

8.80 The Department has commissioned two regional studies from GAIN\textsuperscript{126} to specifically examine the learning extracted from SAIs involving the death of a patient.\textsuperscript{127} Both exercises are to be pursued in partnership with HSCB and the HSC Trusts.

8.81 I have sympathy with the busy clinician working in the pressurised Health Service who is expected to learn rapidly from the dissemination of guidance. Given that corrections to clinical care are not always straightforward or intuitive, it follows that clinicians may require time and space to consider, discuss and assimilate learning from SAIs. I consider it proper that such should be provided within contracted hours.

8.82 In addition, Trusts do not appear to be obligated to provide assurance to the families of victims of clinical mismanagement that lessons have been learned or that that learning is practiced. It is in this context that the work of a Child Death Overview Panel could be important. Such a panel is comprised of individuals from a range of different organisations and professions. It specifically considers the anonymised details of death.

\textsuperscript{124} 403-027-049\textsuperscript{125} 401-001at-001\textsuperscript{126} Now conjoined with RQIA.\textsuperscript{127} 401-003i-001
howsoever caused, to determine whether learning exists such as might prevent another death. The introduction of this process in Northern Ireland under the Safeguarding Board for Northern Ireland has proved problematic\textsuperscript{128} and the Department and PHA may now assume responsibility.\textsuperscript{129} This would enable additional oversight and the potential for additional assurance that lessons have indeed been learned.

8.83 Trusts should publish current policy on learning from SAI deaths (especially child deaths) and thereafter not only publish the detail of all such deaths but also what has been learned from them.

**Family involvement**

8.84 The Permanent Secretary said he believed “very strongly that the best chance we have of securing sustained improvement is through very open involvement …making it easier for patients and families to be…aware …and to feedback views…”\textsuperscript{130} and the CNO, Professor McArdle, said “… we all believe that the patient’s voice has to be front and centre in everything that we do.”\textsuperscript{131}

8.85 In 2009 the Department published standards for ‘Improving the Patient and Client Experience’ in an attempt to define appropriate respect, attitude, behaviour and communication. This was very necessary because, as the evidence confirmed, shortcomings in communication fuel suspicion.

8.86 BHSCT developed a ‘Being Open Policy – saying sorry when things go wrong’\textsuperscript{132} to encourage open disclosure to patients and families involved in adverse incidents. It emphasises that healthcare professionals must understand that good communication engenders trust and that openness is important. In December 2014 the policy was made available as an e-learning module. It advises on communication with patients and families and emphasises quick and open disclosure so that transparency is

\textsuperscript{128} 404-002h-001 Jay Report 2016 – ‘A Review of the Safeguarding Board for Northern Ireland’
\textsuperscript{129} 404-002b-004
\textsuperscript{130} Dr Andrew McCormick T-15-11-13 p.72 line 5
\textsuperscript{131} Ms McArdle T-15-11-13 p.65 line 4
\textsuperscript{132} 332-027-001 & 401-001ad-001 - 2011/2014 and revised 2015
understood. Specific guidance is given for sharing information with additional advices on ‘being open’ in the event of a death. It carries links to the Ombudsman’s ‘Guidance on Issuing an Apology’. The Trust Board is charged with promoting both it and a policy known as ‘Involving You’ which seeks to enhance ‘user’ involvement.133

8.87 Notwithstanding, difficulties continue to surround the problem of communication with patients and families in the context of SAIs134 and HSCB/PHA has produced further guidance (2015) in the form of a checklist to guide and monitor engagement with patients and families. Notwithstanding, it must be recognised that a list does not equip staff to manage difficult conversations with empathy and credibility. Successful interaction at times of distress is difficult, which is why training is critical to ensure the skills and awareness necessary to adequately inform a family and engage with it in the process of investigation and learning.

8.88 Whilst Dr Harper of PHA stressed that medical training has advanced in recent years “particularly in the aspect of communication skills and interpersonal skills”135 and that communication training is now given all trainee clinicians, Dr Anthony Stevens, Medical Director of BHSCT conceded that “there are real areas particularly round engagement with families, where we recognise we’ve still got a great deal to do.”136 It is in this context that I recommend that training in communication skills be accorded enhanced priority.

8.89 I believe that there is also scope for the experience of patients and families to be heard within the Department. I believe that this is a deficiency and one which should be addressed.

133 332-013-001
134 348-010d-001
135 Dr Harper T-14-11-13 p.58 line 3
136 Dr Stevens T-12-11-13 p.95 line 20
Complaints

8.90 In 2009 the Department issued ‘Complaints in HSC: Standards & Guidelines for Resolution and Learning’ to replace the 1996 HPSS Complaints Procedure and established a HSC Complaints Policy Liaison Group in 2011. Departmental policy now requires involvement of the complainant and encompasses advocacy services and staff training. Complainants can get independent advice from the PCC and are now advised of their right to refer their complaint to the Ombudsman. The Department has tried to secure patient engagement through community exercises, such as ‘10,000 Voices’ and ‘Family and Friends Test.’ Policy on complaints continues to evolve.

8.91 HSCB has sought to improve the content of feedback to complainants and has held annual ‘Complaint Learning Events’ with ‘patient-centred’ advice for healthcare professionals coupled with specific guidance on communication and bereavement support. Learning materials are also available on the HSCB intranet and there is an Annual Complaints Report.

8.92 Actual complaints are used as the basis for learning. In one instance, a family complained about poor communication in the context of a relative’s deterioration and death. In consequence the Trust provided specific training to the staff on the proper conduct of such difficult and timely conversations. Mr John Compton, Chief Executive, of HSCB also described a seminar where patients recalled good and bad experiences for the benefit of clinicians which resulted in “interplay between them and the staff about what would make it better.” These are important initiatives in

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137 Who, unlike his predecessor the NI Commissioner for Complaints, can now publically report the outcome of complaint investigation. Public Services Ombudsman Act (Northern Ireland) 2016 - http://www.legislation.gov.uk/nia/2016/4/contents/enacted
138 401-001b-001
139 401-001e-001 & 404-001c-001 & 404-001d-001
140 404-001c-009
141 Mr Compton T-14-11-13 p.31 line 17
feedback and learning and represent an approach which is obvious and should be encouraged.

8.93 The HSCB is responsible for reviewing HSC Trust response to complaints in order to identify trends. It makes regular performance reports to the Department. It advises on the numbers and categories of complaints together with response times and learning outcomes. HSCB reported on the ‘Process for Evaluation of Complaints in HSC: Standards and Guidelines for Resolution and Learning’ in 2011 and concluded that, whilst HSC organisations do learn from complaints, there is a need to advise staff and patients of that learning. The HSCB/PHA Annual Quality Report 2014-2015 noted that “Service user feedback has demonstrated that further work is required to promote the visibility and accessibility of the Complaints Process.”

8.94 HSCB subsequently produced an updated ‘Policy for HSCB staff on the management of complaints’ in April 2016. It set out revised standards and guidelines promoting accessibility, advocacy services, appropriate investigation, involvement of lay persons, independence of experts, opportunities for shared learning and speedier resolution. It provides flow-charts to detail procedures. The 2016 HSCB Policy explains that “The operation and effectiveness of the HSC Complaints Procedure will be monitored continuously. A Regional Complaints Group…has been established and will meet on a quarterly basis to consider analysis of information pertaining to…HSC Trust complaints…the Regional Complaints Group will identify what learning should be cascaded regionally to ensure policies and practices are amended as a result of complaints.”

8.95 The PCC is the main healthcare ‘consumer’ organisation in Northern Ireland. It has responsibility for representing the interests of the patient and for supporting public involvement in decisions about care. The PCC has no

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142 403-004-013 to 014
143 404-001c-005
power to investigate complaints but has a statutory duty to assist those who wish to make a complaint. It has a permanent seat at the monthly meetings of the HSCB board responsible for oversight of HSC complaints.\textsuperscript{144} All HSC Trusts are required to publish annual reports on complaints and submit them to the PCC. The PCC also publishes an annual report on complaints. In 2015-16 it reported that “families and carers do not feel that they are being kept adequately informed about the progress of their treatment and care”\textsuperscript{145}

8.96 The Northern Ireland Commissioner for Complaints\textsuperscript{146} also reports annually and has recorded the growing numbers of healthcare related complaints. In 2014/15 he referred “to an underlying issue in many complaints, being a breakdown in trust between the patient/family and the HSC organisation”\textsuperscript{147} and expressed concern that all but one of the complaints received by him of complaint mismanagement was upheld.\textsuperscript{148}

8.97 Independent Advocacy services have an important role in communication and in connecting the experience of patients and families to the improvement of care. The RQIA has included a Review of Advocacy Services for Children and Adults in its 2015-2018 review programme.\textsuperscript{149}

8.98 BHSCT introduced its ‘Policy and Procedure for the Management of Complaints and Compliments’ in 2010\textsuperscript{150} indicating appropriate responses and time frames. A Complaints Review Group assured the investigation, analysis and follow-up from complaints. However, in order to more effectively involve the complainant and investigate the complaint, BHSCT introduced a largely revised ‘Policy and Procedure for the management of Comments, Concerns, Complaints & Compliments’ in 2017.\textsuperscript{151} Emphasis is placed on effective communication, with appropriate meetings, agreed

\textsuperscript{144} Mr Compton T-14-11-13 p.9 line 9 & p.11 line 8
\textsuperscript{145} 403-008-011
\textsuperscript{146} Now the Ombudsman
\textsuperscript{147} 401-001e-015
\textsuperscript{148} 401-001e-016
\textsuperscript{149} 401-003d-015
\textsuperscript{150} 332-014-001
\textsuperscript{151} 404-003b-001
agendas and recording. Specific requirements are given as to roles and responsibilities, the complaint investigation process and the types of resolution possible and responses to be given. Not only is outcome monitored for pattern but it is also measured for efficiency, learning and complainant satisfaction.

8.99 Given the problems of trust and communication which still seem to undermine the investigation of complaints, Mr Walsh, urged me strongly to the view that there ought to be standards for complaint investigations which should include the early involvement of the family. I agree and consider that there should be a charter to particularise the rights of the family or patient in relation to complaints and further that those Trusts, which have not already published their responsibilities to families in respect of complaints, should do so now. Clarity about the process can only assist. Information encourages inclusion and families and patients should always be included in the investigation of patient safety issues.

8.100 Complaints present a valuable source of insight into patient safety problems and should be analysed as such. I am advised (as of November 2017) that “the Department has commenced, in liaison with HSC Trusts, the piloting of the use of Healthcare Complaints Analysis Tool...for more meaningful analysis and comparison of data from complaints within and across Trusts.” This could prove of considerable benefit for both individual Trusts and regional learning.

The Duty of Candour

8.101 Of all the themes emerging from the evidence to this Inquiry, the most disquieting has been the repeated lack of honesty and openness with the families. In his report on the Mid Staffordshire NHS Foundation Trust Public Inquiry, Robert Francis QC found the same problem. In consequence, he recommended that a statutory duty of candour be imposed in situations where it was suspected or believed that death or serious injury had been

152 Mr Peter Walsh T-11-11-13 p.8
153 404-002b-003
caused to a patient by an act or omission of a healthcare organisation or its staff. He proposed that in such circumstances the patient or family should be informed of the incident and given an explanation. He believed furthermore that the duty of candour should be imposed on registered healthcare professionals, NHS healthcare organisations and private providers.

8.102 Since then there has been a prolonged debate as to whether those recommendations should be implemented in their entirety, whether the duty should apply to both individuals and organisations and exactly what the threshold definition of harm should be. In England a statutory duty has been enacted for organisations but not for individuals and in Wales the position has not progressed beyond White Paper proposals. In Scotland, a duty of candour will come into force in April 2018 but will differ from the English model in minor but significant respects.154

8.103 In Northern Ireland, Jim Wells MLA (then Minister for the Department), informed the Assembly on 27th January 2015 that “a statutory duty of candour will be introduced in Northern Ireland. There should be no ambiguity in respect of my expectation regarding the crucial elements of patient safety, which are openness and transparency.”155

8.104 The Department advised that in November 2017 it “continues to develop policy to support the introduction of a statutory duty of candour in Northern Ireland. Initial comparisons of the approaches adopted in other jurisdictions and a workshop with HSC colleagues has highlighted a number of issues which require further consideration before we will be in a position to take our proposals to Minister, including definitions of harm, apologies etc. There is learning to be had from the experience of colleagues in other jurisdictions and we are examining the evidence presented during the associated Parliamentary sessions and the difficulties/successes of implementing their legislation to further inform our options. The Department will need to

154 http://www.legislation.gov.uk/asp/2016/14/contents/enacted
consider the introduction of a statutory duty that is straightforward and brings value to existing principles of openness and transparency and the individual duty of candour.\textsuperscript{156}

8.105 Whilst the issues involved are not straightforward and there are matters for legitimate debate, the unfortunate truth to be drawn from this Inquiry is that there are too many people in the Health Service who place reputation before honesty and avoidance of blame before duty. All that is required is that people be told honestly what has happened and a legally enforceable duty of candour for individuals will not threaten those whose conduct is appropriate. The duty was not imposed upon clinicians in England on the basis that they are already placed under an ‘ethical duty’ of honesty by their professional organisations. I consider that such an argument would be stronger, had the evidence to this Inquiry not revealed obvious weakness in the call of ‘ethical duty’.

8.106 Whilst Mr Walsh did indicate some recent improvement in levels of openness towards families, he believed that that improvement had not been consistent. It is to encourage consistency in openness and to avoid any ambiguity in expectation that I endorse the Francis recommendations.\textsuperscript{157} I recommend that a duty of candour attach to individuals as well as organisations in the event of death or serious harm and that criminal sanctions should apply.

8.107 It will be necessary to provide specific guidance on implementation and compliance. The duty should be entrenched by Trust Directors appointed with specific responsibility for candour. Procedures should be audited, not only by HSC Trusts but also by the RQIA. It will be necessary for a regulatory body, such as the RQIA, to undertake enforcement. There should be willingness to prosecute in cases of serious non-compliance.

\textsuperscript{156} 404-002b-009
\textsuperscript{157} Recommendations 181-183
**Whistleblowing**

8.108  Patient safety is the concern of everyone working in the Health Service and accordingly it must be the duty of everyone to raise patient safety concerns. However, because it has been found necessary to encourage whistleblowers, the Department has directed that Trusts develop policies enabling staff to raise concerns about questionable practice.\(^\text{158}\) The RQIA issued guidance for whistleblowers and published its ‘Review of Whistleblowing Arrangements in Health and Social Care in Northern Ireland’ in September 2016.\(^\text{159}\) It made eleven recommendations, seven of which the Department maintains “are either fully implemented or on target to be implemented” as at November 2017.\(^\text{160}\) This impetus should be maintained. In every hospital there should be real or virtual individuals to whom concerns can be taken easily and without formality. There should be training and the system should be as responsive as possible.

**Appraisal of clinical performance**

8.109  The Department has developed procedures to address concerns about poor medical performance. ‘Maintaining High Professional Standards’ gives guidance for managing under-performance and allows Trusts access to the National Clinical Assessment Service. This complements recently introduced professional revalidation for practicing doctors.\(^\text{161}\) There is now a statutory duty\(^\text{162}\) to ensure that doctors undergo regular appraisal, that action is taken in respect of any lack of fitness to practice and that relevant concerns are referred to the GMC. The re-validation process became operational within the BHSCT by 2013 and has since been extended to the rest of Northern Ireland. It considers feedback from colleagues and feedback from patients.\(^\text{163}\) The GMC has appointed a Liaison Advisor in Northern Ireland to assist with formal referrals to the GMC. Whilst the

\(^\text{158}\) 403-019-001  
\(^\text{159}\) 401-003x-001  
\(^\text{160}\) 404-002b-003  
\(^\text{161}\) 332-030-001  
\(^\text{162}\) http://www.legislation.gov.uk/nidsr/2010/9780337981302/body  
\(^\text{163}\) Dr Michael McBride T-15-11-13 p.28 line 19
overall number of recent referrals has been too small to reveal trends, the procedure itself provides additional quality assurance.

8.110 Management of poor nursing performance is now also the subject of process and protocol.\textsuperscript{164} Each Trust has disciplinary and capability procedures and can make referral to the NMC.\textsuperscript{165} All nurses are required to undergo annual appraisal with their line manager.

**Leadership**

8.111 Evidence received by this Inquiry revealed numerous failings in leadership. These included failure to supervise nursing staff, consultant failure to direct care or give leadership in the event of unexpected death, failure of those in governance to demonstrate appropriate behaviour, failure of Directors of Nursing to provide visible leadership, failure of a HSC Trust Chief Executive to accept responsibility for the quality of care given children in his hospital and failure by the Department to hold the Health Service to account in respect of the quality of care or secure the timely introduction of clinical governance. Such attitudes and behaviours influence hospital cultures.

8.112 Building a culture where the natural response to error is to learn from it, is therefore very much the responsibility of leadership at every level. Change in culture will take time and expert leadership. Leadership has now been exercised by the Department in setting the direction of quality improvement. The Directors of each HSC Trust now have the major role to play in achieving the appropriate learning culture within each organisation. The best leadership is critical and there should be investment in the best.

8.113 The Permanent Secretary observed that “leadership is not about position, it’s about behaviours that drive each individual to do the right thing all the time…”\textsuperscript{166} I believe that to achieve the ‘right thing’ that there should be visible leadership at every level of an organisation. Leaders at all levels and especially at Board level must not be inaccessible. They should do

\textsuperscript{164}332-033-004
\textsuperscript{165}332-038-001
\textsuperscript{166}Dr Andrew McCormick T-15-11-13 p.99 line 7
more than appear on the occasional senior management ‘walk-round’. Senior managers should be observable to the ‘front-line’ encouraging learning and discouraging blame. They should welcome concerns and give feedback on improvement. They should demonstrate confidence in transparency by commending staff who speak out. They should communicate in the clearest terms that it is safe to raise concerns.

8.114 Clinical leadership should encourage those who care for patients to improve their care. Senior clinicians should be role models. They should challenge defensiveness and ensure that every opportunity for improvement is taken.

8.115 The BHSCT has introduced a ‘Clinical Engagement and Leadership’ programme and a ‘Leadership Attributes Framework.’ The Department published a HSC Collective Leadership Strategy in October 2017. Whilst such initiatives respect the broad importance of leadership, I believe that there is nonetheless a pressing necessity to strengthen leadership at each and every level. I recommend that improvement in leadership now be accorded the utmost priority.

**Death certification**

8.116 Both the Luce Review (2003) and the Shipman Inquiry (2003) considered issues of death investigation and certification and made recommendations for Northern Ireland. Recognising the problem of inaccuracy in certification, the Department issued guidance for both completion of the Medical Certificate of Cause of Death (‘MCCD’) and notification to the Coroner in 2008. The Coroner’s Service published a ‘Best Practice’ guide in 2009 and appointed a Medical Officer to assist the coroner in identifying issues of clinical concern. Notwithstanding, the senior Coroner had to ask
the Board and the CMO in 2014 to remind doctors of their duty to notify the coroner of all deaths which might be SAI related.\textsuperscript{170}

8.117 Within the BHSCT there was no systematic way of collecting details of MCCDs or notifications to the Coroner for the purposes of review. It was therefore difficult to assure that every death and certification had been clinically scrutinised. Accordingly, and at the instigation of the Department, a Death Certification Implementation Working Group was established to improve assurance of the certification process.

8.118 In 2016, the Department issued comprehensive, detailed and step-by-step guidance on the ‘Child Death Reporting Process’\textsuperscript{171} and the BHSCT in turn adopted clear policy on ‘Actions Following a Patient’s death’ with advice on what, when and how to report to the coroner. Updated training has been provided to all junior doctors to ensure a proper understanding of the responsibilities attaching to completion of the MCCD. Further training programmes are being developed. The MCCD has been re-designed to collect additional information enabling audit and improved assessment of medical compliance with statutory obligation.\textsuperscript{172}

8.119 In April 2017 the CMO then issued further guidance on reporting child deaths.\textsuperscript{173} Child deaths in hospital are to be recorded by means of the Regional Mortality and Morbidity Review System (‘RM&MRS’)\textsuperscript{174} which standardises procedures and permits review of all hospital deaths and death certificates.

8.120 The process means that all child deaths in hospital are recorded by means of a step-by-step computerised procedure on the RM&MRS. The consultant will particularise and certify the details as accurate. The system will generate the MCCD or a clinical summary where the death is to be referred to the coroner. The consultant must record all contact with the Coroner’s

\textsuperscript{170} 401-002d-001
\textsuperscript{171} 401-001av-001
\textsuperscript{172} 401-002b-017
\textsuperscript{173} 404-002e-001
\textsuperscript{174} 401-002h-001
Office and cite an identifying reference provided by the Coroner’s Death Reporting Team. If the death meets SAI criteria the consultant must initiate the SAI process. The consultant must then forward the case to the designated Mortality and Morbidity (‘M&M’) lead for discussion and review at the next M&M meeting. SAI investigation reports will be listed for the next M&M meeting which will thus review all child deaths and any completed SAI investigations occurring since the previous meeting. The M&M lead will cause a multi-disciplinary review of the clinical history, cause of death, avoidable factors, discussions with the Coroner, lessons learned and actions required.

8.121 All child deaths must be reviewed within 12 weeks. This includes those deaths reported to the Police Service of Northern Ireland (‘PSNI’) or the Coroner as well as those investigated as an SAI or subject to post-mortem. This is to ensure that learning is disseminated as soon as possible. Should it appear to a M&M meeting that a case should be reported as a SAI or to the Coroner, then this must be done immediately. Only when the M&M has completed its review and each step of the process has been completed can a child death notification form issue. It is sent to the Trust governance team and/or audit unit and served on the HSCB/PHA.

8.122 The RM&MRS will thus routinely collect information from certificates, reports to the coroner, consultant reviews, mortality meetings, inquest findings, action plans, learning reports and other relevant sources. The information will be consolidated and made available for scrutiny. The system provides a means to assure that the process of certification can be relied upon and that notifiable deaths are reported to the coroner. The information, if properly interpreted, should provide reasonable assurance to public and Trust board members alike, that such deaths in their hospitals as do result from unsafe care are identified, analysed and learned from.

8.123 Implementation of the system was complete by March 2017. In November 2017 there were reported to be “over 150 teams across the 5 HSC Trust

\[^{175}401-002r-006\]
hospitals using the system with a recording rate of over 80%". HSC Trusts were said to be “establishing mechanisms to ensure they oversee/monitor outcomes from the M&M process.” 176 This is a most valuable development and its operation and effectiveness should be subject to regular internal and external audit.

8.124 Notwithstanding the advances inherent in this system, I would nonetheless recommend the appointment of an Independent Medical Examiner, at least until such time as the RM&MRS has proven its reliability. A Medical Examiner can reconsider the consultant input and the MCCD, and with full access to the medical records, can pursue queries with the certifying doctor and the family of the deceased. The Examiner can refer uncertain cases to the coroner for further investigation and assist in the important task of pattern recognition.

Issues of coronial involvement

8.125 A most important part of the Coroner’s role in relation to deaths associated with clinical mismanagement, is the power to alert relevant authority to the potential to prevent further fatality. 177 The Coroner can do this by way of a formal report made pursuant to Rule 23(2) of The Coroner’s (Practice and Procedure) Rules (Northern Ireland) 1963.

8.126 However, the Department advised that “... there is no standardised approach to how [Rule 23] reports are made. In some cases correspondence is addressed to the Minister, on other occasions information is provided for the Chief Medical Officer or some other senior officials, and in some instances there is no mention that the referral is being made under Rule 23(2).” 178 In recognition of the weaknesses of such an approach the Department indicated that it would seek agreement on standardising referral of Rule 23 Reports.

176 404-002b-006
177 303-052-715
178 401-002r-005
8.127 The Coronal Service has indicated that Rule 23 Reports are now sent to the Department with a requirement that it respond giving both proposed action and timetabling. Copies of the report and response are sent to other interested parties to stimulate appropriate action. The Coroner will then seek assurance from the Department and HSC Trust that learning has indeed been, or will be, put into practice. This feedback is important. It was these channels of communication that the Coroner regretted were not available to him following the Inquest into Adam’s death.

8.128 Furthermore, the Coronal Service has confirmed in that "Work is underway to ensure that there is proper feedback and follow up to Rule 23 Reports taking account of best practice in other jurisdictions." Additionally, inquest findings which may have implications for health care are forwarded by the Coroner’s Office to HSCB where they are reviewed through the SAI process. These procedures are detailed in HSCB ‘Paper on communication Pathways between the Coroner’s Office, PHA and HSCB.’ Additional measures have been agreed enabling the Coroner’s Medical Officer to notify healthcare authorities of emerging trends.

Disclosure of relevant documents to the Coroner

8.129 The right to assert entitlement to legal privilege in respect of certain documents and so withhold them from a coroner’s investigation into a health care related death, highlights a tension between transparency and important legal principle. A coroner has no power to order the production of documents and HSC Trusts are under no general legal duty to disclose relevant expert opinions to the Coroner. This is notwithstanding obligation to assist the coroner and the fact that such reports are publically funded. Nor is a Trust under any duty to advise the Coroner that such experts could be called to give evidence at inquest. Furthermore, an organisational duty
of candour might not necessarily obligate disclosure because it would relate to factual information rather than an expert expression of opinion.

8.130 Whilst the Department maintains “a presumption in favour of disclosure as a matter of general principle, the matter of whether to claim privilege is one for a Trust to consider based on its own legal advice,” the CMO nonetheless expressed the view that “it should never be the case that we have information in relation to the circumstances and death of a patient which is not shared fully, frankly and openly with the coroner to inform and assist him in his investigations and determination of the cause of death.”

8.131 BHSCT is said to share all such reports with the Coroner. I believe that is the preferred approach. However, and in order to acknowledge the claims of both transparency and privilege, I would recommend that HSC Trusts claiming privilege in respect of a document relevant to the proceedings of an inquest, should inform the Coroner as to both the existence and nature of the document.

8.132 The Department should, in any event, issue guidance to HSC Trusts on the approach it would wish adopted.

Regular external review

8.133 Cumulatively, the measures introduced over recent years have very significantly reduced the risk of harm to children and young people receiving IV fluids. Additionally where a SAI does occur, there are greatly improved mechanisms to identify it, investigate it, learn from it and reduce the risk of recurrence. That so much has been done, taught and published and that so many more SAIs and complaints are reported, all confirm that the Health Service environment has most definitely been transformed since the period under review.

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182 Dr Michael McBride T-15-11-13 p.79 line 14
183 Mr Colm Donaghy T-12-11-13 p.81 line 20
184 333-342-011
8.134 Whilst I am able to conclude that lessons have been learnt, I cannot conclude that all risk of recurrence has been eliminated. Given that the provision of health care is an immense and complex task, I can only agree with Dr Carson when he observed “one can never give full assurance that full compliance will ever be achieved.”  

8.135 Accordingly, it remains critical to keep building upon the very real progress made and to further undermine the remnant culture of clinical defensiveness. To that vital end, future progress should be subject to regular external review.
RECOMMENDATIONS

9.1 The lessons of these sad cases must be learnt because it cannot be assumed that such tragedy could not happen again. Although much has been achieved, much remains to be done. These recommendations have been guided by the following principles:

(i) That healthcare services exist to serve the patient.

(ii) That quality of healthcare is dependent upon both clinical and non-clinical services.

(iii) That the particular needs of children must be addressed.

(iv) That leadership and candour must be accorded the utmost priority if the fullest learning is to be gained from error.

(v) That progress should be subject to regular external review.

9.2 I believe that parents must be involved in the implementation of these recommendations. It is to be recognised that improvement cannot be achieved without expenditure. These recommendations have not been costed.

Recommendations

Candour

1. A statutory duty of candour should now be enacted in Northern Ireland so that:

   (i) Every healthcare organisation and everyone working for them must be open and honest in all their dealings with patients and the public.

   (ii) Where death or serious harm has been or may have been caused to a patient by an act or omission of the organisation or
its staff, the patient (or duly authorised representative) should be informed of the incident and given a full and honest explanation of the circumstances.

(iii) Full and honest answers must be given to any question reasonably asked about treatment by a patient (or duly authorised representative).

(iv) Any statement made to a regulator or other individual acting pursuant to statutory duty must be truthful and not misleading by omission.

(v) Any public statement made by a healthcare organisation about its performance must be truthful and not misleading by omission.

(vi) Healthcare organisations who believe or suspect that treatment or care provided by it, has caused death or serious injury to a patient, must inform that patient (or duly authorised representative) as soon as is practicable and provide a full and honest explanation of the circumstances.

(vii) Registered clinicians and other registered healthcare professionals, who believe or suspect that treatment or care provided to a patient by or on behalf of any healthcare organisation by which they are employed has caused death or serious injury to the patient, must report their belief or suspicion to their employer as soon as is reasonably practicable.

2. Criminal liability should attach to breach of this duty and criminal liability should attach to obstruction of another in the performance of this duty.

3. Unequivocal guidance should be issued by the Department to all Trusts and their legal advisors detailing what is expected of Trusts in order to meet the statutory duty.
4. Trusts should ensure that all healthcare professionals are made fully aware of the importance, meaning and implications of the duty of candour and its critical role in the provision of healthcare.

5. Trusts should review their contracts of employment, policies and guidance to ensure that, where relevant, they include and are consistent with the duty of candour.

6. Support and protection should be given to those who properly fulfil their duty of candour.

7. Trusts should monitor compliance and take disciplinary action against breach.

8. Regulation and Quality Improvement Authority ('RQIA') should review overall compliance and consideration should be given to granting it the power to prosecute in cases of serial non-compliance or serious and wilful deception.

**Leadership**

9. The highest priority should be accorded the development and improvement of leadership skills at every level of the health service including both executive and non-executive Board members.

**Paediatric - clinical**

10. Health and Social Care ('HSC') Trusts should publish policy and procedure for ensuring that children and young people are cared for in age-appropriate hospital settings.

11. There should be protocol to specify the information accompanying a patient on transfer from one hospital to another.

12. Senior paediatric medical staff should hold overall patient responsibility in children’s wards accommodating both medical and surgical patients.
13. Foundation doctors should not be employed in children’s wards.

14. The experience and competence of all clinicians caring for children in acute hospital settings should be assessed before employment.

15. A consultant fixed with responsibility for a child patient upon an unscheduled admission should be informed promptly of that responsibility and kept informed of the patient’s condition, to ensure senior clinical involvement and leadership.

16. The names of both the consultant responsible and the accountable nurse should be prominently displayed at the bed in order that all can know who is in charge and responsible.

17. Any change in clinical accountability should be recorded in the notes.

18. The names of all on-call consultants should be prominently displayed in children’s wards.

19. To ensure continuity, all children’s wards should have an identifiable senior lead nurse with authority to whom all other nurses report. The lead nurse should understand the care plan relating to each patient, be visible to both patients and staff and be available to discuss concerns with parents. Such leadership is necessary to reinforce nursing standards and to audit and enforce compliance. The post should be provided in addition to current staffing levels.

20. Children’s ward rounds should be led by a consultant and occur every morning and evening.

21. The accountable nurse should, insofar as is possible, attend at every interaction between a doctor and child patient.

22. Clinicians should respect parental knowledge and expertise in relation to a child’s care needs and incorporate the same into their care plans.
23. The care plan should be available at the bed and the reasons for any change in treatment should be recorded.

24. All blood test results should state clearly when the sample was taken, when the test was performed and when the results were communicated and in addition serum sodium results should be recorded on the Fluid Balance Chart.

25. All instances of drug prescription and administration should be entered into the main clinical notes and paediatric pharmacists should monitor, query and, if necessary, correct prescriptions. In the event of correction the pharmacist should inform the prescribing clinician.

26. Clinical notes should always record discussions between clinicians and parents relating to patient care and between clinicians at handover or in respect of a change in care.

27. Electronic patient information systems should be developed to enable records of observation and intervention to become immediately accessible to all involved in care.

28. Consideration should be given to recording and/or emailing information and advices provided for the purpose of obtaining informed consent.

29. Record keeping should be subject to rigorous, routine and regular audit.

30. Confidential on-line opportunities for reporting clinical concerns should be developed, implemented and reviewed.

**Serious Adverse Clinical Incident Reporting**

31. Trusts should ensure that all healthcare professionals understand what is expected of them in relation to reporting Serious Adverse Incidents (‘SAIs’).

32. Failure to report an SAI should be a disciplinary offence.
Serious Adverse Clinical Incident Investigation

33. Compliance with investigation procedures should be the personal responsibility of the Trust Chief Executive.

34. The most serious adverse clinical incidents should be investigated by wholly independent investigators (i.e. an investigation unit from outside Northern Ireland) with authority to seize evidence and interview witnesses.

35. Failure to co-operate with investigation should be a disciplinary offence.

36. Trust employees who investigate and accident should not be involved with related Trust preparation for inquest or litigation.

37. Trusts should seek to maximise the involvement of families in SAI investigations and in particular:

   (i) Trusts should publish a statement of patient and family rights in relation to all SAI processes including complaints.

   (ii) Families should be given the opportunity to become involved in setting the terms of reference for an investigation.

   (iii) Families should, if they so wish, engage with the investigation and receive feedback on progress.

   (iv) A fully funded Patient Advocacy Service should be established, independent of individual Trusts, to assist families in the process. It should be allowed funded access to independent expert advice in complex cases.

   (v) Families in cases of SAI related child death should be entitled to see relevant documentation, including all records, written communication between healthcare professionals and expert reports.
(vi) All written Trust communication to parents or family after a SAI related child death should be signed or co-signed by the chief executive.

(vii) Families should be afforded the opportunity to respond to the findings of an investigation report and all such responses should be answered in writing.

(viii) Family GPs should, with family consent, receive copies of feedback provided.

(ix) Families should be formally advised of the lessons learned and the changes effected.

(x) Trusts should seek, and where appropriate act upon, feedback from families about adverse clinical incident handling and investigation.

38. Investigations should be subject to multi-disciplinary peer review.

39. Investigation teams should reconvene after an agreed period to assess both investigation and response.

40. Learning and trends identified in SAI investigations should inform programmes of clinical audit.

41. Trusts should publish the reports of all external investigations, subject to considerations of patient confidentiality.

42. In the event of new information emerging after finalisation of an investigation report or there being a change in conclusion, then the same should be shared promptly with families.

**In the event of a Death related to a Serious Adverse Clinical Incident.**

43. A deceased’s family GP should be notified promptly as to the circumstances of death to enable support to be offered in bereavement.
44. Authorisation for any limitation of a post-mortem examination should be signed by two doctors acting with the written and informed consent of the family.

45. Check-list protocols should be developed to specify the documentation to be furnished to the pathologist conducting a hospital post-mortem.

46. Where possible, treating clinicians should attend for clinico-pathological discussions at the time of post-mortem examination and thereafter upon request.

47. In providing post-mortem reports pathologists should be under a duty to:

(i) Satisfy themselves, insofar as is practicable, as to the accuracy and completeness of the information briefed them.

(ii) Work in liaison with the clinicians involved.

(iii) Provide preliminary and final reports with expedition.

(iv) Sign the post-mortem report.

(v) Forward a copy of the post-mortem report to the family GP.

48. The proceedings of mortality meetings should be digitally recorded, the recording securely archived and an annual audit made of proceedings and procedures.

49. Where the care and treatment under review at a mortality meeting involves more than one hospital or Trust, video conferencing facilities should be provided and relevant professionals from all relevant organisations should, in so far as is practicable, engage with the meeting.

50. The Health and Social Care (‘HSCB’) should be notified promptly of all forthcoming healthcare related inquests by the Chief Executive of the Trust(s) involved.
51. Trust employees should not record or otherwise manage witness statements made by Trust staff and submitted to the Coroner’s office.

52. Protocol should detail the duties and obligations of all healthcare employees in relation to healthcare related inquests.

53. In the event of a Trust asserting entitlement to legal privilege in respect of an expert report or other document relevant to the proceedings of an inquest, it should inform the Coroner as to the existence and nature of the document for which privilege is claimed.

54. Professional bereavement counselling for families should be made available and should fully co-ordinate bereavement information, follow-up service and facilitated access to family support groups.

**Training and Learning**

55. Trust Chairs and Non-Executive Board Members should be trained to scrutinise the performance of Executive Directors particularly in relation to patient safety objectives.

56. All Trust Board Members should receive induction training in their statutory duties.

57. Specific clinical training should always accompany the implementation of important clinical guidelines.

58. HSC Trusts should ensure that all nurses caring for children have facilitated access to e-learning on paediatric fluid management and hyponatraemia.

59. There should be training in the completion of the post-mortem examination request form.

60. There should be training in the communication of appropriate information and documentation to the Coroner’s office.
61. Clinicians caring for children should be trained in effective communication with both parents and children.

62. Clinicians caring for children should be trained specifically in communication with parents following an adverse clinical incident, which training should include communication with grieving parents after a SAI death.

63. The practice of involving parents in care and the experience of parents and families should be routinely evaluated and the information used to inform training and improvement.

64. Parents should be involved in the preparation and provision of any such training programme.

65. Training in SAI investigation methods and procedures should be provided to those employed to investigate.

66. Clinicians should be afforded time to consider and assimilate learning feedback from SAI investigations and within contracted hours.

67. Should findings from investigation or review imply inadequacy in current programmes of medical or nursing education then the relevant teaching authority should be informed.

68. Information from clinical incident investigations, complaints, performance appraisal, inquests and litigation should be specifically assessed for potential use in training and retraining.

Trust Governance

69. Trusts should appoint and train Executive Directors with specific responsibility for:

(i) Issues of Candour.
(ii) Child Healthcare.

(iii) Learning from SAI related patient deaths.

70. Effective measures should be taken to ensure that minutes of board and committee meetings are preserved.

71. All Trust Boards should ensure that appropriate governance mechanisms are in place to assure the quality and safety of the healthcare services provided for children and young people.

72. All Trust publications, media statements and press releases should comply with the requirement for candour and be monitored for accuracy by a nominated non-executive Director.

73. General Medical Council (‘GMC’) ‘Good Medical Practice’ Code requirements should be incorporated into contracts of employment for doctors.

74. Likewise, professional codes governing nurses and other healthcare professionals should be incorporated into contracts of employment.

75. Notwithstanding referral to the GMC, or other professional body Trusts should treat breaches of professional codes and/or poor performance as disciplinary matters and deal with them independently of professional bodies.

76. Clinical standards of care, such as patients might reasonably expect, should be published and made subject to regular audit.

77. Trusts should appoint a compliance officer to ensure compliance with protocol and direction.

78. Implementation of clinical guidelines should be documented and routinely audited.
79. Trusts should bring significant changes in clinical practice to the attention of the HSCB with expedition.

80. Trusts should ensure health care data is expertly analysed for patterns of poor performance and issues of patient safety.

81. Trusts should ensure that all internal reports, reviews and related commentaries touching upon SAI related deaths within the Trust are brought to the immediate attention of every Board member.

82. Each Trust should publish policy detailing how it will respond to and learn from SAI related patient deaths.

83. Each Trust should publish in its Annual Report, details of every SAI related patient death occurring in its care in the preceding year and particularise the learning gained therefrom.

84. All Trust Boards should consider the findings and recommendations of this Report and where appropriate amend practice and procedure.

**Department**

85. The Department should appoint a Deputy Chief Medical Officer with specific responsibility for children’s healthcare.

86. The Department should expand both the remit and resources of the RQIA in order that it might (i) maintain oversight of the SAI process (ii) be strengthened in its capacity to investigate and review individual cases or groups of cases, and (iii) scrutinise adherence to duty of candour.

87. The Department should now institute the office of Independent Medical Examiner to scrutinise those hospital deaths not referred to the Coroner.

88. The Department should engage with other interested statutory organisations to review the merits of introducing a Child Death Overview Panel.
89. The Department should consider establishing an organisation to identify matters of patient concern and to communicate patient perspective directly to the Department.

90. The Department should develop protocol for the dissemination and implementation of important clinical guidance, to include:

(i) The naming of specific individuals fixed with responsibility for implementation and audit to ensure accountability.

(ii) The identification of specific training requirements necessary for effective implementation.

91. The Department, HBSC, PHA, RQIA and HSC Trusts should synchronise electronic patient safety incident and risk management software systems, codes and classifications to enable effective oversight and analysis of regional information.

92. The Department should review healthcare standards in light of the findings and recommendations of this report and make such changes as are necessary.

93. The Department should review Trust responses to the findings and recommendations of this Report.

Culture and Litigation

94. The interests of patient safety must prevail over the interests engaged in clinical negligence litigation. Such litigation can become an obstacle to openness. A government committee should examine whether clinical negligence litigation as it presently operates might be abolished or reformed and/or whether appropriate alternatives can be recommended.

95. Given that the public is entitled to expect appropriate transparency from a publically funded service, the Department should bring forward
protocol governing how and when legal privilege entitlement might properly be asserted by Trusts.

96. The Department should provide clear standards to govern the management of healthcare litigation by Trusts and the work of Trust employees and legal advisors in this connection should be audited.
APPENDICES
### GLOSSARY OF ACRONYMS

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<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>ADH</td>
<td>Antidiuretic Hormone</td>
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<tr>
<td>Altnagelvin</td>
<td>Altnagelvin Area Hospital</td>
</tr>
<tr>
<td>AHHSST</td>
<td>Altnagelvin Area Hospitals Health and Social Services Trust</td>
</tr>
<tr>
<td>APLS</td>
<td>Advanced Paediatric Life Support</td>
</tr>
<tr>
<td>AS</td>
<td>Adam Strain</td>
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<tr>
<td>ASIS</td>
<td>Anterior Superior Iliac Spine</td>
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<tr>
<td>AST</td>
<td>Aspartate Aminotransferase</td>
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<tr>
<td>ATICS</td>
<td>Anaesthetics, Theatre and Intensive Care</td>
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<tr>
<td>A&amp;E</td>
<td>Accident and Emergency</td>
</tr>
<tr>
<td>AvMA</td>
<td>Action against Medical Accidents</td>
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<tr>
<td>BCH</td>
<td>Belfast City Hospital</td>
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<tr>
<td>BHSCT</td>
<td>Belfast Health and Social Care Trust</td>
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<tr>
<td>BL</td>
<td>Barrister-at-Law</td>
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<tr>
<td>BMJ</td>
<td>British Medical Journal</td>
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<tr>
<td>BNF</td>
<td>British National Formulary</td>
</tr>
<tr>
<td>CBE</td>
<td>Commander of the Most Excellent Order of the British Empire</td>
</tr>
<tr>
<td>CAHGT</td>
<td>Craigavon Area Hospital Group (HSS) Trust</td>
</tr>
<tr>
<td>CGs</td>
<td>Clinical Guidelines</td>
</tr>
<tr>
<td>CIT</td>
<td>Cold Ischaemic Time</td>
</tr>
<tr>
<td>CM</td>
<td>Conor Mitchell</td>
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<tr>
<td>CMO</td>
<td>Chief Medical Officer</td>
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## GLOSSARY OF ACRONYMS

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Full Form</th>
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<tr>
<td>CMV</td>
<td>Cytomegalovirus</td>
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<td>CNO</td>
<td>Chief Nursing Officer</td>
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<tr>
<td>CNS</td>
<td>Central Nervous System</td>
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<tr>
<td>CPA</td>
<td>Care Programme Approach</td>
</tr>
<tr>
<td>CPP</td>
<td>Cerebral Perfusion Pressure</td>
</tr>
<tr>
<td>CR</td>
<td>Claire Roberts</td>
</tr>
<tr>
<td>CREST</td>
<td>Clinical Resource Efficiency Support Team</td>
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<tr>
<td>CRP</td>
<td>Creactive Protein</td>
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<tr>
<td>CSF</td>
<td>Cerebral Spinal Fluid</td>
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<tr>
<td>CSM</td>
<td>Clinical Services Manager</td>
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<tr>
<td>CT</td>
<td>Computerised Tomography</td>
</tr>
<tr>
<td>CVP</td>
<td>Central Venous Pressure</td>
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<tr>
<td>CVST</td>
<td>Cerebral Venous Sinus Thrombosis</td>
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<tr>
<td>Dept</td>
<td>Department</td>
</tr>
<tr>
<td>DHSSPS</td>
<td>Department of Health, Social Services and Public Safety (the Department)</td>
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<tr>
<td>DHSSPSNI</td>
<td>Department of Health, Social Services and Public Safety Northern Ireland</td>
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<tr>
<td>DLS</td>
<td>Directorate of Legal Services</td>
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<tr>
<td>DoH</td>
<td>Department of Health</td>
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<tr>
<td>DRO</td>
<td>Designated Review Officer</td>
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<tr>
<td>DSO</td>
<td>Departmental Solicitors Office</td>
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### GLOSSARY OF ACRONYMS

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<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>ECP</td>
<td>Episodic Care Plan</td>
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<tr>
<td>EEG</td>
<td>Electroencephalography</td>
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<tr>
<td>ENT</td>
<td>Ear, Nose and Throat</td>
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<tr>
<td>FB&amp;PCs</td>
<td>Fluid Balance and Prescription Charts</td>
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<tr>
<td>FRCS</td>
<td>Fellowship of the Royal Colleges of Surgeons</td>
</tr>
<tr>
<td>GAIN</td>
<td>Guidelines Audit and Implementation Network</td>
</tr>
<tr>
<td>GCS</td>
<td>Glasgow Coma Scale</td>
</tr>
<tr>
<td>GFR</td>
<td>Glomerular Filtration Rate</td>
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<tr>
<td>GP</td>
<td>General Practitioner</td>
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<tr>
<td>GMC</td>
<td>General Medical Council</td>
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<tr>
<td>HLA</td>
<td>Human Leucocyte Antigen</td>
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<tr>
<td>HM Coroner</td>
<td>Her Majesty’s Coroner</td>
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<tr>
<td>HPPF</td>
<td>Human Plasma Protein Fraction</td>
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<td>HPSS</td>
<td>Health and Personal Social Services</td>
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<tr>
<td>HSC</td>
<td>Health and Social Care</td>
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<tr>
<td>HSCB</td>
<td>Health and Social Care Board</td>
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<tr>
<td>HSC Trust</td>
<td>Health and Social Care Trust</td>
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<tr>
<td>HSE</td>
<td>Health Service Executive</td>
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<tr>
<td>ICP</td>
<td>Intracranial Pressure</td>
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<tr>
<td>ICT</td>
<td>Information and Communications Technology</td>
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<tr>
<td>ICU</td>
<td>Intensive Care Unit</td>
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<tr>
<td>Acronym</td>
<td>Description</td>
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<tr>
<td>IHRD</td>
<td>Inquiry into Hyponatraemia-related Deaths</td>
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<tr>
<td>IV</td>
<td>Intravenous</td>
</tr>
<tr>
<td>JHO</td>
<td>Junior House Officer</td>
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<tr>
<td>JVP</td>
<td>Jugular Venous Pressure</td>
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<tr>
<td>KFOA</td>
<td>Kings Fund Organisational Audit</td>
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<tr>
<td>LC</td>
<td>Lucy Crawford</td>
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<tr>
<td>MAP</td>
<td>Mean Arterial Pressure</td>
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<tr>
<td>MAU</td>
<td>Medical Admissions Unit</td>
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<tr>
<td>MCA</td>
<td>Medicines Control Agency</td>
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<tr>
<td>MCCD</td>
<td>Medical Certificate of Cause of Death</td>
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<tr>
<td>Mmol/l</td>
<td>Millimoles per litre</td>
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<tr>
<td>MDU</td>
<td>Medical Defence Union</td>
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<tr>
<td>MRI</td>
<td>Magnetic Resonance Imaging</td>
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<tr>
<td>M&amp;M</td>
<td>Mortality and Morbidity</td>
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<tr>
<td>NCP</td>
<td>Nursing Care Plan</td>
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<tr>
<td>NCEPOD</td>
<td>National Confidential Enquiry into Perioperative Deaths</td>
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<tr>
<td>NHS</td>
<td>National Health Service</td>
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<tr>
<td>NICE</td>
<td>National Institute for Health and Care Excellence</td>
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<td>NIMDTA</td>
<td>Northern Ireland Medical and Dental Training Agency</td>
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<td>NMC</td>
<td>Nursing and Midwifery Council</td>
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<td>NPSA</td>
<td>National Patient Safety Agency</td>
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# GLOSSARY OF ACRONYMS

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
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<tbody>
<tr>
<td>OTC</td>
<td>Ornithine Transcarbamylase</td>
</tr>
<tr>
<td>PCC</td>
<td>Patient Client Council</td>
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<tr>
<td>PEWS</td>
<td>Physiological Early Warning Scores System</td>
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<tr>
<td>PHA</td>
<td>Public Health Agency</td>
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<tr>
<td>PICU</td>
<td>Paediatric Intensive Care Unit</td>
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<tr>
<td>PIVFAIT</td>
<td>Paediatric IV Fluid Audit Improvement Tool</td>
</tr>
<tr>
<td>PNS</td>
<td>Peripheral Nervous System</td>
</tr>
<tr>
<td>PONV</td>
<td>Post-Operative Nausea and Vomiting</td>
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<tr>
<td>PRES</td>
<td>Posterior Reversible Encephalopathy Syndrome</td>
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<tr>
<td>PSNI</td>
<td>Police Service for Northern Ireland</td>
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<tr>
<td>PU</td>
<td>Passed Urine</td>
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<tr>
<td>QC</td>
<td>Queens Counsel</td>
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<tr>
<td>RCA</td>
<td>Root Cause Analysis</td>
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<td>RCP</td>
<td>Royal College of Physicians</td>
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<td>RCPCH</td>
<td>Royal College of Paediatrics and Child Health</td>
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<td>RBHSC</td>
<td>Royal Belfast Hospital for Sick Children</td>
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<td>RDW</td>
<td>Red Cell Distribution Width</td>
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<td>RF</td>
<td>Raychel Ferguson</td>
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<td>RCPCH</td>
<td>Royal College of Paediatrics and Child Health</td>
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<td>RGHT</td>
<td>Royal Group of Hospitals Trust</td>
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<tr>
<td>RMCO</td>
<td>Risk Management Co-Ordinator</td>
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# Glossary of Acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>RM&amp;MRS</td>
<td>Regional Mortality and Morbidity Review System</td>
</tr>
<tr>
<td>RQIA</td>
<td>Regulation and Quality Improvement Authority</td>
</tr>
<tr>
<td>RVH</td>
<td>Royal Victoria Hospital</td>
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<tr>
<td>SAC</td>
<td>Special Advisory Committees</td>
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<tr>
<td>SAI</td>
<td>Serious Adverse Incident</td>
</tr>
<tr>
<td>SHO</td>
<td>Senior House Officer</td>
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<tr>
<td>SIADH</td>
<td>Syndrome of Inappropriate Antidiuretic Hormone Secretion</td>
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<tr>
<td>SHSCT</td>
<td>Southern Health and Social Care Trust</td>
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<tr>
<td>S/N</td>
<td>Staff Nurse</td>
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<tr>
<td>SLT</td>
<td>Sperrin Lakeland Trust</td>
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<tr>
<td>SQUAT</td>
<td>Safety Quality and Alerts Team</td>
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<td>STP</td>
<td>Sodium Thiopentone</td>
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<tr>
<td>UKCC</td>
<td>United Kingdom Central Council for Nursing, Midwifery and Health Visiting</td>
</tr>
<tr>
<td>UTI</td>
<td>Urinary Tract Infection</td>
</tr>
<tr>
<td>U&amp;E</td>
<td>Urea and Electrolyte</td>
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<tr>
<td>WCC</td>
<td>White Cell Count</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organisation</td>
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<td>WHSCT</td>
<td>Western Health and Social Care Trust</td>
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GLOSSARY OF ACRONYMS
# Advisors, Experts and Peer Reviewers

## Appointed Expert Advisors

<table>
<thead>
<tr>
<th>Name</th>
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<tbody>
<tr>
<td>The late Dr Peter Booker</td>
<td>Consultant Paediatric Anaesthetist</td>
</tr>
<tr>
<td>Mr Grenville Kershaw</td>
<td>Consultant Health Service Governance and Management</td>
</tr>
<tr>
<td>Dr Harvey Marcovitch</td>
<td>Consultant Paediatrician</td>
</tr>
<tr>
<td>Ms Mary Whitty</td>
<td>Consultant Health Service Governance and Management</td>
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<tr>
<td>Ms Carol Williams</td>
<td>Nursing Consultant</td>
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## Peer Reviewers

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<tr>
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<tr>
<td>Dr Desmond Bohn</td>
<td>Consultant Paediatric Anaesthetist</td>
</tr>
<tr>
<td>Dr Sharon Kinney</td>
<td>Consultant Paediatric Intensive Care Nursing</td>
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## Experts Advising the Inquiry

<table>
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<tr>
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<tbody>
<tr>
<td>Dr Philip Anslow</td>
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</tr>
<tr>
<td>Dr Jeffrey Aronson</td>
<td>Consultant Pharmacologist</td>
</tr>
<tr>
<td>Professor Keith Cartwright</td>
<td>Consultant Clinical Microbiologist</td>
</tr>
<tr>
<td>Dr Malcolm Coulthard</td>
<td>Honorary Consultant Paediatric Nephrologist</td>
</tr>
<tr>
<td>Dr Wellesley St C Forbes</td>
<td>Consultant Neuroradiologist (retired)</td>
</tr>
<tr>
<td>Professor John Forsythe</td>
<td>Consultant Transplant Surgeon</td>
</tr>
<tr>
<td>Mr George Foster</td>
<td>Consultant General Surgeon</td>
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## Advisors, Experts and Peer Reviewers

### Experts Advising the Inquiry

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<tr>
<td>Dr Audrey Giles</td>
<td>Forensic Document Analyst</td>
</tr>
<tr>
<td>Professor Alan Glasper</td>
<td>Professor of Children’s &amp; Young Peoples Nursing</td>
</tr>
<tr>
<td>Professor Dr Peter Gross</td>
<td>Professor of Medicine and Nephrology</td>
</tr>
<tr>
<td>Professor Brian Harding</td>
<td>Consultant Paediatric Neuropathologist and Professor of Pathology &amp; Laboratory Medicine</td>
</tr>
<tr>
<td>Dr Simon Haynes</td>
<td>Consultant in Paediatric Cardiothoracic Anaesthesia and Intensive Care</td>
</tr>
<tr>
<td>Professor Fenella Kirkham</td>
<td>Professor of Paediatric Neurology, Institute of Child Health</td>
</tr>
<tr>
<td>Mr Geoff Koffman</td>
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<tr>
<td>Dr Caren Landes</td>
<td>Consultant Paediatric Radiologist</td>
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<tr>
<td>Professor Sebastian Lucas</td>
<td>Professor of Clinical Histopathology and Consultant Histopathologist</td>
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<tr>
<td>Dr Roderick MacFaul</td>
<td>Consultant Paediatrician</td>
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<tr>
<td>Professor Aidan Mullan</td>
<td>Acting Chief Executive Officer and Director of Nursing and Clinical Governance</td>
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<tr>
<td>Professor Brian Neville</td>
<td>Consultant Paediatric Neurologist and Professor of Childhood Epilepsy</td>
</tr>
<tr>
<td>Mr Stephen Ramsden</td>
<td>Chief Executive Officer</td>
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<tr>
<td>Ms Sally Ramsay</td>
<td>Independent Children’s Nursing Advisor</td>
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<tr>
<td>Professor Dr Dietz Rating</td>
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<td>Mr Keith Rigg</td>
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<tr>
<td>Professor Gabriel Scally</td>
<td>Professor of Public Health and Planning, Director of WHO Collaborating Centre for Healthy Urban Environments</td>
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<td>Dr Robert Scott-Jupp</td>
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## ADVISORS, EXPERTS AND PEER REVIEWERS

### Experts Advising the Inquiry

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<tr>
<td>Dr Waney Squier</td>
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<tr>
<td>Professor Charles Swainson</td>
<td>Consultant Renal Physician and Medical Director (retired)</td>
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### Other Expert's Reports Considered

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<tr>
<td>Dr John Alexander</td>
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<tr>
<td>Professor Peter Jeremy Berry</td>
<td>Professor of Paediatric Pathology</td>
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<tr>
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<tr>
<td>Ms Susan Chapman</td>
<td>Nurse Consultant for Acute and High Dependency Care</td>
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<tr>
<td>Dr Dewi Evans</td>
<td>Consultant Paediatrician</td>
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<tr>
<td>Dr Brian Herron</td>
<td>Consultant Neuropathologist</td>
</tr>
<tr>
<td>Dr John Jenkins</td>
<td>Senior Lecturer in Child Health and Consultant Paediatrician</td>
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<tr>
<td>Dr Clodagh Loughrey</td>
<td>Consultant Chemical Pathologist</td>
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<tr>
<td>Dr Ian Maconochie</td>
<td>Consultant in Paediatric Accident and Emergency Medicine</td>
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<tr>
<td>Mr John Orr</td>
<td>Consultant Paediatric Surgean</td>
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<tr>
<td>Professor Rupert Risdon</td>
<td>Consultant Forensic Paediatric Pathologist</td>
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<tr>
<td>Dr Edward Sumner</td>
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<tr>
<td>Dr Declan Warde</td>
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## ADVISORS, EXPERTS AND PEER REVIEWERS

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<tr>
<td><strong>Professor Sir Alan Craft</strong></td>
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<td><strong>Dr Bridget Dolan</strong></td>
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<td><strong>Professor Mary Hanratty</strong></td>
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<td><strong>Dr Jan Keeling</strong></td>
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<td><strong>Dr Michael Ledwith</strong></td>
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<td>Dr Trevor Anderson</td>
<td>Clinical Director of Women and Children’s Services Erne Hospital</td>
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<td>Dr Philip Anslow</td>
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<td>Dr Alison Armour</td>
<td>Senior Registrar Forensic Medicine State Pathologist’s Department</td>
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<td>Dr Jeffrey Aronson</td>
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<tr>
<td>Dr Mohammed Asghar</td>
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<tr>
<td>Dr Elma Ashenhurst</td>
<td>Raychel Ferguson’s GP</td>
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<td>Dr Thomas Auterson</td>
<td>Consultant Anaesthetist Erne Hospital</td>
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<td>Dr Brigitte Bartholome</td>
<td>Paediatric Registrar RBHSC</td>
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<tr>
<td>Mr Paul Bateson (Deceased)</td>
<td>Clinical Director of Surgery</td>
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<tr>
<td>Ms Susan Beattie</td>
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<td>Dr Barbara Ann Bell</td>
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<td>Mrs Eleanor Boyce (nee Donaghy)</td>
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<td>Mr Martin Bradley</td>
<td>Director of Health Care &amp; Chief Nurse WHSSB</td>
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<td>Dr Richard Brady</td>
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<td>Ms Irene Brennan (nee Dickey)</td>
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<td>Dr Jacqueline Cartmill</td>
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<td>Ms Susan Chapman</td>
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<td>Mrs Lorna Cullen</td>
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<td>Dr Michael Curran</td>
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<td>Dr Mike Curtis</td>
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<td>Dr Aparna Date</td>
<td>Specialist Registrar Altnagelvin</td>
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<td>Mrs Maureen Dennison</td>
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<td>Mrs Margaret Doherty</td>
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<td>Mrs Kay Doherty</td>
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<td>Mr Colm Donaghy</td>
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<td>Mr Stephen Duffy</td>
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<tr>
<td>Ms Elaine Duffy</td>
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## Appendix 3
### PERSONS REFERRED TO IN THE REPORT

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<tbody>
<tr>
<td>Mr Eugene Fee</td>
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<tr>
<td>Mr Raymond Ferguson</td>
<td>Raychel's father</td>
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<tr>
<td>Mrs Marie Ferguson</td>
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<td>Professor John Forsythe</td>
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<td>Mr George Foster</td>
<td>Consultant General Surgeon</td>
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<tr>
<td>Miss Bridie Foy</td>
<td>Deputy Director of Nursing CAH</td>
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<td>Dr Thomas Frawley</td>
<td>Area Manager WHSSB</td>
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<td>Dr Raymond Fulton</td>
<td>Medical Director AHHSST</td>
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<tr>
<td>Dr Joseph Gaston</td>
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<td>Dr Colin Gaston</td>
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<tr>
<td>Dr Audrey Giles</td>
<td>Giles Document Laboratory handwriting analysis Expert</td>
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<tr>
<td>Mr Clive Gowdy</td>
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## Appendix 3

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# Persons and Organisations Granted Interested Party Status

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<td>Mr John Leckey</td>
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# Events Following Lucy Crawford’s Death

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<td>Dr Michael Curran</td>
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<td>Dr Joseph Devlin</td>
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<td>Ms Margaret Doherty</td>
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<tr>
<td>Ms Irene Duddy</td>
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<tr>
<td>Mr &amp; Mrs Raymond Ferguson</td>
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<td>Dr Raymond Fulton</td>
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<tr>
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<td>Dr Robert Gilliland</td>
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## PERSONS AND ORGANISATIONS GRANTED INTERESTED PARTY STATUS

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<tr>
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<td>Ms Michaela McAuley</td>
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<td>Dr Brian McCord</td>
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<td>Mr Clive Gowdy</td>
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<td>Mr John Hunter</td>
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<tr>
<td>Dr Norman Morrow</td>
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<td>Mr Paul Simpson</td>
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## SCHEDULES COMPILED BY THE INQUIRY

### Adam Strain

<table>
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<tr>
<td>List of persons – clinical</td>
</tr>
<tr>
<td>Schedule detailing experience of the anaesthetists and surgeons involved</td>
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<tr>
<td>Schedule of anaesthetic nurses and trainee anaesthetists involved</td>
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<tr>
<td>Schedule detailing education and training of doctors involved</td>
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<tr>
<td>Table detailing education &amp; training of nurses involved</td>
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<td>Chronology relating to draft recommendations submitted to the Coroner</td>
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<tr>
<td>Summaries of Inquiry expert opinion as to contributory factors to death, given before and after Newcastle-upon-Tyne meeting of experts (March 2012)</td>
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<tr>
<td>Glossary of Medical Terms</td>
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### Claire Roberts

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<th>Schedule</th>
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<td>Timeline of Treatment</td>
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<tr>
<td>Schedule of Consultant Responsibility (22\textsuperscript{nd} - 23\textsuperscript{rd} October 1996)</td>
</tr>
<tr>
<td>Schedule of Medication</td>
</tr>
<tr>
<td>Schedule of Fluid and Medication Input</td>
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<tr>
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## SCHEDULES COMPILLED BY THE INQUIRY

### Claire Roberts

| Schedules of Expert Views on Cause of Death & Cerebral Oedema |
| Schedule of Glasgow Coma Scale (‘GCS’) scores (22\textsuperscript{nd} October 1996) |
| Schedule of Recorded Sodium Levels (21\textsuperscript{st} - 23\textsuperscript{rd} October 1996) |
| Schedule of Blood Cell Counts (21\textsuperscript{st}-24\textsuperscript{th} October 1996) |
| Cerebral Oedema Flow Chart |
| Glossary of Medical Terms |

### Events following Lucy Crawford’s death

| List of persons involved |
| Schedule detailing Nomenclature & Grading of Doctors 1948 to 2012 |
| Schedule detailing Nomenclature & Grading of Nurses 1989 to 2012 |
| Chronology of Clinical Events |
| Consolidated Chronology: Governance and Lessons Learned |
| Compendium Glossary of Medical Terms |

### Raychel Ferguson

| Chronology of Clinical Events |
| Timeline of Treatment |
| Chronology and Clinical Timeline Post-Collapse 9\textsuperscript{th} June 2001 |
| Table of Clinicians duty times 7\textsuperscript{th} – 9\textsuperscript{th} June 2001 |
| Schedule of Observations |
| List of persons – Clinical |
## SCHEDULES COMPiled BY THE INQUIRE

### Raychel Ferguson

<table>
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<td>Schedule detailing Nomenclature &amp; Grading of Nurses 1989 to 2012</td>
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<td>Consolidated Chronology: Governance and Lessons Learned</td>
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<tr>
<td>Table of Nurses’ training and experience</td>
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<td>Table of Trainee Doctors’ training and experience</td>
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<td>HSC Trust Areas in Northern Ireland</td>
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<td>Commissioning structure for HSC Services in Northern Ireland</td>
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<td>Membership of Chief Medical Officer’s Working Group on Hyponatraemia</td>
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## LEGAL REPRESENTATIVES

### Adam Strain

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## Appendix 8

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<tr>
<td>Ablation</td>
<td>The removal of material from the surface of an object by vaporization, chipping, or other erosive process.</td>
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<tr>
<td>Abnormal cerebral venous drainage</td>
<td>Blood is drained from the brain through a network of veins &amp; venous sinuses (‘lakes’). Much of the blood eventually drains into the jugular veins. Blockage of a jugular vein, for example because of thrombosis after previous cannulation, results in blood finding alternative pathways.</td>
<td></td>
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<tr>
<td>Acetylcholine</td>
<td>A chemical neurotransmitter in both the peripheral nervous system (PNS) and central nervous system (CNS), facilitating the passage of the electrical potential across the gap between contiguous nerve fibres.</td>
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<tr>
<td>Acute tubular necrosis</td>
<td>The kidney consists of about a million microscopic units, each consisting of a glomerulus – a tuft of tiny blood vessels and a tubule – a hollow tube carrying the fluid filtered from blood which will go to make up urine. An event causing disruption and death of the cells lining the tubules and which leads to kidney failure has been termed acute tubular necrosis, although the term is now regarded as archaic.</td>
<td></td>
</tr>
<tr>
<td>Acyclovir or Aciclovir</td>
<td>An antiviral drug with specific activity against Herpes virus. Due to relative freedom from side effects, it may be used in treating unexplained neurological (‘brain’) disease in case virus is responsible.</td>
<td></td>
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<tr>
<td>Adalat</td>
<td>A tablet form of the drug, nifedipine. It is used in the treatment of high blood pressure &amp; in the prevention of angina.</td>
<td></td>
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<tr>
<td>Adenosine</td>
<td>A nucleoside comprising a molecule of adenine attached to a ribose sugar molecule. Adenosine plays an important role in biochemical processes, such as energy transfer.</td>
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<tr>
<td>Adhesion</td>
<td>The abnormal union of two normally separate tissues.</td>
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<tr>
<td>Adrenals</td>
<td>The glands on top of the kidneys that produce four different hormones.</td>
<td></td>
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<tr>
<td>Adventitia</td>
<td>The outermost connective tissue covering of any organ, vessel, or other structure.</td>
<td></td>
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<tr>
<td>Aetiology</td>
<td>The cause or origin of a disease.</td>
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<tr>
<td>Agglutination</td>
<td>Adherence of small bodies in a fluid.</td>
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<tr>
<td>Agonist</td>
<td>A chemical that binds to a receptor of a cell and causes a response in that cell. Agonists often mimic the action of a naturally occurring substance.</td>
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<tr>
<td>Term</td>
<td>Definition</td>
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<tr>
<td>Albumin</td>
<td>A protein soluble in water and present in all body tissue (egg-white is mostly albumin). Albumin in the blood is important in maintaining oncotic pressure. Albumin preparations can be given intravenously to boost blood volume when dangerously low.</td>
<td></td>
</tr>
<tr>
<td>Ambulatory</td>
<td>Designed for or available to patients who are not bedridden.</td>
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<tr>
<td>Aminoacidopathy</td>
<td>Disorders due to a defective enzymatic step in the metabolic pathway of one or more amino acids or in a protein mediator necessary for the transport of certain amino acids in or out of cells.</td>
<td></td>
</tr>
<tr>
<td>Ammon’s horn sclerosis</td>
<td>The most common type of neuropathological damage seen in individuals with temporal lobe epilepsy. This type of neuron cell loss, primarily in the hippocampus, can be observed in approximately 65% of people suffering from this epilepsy.</td>
<td></td>
</tr>
<tr>
<td>Ammonia</td>
<td>A colourless pungent gas consisting of nitrogen and hydrogen. Ammonia is a cerebrointoxicant and a high level in the blood causes a degenerative brain lesion. High blood levels of ammonia can occur in a number of diseases of the liver, in portacaval shunts, urea poisoning and liver dysfunction.</td>
<td></td>
</tr>
<tr>
<td>Amnesia</td>
<td>A condition in which memory is lost.</td>
<td></td>
</tr>
<tr>
<td>Amylase</td>
<td>Any of a group of proteins found in saliva and pancreatic juice and which assist in the conversion of starch to sugar.</td>
<td></td>
</tr>
<tr>
<td>Anaemia</td>
<td>A decrease in haemoglobin, the red pigment in blood which carries oxygen to tissues and carries away carbon dioxide.</td>
<td></td>
</tr>
<tr>
<td>Anaphylaxis</td>
<td>A serious allergic reaction that is rapid in onset and may cause death.</td>
<td></td>
</tr>
<tr>
<td>Anastomosis</td>
<td>The surgical connection of two structures, eg connections between blood vessels or between other tubular structures such as intestine.</td>
<td></td>
</tr>
<tr>
<td>Anatomical</td>
<td>Pertaining to anatomy or to the structure of the body.</td>
<td></td>
</tr>
<tr>
<td>Angiography</td>
<td>A medical imaging technique using an intravenous dye to visualize the inside, or lumen, of arteries, veins or heart.</td>
<td></td>
</tr>
<tr>
<td>Anoxia</td>
<td>An extreme form of hypoxia or &quot;low oxygen&quot;.</td>
<td></td>
</tr>
<tr>
<td>Antecubital fossa</td>
<td>The triangular cavity at the front of the elbow that contains a tendon of the biceps muscle, the median nerve and the brachial artery.</td>
<td></td>
</tr>
<tr>
<td>Anterior superior iliac spine (ASIS)</td>
<td>The hip bones located towards the front of the body.</td>
<td></td>
</tr>
<tr>
<td>Antidiuretic hormone (ADH)</td>
<td>Also known as vasopressin, a chemical hormone produced by the hypothalamus at the base of the brain. One of its effects is to inhibit the production of urine by stimulating the kidney tubules to reabsorb some of the water otherwise destined to be passed as urine.</td>
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<td>Term</td>
<td>Definition</td>
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</tr>
<tr>
<td>Anti-rejection therapy</td>
<td>The use of certain drugs after transplantation to prevent rejection of the transplanted organ.</td>
<td></td>
</tr>
<tr>
<td>Anuria</td>
<td>Failure to produce urine, generally due to kidney failure. Production of an abnormally low volume of urine is termed oliguria.</td>
<td></td>
</tr>
<tr>
<td>Aorta</td>
<td>The largest artery in the body – arising out of the left ventricle of the heart, arching leftwards and backwards though the chest to lie alongside the backbone. It exits the chest through a gap in the diaphragm muscle and continues along the spine until it splits into the two common iliac arteries at the level of the umbilicus. Through its branches it provides arterial blood to all the organs of the body.</td>
<td></td>
</tr>
<tr>
<td>Apnoea</td>
<td>Cessation of breathing.</td>
<td></td>
</tr>
<tr>
<td>Apoptosis</td>
<td>The process of genetically programmed cell death.</td>
<td></td>
</tr>
<tr>
<td>Appendicectomy (American English: Appendectomy)</td>
<td>The surgical removal of the appendix. This procedure is normally performed as an emergency intervention when a patient is suffering from inflammation of the appendix (appendicitis).</td>
<td></td>
</tr>
<tr>
<td>Apyrexic</td>
<td>Having normal human body temperature.</td>
<td></td>
</tr>
<tr>
<td>Aquaporins</td>
<td>The proteins embedded in the cell membrane which regulate the flow of water.</td>
<td></td>
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<tr>
<td>Aqueous solutions</td>
<td>Solutions containing material dissolved in water.</td>
<td></td>
</tr>
<tr>
<td>Arachidonic acid</td>
<td>A polyunsaturated fatty acid present in the membranes of body cells.</td>
<td></td>
</tr>
<tr>
<td>Arginine vasopressin</td>
<td>A synthetic form of ADH, used in the treatment of diabetes insipidus (a condition where the patient does not produce his or her own ADH).</td>
<td></td>
</tr>
<tr>
<td>Artefact</td>
<td>A false object or test result, eg when faulty preparation of a specimen for microscopic examination allows contamination and a misleading result.</td>
<td></td>
</tr>
<tr>
<td>Artefactual</td>
<td>Of or relating to an error in perception of information.</td>
<td></td>
</tr>
<tr>
<td>Arterial anastomosis</td>
<td>The surgical joining together of two arteries (or one artery that has been severed).</td>
<td></td>
</tr>
<tr>
<td>Arterial blood pressure</td>
<td>The pressure on the blood flowing through arteries. It is conventionally described by two figures eg 120/70, where the 120 is the pressure at maximum contraction of the heart ventricles (systolic pressure) and the 70 the pressure at the moment of greatest relaxation (diastolic pressure).</td>
<td></td>
</tr>
<tr>
<td>Arterial line</td>
<td>A hollow tube passed through the skin into an artery in order to sample blood, measure pressure and/or deliver injectable material.</td>
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## GLOSSARY OF MEDICAL TERMS

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<thead>
<tr>
<th>Term</th>
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<tbody>
<tr>
<td>Ascites</td>
<td>The accumulation of fluid in the abdominal cavity.</td>
</tr>
<tr>
<td>Aspartate aminotransferase (AST)</td>
<td>An enzyme normally present in body serum and other tissue, particularly in that of the heart and liver.</td>
</tr>
<tr>
<td>Aspiration</td>
<td>The removal of a gas or fluid by suction.</td>
</tr>
<tr>
<td>Astrocyte</td>
<td>The star-shaped glial cells in the brain and spinal cord which perform many functions including repair of the brain and spinal cord.</td>
</tr>
<tr>
<td>Ataxic</td>
<td>The loss of ability to coordinate muscle movement.</td>
</tr>
<tr>
<td>Atracurium</td>
<td>A muscle relaxant of short to intermediate duration used by anaesthetists in surgery or intensive care. It assists intubation and artificial ventilation. It is used to relax stomach muscles and the diaphragm to permit surgery within the abdominal cavity.</td>
</tr>
<tr>
<td>Atrophy</td>
<td>A wasting away of an organ or part or a failure to grow to normal size in consequence of disease.</td>
</tr>
<tr>
<td>Atropine</td>
<td>A drug, prepared originally from the plant Belladonna, which relaxes muscles not under conscious control, particularly those of the intestines, bladder and stomach. It also reduces the production of saliva and sweat. It was used as premedication before an anaesthetic but is now rarely used for that purpose. It increases heart rate so may be used to oppose certain other anaesthetic drugs having the opposite effect.</td>
</tr>
<tr>
<td>Augmentin</td>
<td>A brand of the antibiotic co-amoxiclav. It combines amoxicillin, a derivative of penicillin and clavulanic acid which enhances its effectiveness. It can be given by injection or by mouth.</td>
</tr>
<tr>
<td>Autopsy</td>
<td>A post mortem assessment or examination of the body to determine the cause of death.</td>
</tr>
<tr>
<td>Axon</td>
<td>A long, slender projection of a nerve cell, or neuron, that conducts electrical impulses away from the neuron's cell body or soma.</td>
</tr>
<tr>
<td>Azathioprine</td>
<td>A drug prescribed to transplant recipients to inhibit rejection of the transplanted tissue. It is one of a group of drugs called immunosuppressants.</td>
</tr>
<tr>
<td>Basal cistern</td>
<td>A wide cavity where the arachnoid (a layer of membranes that contain the central nervous system) extends between the two temporal lobes.</td>
</tr>
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<tbody>
<tr>
<td>Basal ganglia</td>
<td>A group of cell collections (nuclei) in the brain. Situated at the base of the forebrain and strongly connected with the cerebral cortex, thalamus and other brain areas, they are associated with a variety of functions, including voluntary motor control and procedural learning.</td>
</tr>
<tr>
<td>Baxter’s solution</td>
<td>Solutions used in peritoneal dialysis.</td>
</tr>
<tr>
<td>Bergman glia</td>
<td>See Glial.</td>
</tr>
<tr>
<td>Bilateral fundal haemorrhages</td>
<td>Fundal haemorrhage is a sign of trauma or damage to the blood vessels at the back of the eye. It is indicative of a lack of oxygen or a catastrophic fall in blood pressure. Bilateral means ‘on both sides of the body.’</td>
</tr>
<tr>
<td>Bilateral Papilloedema</td>
<td>Swelling of the optic discs and diagnostic of severe raised intracranial pressure</td>
</tr>
<tr>
<td>Bilateral reimplanatation of ureters</td>
<td>Ureters are the muscular tubes, one on each side of the body, which carry urine from the kidney to the bladder. When a kidney is transplanted, its ureters have to be sewn into the recipient’s bladder or reimplanted.</td>
</tr>
<tr>
<td>Blood gas analyser</td>
<td>A device used to measure the partial pressures of oxygen and carbon dioxide in a blood sample. It also measures the acidity of blood and gives an indication of the concentrations of electrolytes (chemicals such as sodium) and haemoglobin. It is often used as a ‘near-patient’ device as well as in laboratory use.</td>
</tr>
<tr>
<td>Blood groups</td>
<td>The four main groups are O, A, B and AB</td>
</tr>
<tr>
<td>Bolus</td>
<td>A single dose given rapidly, most usually referred to in intravenous use.</td>
</tr>
<tr>
<td>Bone profile</td>
<td>A blood test analysing chemicals and providing information about the quality of bones. Important in the treatment of renal failure where calcium loss occurs.</td>
</tr>
<tr>
<td>Boyd’s equation</td>
<td>A rapid method of calculating body surface area from height and weight and read from a chart. Surface area is often used to calculate drug dosage, especially in children.</td>
</tr>
<tr>
<td>Brachiocephalic vein</td>
<td>A vein which supplies blood to the right arm, head and neck.</td>
</tr>
<tr>
<td>Brain-stem death</td>
<td>Brain damage causing irreversible loss of brain function and rendering the individual incapable of life without the aid of a ventilator.</td>
</tr>
<tr>
<td>Brain stem death test</td>
<td>A series of tests performed by two doctors, some hours apart, to confirm brain stem death.</td>
</tr>
<tr>
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</tr>
<tr>
<td>British National Formulary (BNF)</td>
<td>A publication of the British Medical Association &amp; Royal Pharmaceutical Society of Great Britain listing all drugs available for use and detailing the licensed reasons for use, side-effects, contraindications, dosages and methods of administration.</td>
</tr>
<tr>
<td>Bronchiolitis</td>
<td>Inflammation of the bronchioles.</td>
</tr>
<tr>
<td>Bronchopnuemonia</td>
<td>Inflammation of the lungs.</td>
</tr>
<tr>
<td>Broviac line</td>
<td>An intravenous catheter most often used for the administration of medication and the withdrawal of blood for analysis. Broviac lines may remain in place for extended periods and are used when long-term intravenous access is required.</td>
</tr>
<tr>
<td>Bulbar function</td>
<td>The function of the cranial nerves IX, X, XI and XII.</td>
</tr>
<tr>
<td>Calcification</td>
<td>The deposit of calcium salts in the body tissue, normally the bones and teeth.</td>
</tr>
<tr>
<td>Cannula</td>
<td>A short, narrow hollow tube which can be inserted into a blood vessel and used to take samples or deliver medication. If a cannula becomes dislodged allowing fluids to escape and enter tissue outside a blood vessel, then it must be removed and replaced.</td>
</tr>
<tr>
<td>Capillary</td>
<td>The terminal vessels uniting the arterial with the venous systems of the body.</td>
</tr>
<tr>
<td>Capillary refill</td>
<td>The rate at which blood refills empty capillaries. It may be measured by holding the hand higher than the heart and pressing the soft pad of a finger until it turns white and noting the time to re-colour once pressure is released. Normal capillary refill time (crt) is less than 2 seconds.</td>
</tr>
<tr>
<td>Cardiac arrest</td>
<td>A sudden cessation of cardiac function resulting in loss of effective circulation.</td>
</tr>
<tr>
<td>Cardiac resuscitation</td>
<td>An emergency procedure involving external cardiac massage and artificial respiration in an attempt to restore circulation of the blood and so prevent death or brain damage from lack of oxygen.</td>
</tr>
<tr>
<td>Cardiomegaly</td>
<td>A medical condition wherein the heart is enlarged.</td>
</tr>
<tr>
<td>Carina</td>
<td>The point of division of the main airway.</td>
</tr>
<tr>
<td>Carotid artery</td>
<td>One of two paired arteries (left and right) supplying the head and neck with oxygenated blood.</td>
</tr>
<tr>
<td>Catarrh</td>
<td>A disorder of inflammation of the mucous membranes.</td>
</tr>
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<tbody>
<tr>
<td>Catecholamines</td>
<td>Molecules with a nucleus consisting of benzene with two hydroxyl side groups and a side-chain amine. They include dopamine and the “fight-or-flight” hormone adrenaline released in response to stress.</td>
</tr>
<tr>
<td>Catheter</td>
<td>Hollow tubes, longer than cannulas, which are inserted into the body, eg cardiac catheters which are passed along a vein into the heart, suprapubic catheters which are inserted above the pubic bone into the bladder to drain urine, urethral catheters passed into the urethra, ureteric catheters which are passed from the bladder up the ureters to inject material or sample urine from the kidney.</td>
</tr>
<tr>
<td>Cefotaxime sodium (Claforan)</td>
<td>An antibiotic used in the treatment of infections of the respiratory tract.</td>
</tr>
<tr>
<td>Central nervous system (CNS)</td>
<td>The brain and spinal cord.</td>
</tr>
<tr>
<td>Central venous line</td>
<td>A cannula or catheter passed into a large vein, often in the neck and threaded up into the vena cava, the major vein draining into the heart. The line can be used to judge heart and circulation function by measuring pressures.</td>
</tr>
<tr>
<td>Central venous pressure (CVP)</td>
<td>A measure of the pressure of blood in one of the main veins draining into the heart (superior or inferior vena cava). It is measured through a central venous line and is affected by various factors, including whether or not the circulation requires more fluid for the heart to pump blood effectively or whether the circulation is overloaded. An understanding of CVP is of value to anaesthetists in adjusting intravenous fluid replacement.</td>
</tr>
<tr>
<td>Cerebellar tonsil</td>
<td>A rounded lobule on the under surface of each cerebellar hemisphere.</td>
</tr>
<tr>
<td>Cerebellum</td>
<td>A region of the brain having an important role in motor control and cognitive function.</td>
</tr>
<tr>
<td>Cerebral</td>
<td>Of or relating to the brain or cerebrum.</td>
</tr>
<tr>
<td>Cerebral autoregulation</td>
<td>An adaptive mechanism that plays an important role in maintaining an appropriate blood pressure within vessels supplying brain tissue.</td>
</tr>
</tbody>
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<tr>
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<tbody>
<tr>
<td>Cerebral oedema</td>
<td>An excess of fluid within and around brain cells. It has many causes, including infections such as meningitis, a prolonged epileptic fit or starvation of the brain’s oxygen supply. It can result from Hyponatraemia. Because the brain is within a rigid skull, any increase in its volume in consequence of oedema causes increased pressure on the brain which in turn, restricts the amount of venous blood draining from the brain and further increases the oedema. The eventual result is that parts of the brain are forced by the pressure down through the foramen magnum, the hole in the base of the skull, impairing blood supply to the brainstem and leading to loss of control over the heart, blood pressure and breathing. Sudden death may result.</td>
</tr>
<tr>
<td>Cerebral palsy</td>
<td>An umbrella term encompassing a group of non-progressive, non-contagious motor conditions which cause physical disability in human development.</td>
</tr>
<tr>
<td>Cerebral perfusion pressure (CPP)</td>
<td>The net pressure gradient causing blood flow to the brain (brain perfusion).</td>
</tr>
<tr>
<td>Cerebral venous sinus thrombosis (CVST)</td>
<td>A rare form of stroke that results from thrombosis (a blood clot) of the dural venous sinuses, which drain blood from the brain. Symptoms may include headache, abnormal vision, any of the symptoms of stroke and seizures. Intracranial pressure may rise causing papilloedema (swelling of the optic disc).</td>
</tr>
<tr>
<td>Cerebrospinal fluid (CSF)</td>
<td>A clear, colourless, body fluid, that occupies the subarachnoid space and the ventricular system around and inside the brain and spinal cord. In essence, the brain “floats” in it.</td>
</tr>
<tr>
<td>Cerebrovascular disease</td>
<td>A group of conditions affecting the circulation of blood to the brain.</td>
</tr>
<tr>
<td>Cervical cord</td>
<td>That part of the spinal cord situate in the neck.</td>
</tr>
<tr>
<td>Chemoreceptor</td>
<td>A sensory receptor that converts chemical signals into electrical potential. In more general terms, chemoreceptors detect certain chemical stimuli in the environment.</td>
</tr>
<tr>
<td>Cheyne-Stokes respiration</td>
<td>An abnormal pattern of breathing characterized by progressively deeper and sometimes faster breathing, followed by a gradual decline and then a temporary stop called an apnea. The pattern is repeated with each cycle taking between 30 seconds and 2 minutes.</td>
</tr>
<tr>
<td>Chiari malformation</td>
<td>A malformation of the brain consisting of a downward displacement of the cerebellar tonsils through the foramen magnum (the opening at the base of the skull).</td>
</tr>
<tr>
<td>Cingulate gyrus</td>
<td>A part of the brain situate in the medial aspect of the cerebral cortex and considered part of the limbic lobe.</td>
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<tbody>
<tr>
<td>Circle of Willis</td>
<td>A circle of arteries supplying blood to the brain and named after Thomas Willis (1621–1675), an English physician.</td>
</tr>
<tr>
<td>Circulating nurse (‘runner’)</td>
<td>An operating theatre nurse who is not ‘scrubbed up’ and can therefore handle non-sterile material unlike the operating surgeons or the scrub nurse. The circulating nurse has many tasks, including weighing discarded swabs to assess blood loss, the connection of replacement fluid to drips and fetching equipment. The circulating nurse can also assess or measure the amount of blood or other fluids draining from catheters etc.</td>
</tr>
<tr>
<td>Circulatory arrest</td>
<td>An alternative phrase for ‘cardiac arrest’.</td>
</tr>
<tr>
<td>Circulatory resuscitation</td>
<td>See ‘cardiac resuscitation’.</td>
</tr>
<tr>
<td>Cirrhosis</td>
<td>A consequence of chronic liver disease characterized by replacement of liver tissue by fibrosis, scar tissue and nodules leading to loss of liver function.</td>
</tr>
<tr>
<td>Claforan</td>
<td>An antibiotic used in the treatment of severe infection of the lung, throat, ear or urinary tract.</td>
</tr>
<tr>
<td>Clonus</td>
<td>A succession of intermittent muscular contractions and relaxations usually resulting from a sustained stretching stimulus and often a sign of brain or spinal cord disease.</td>
</tr>
<tr>
<td>Clotting</td>
<td>The formation of a jellylike substance within a blood vessel causing a stoppage of the blood flow, also called coagulation.</td>
</tr>
<tr>
<td>Coagulation screen</td>
<td>A standard set of blood tests performed in a haematology laboratory to detect abnormality in the blood clotting system.</td>
</tr>
<tr>
<td>Cockcroft-Gault formula</td>
<td>A method of calculating creatinine clearance (see below) from the blood creatinine level and the individual patient’s age, height and weight.</td>
</tr>
<tr>
<td>Cogwheel rigidity</td>
<td>The tension in a muscle which gives way in little jerks when the muscle is passively stretched.</td>
</tr>
<tr>
<td>Cold ischaemic time (‘CIT’)</td>
<td>Ischaemia means a deficient blood supply which can lead to cell damage. If a tissue is kept cold, it can withstand ischaemia for longer than at body temperature. It is therefore important when performing a transplant operation to keep the donor organ cold. The cold ischaemic time is relevant in assessing the viability of a donor organ. The CIT is calculated from the time of removal from the donor to time of insertion into the recipient and anastomosis of the arteries.</td>
</tr>
<tr>
<td>Colloid</td>
<td>A substance evenly and microscopically dispersed throughout another substance.</td>
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<tr>
<td>Coma</td>
<td>A profound state of unconsciousness associated with depressed cerebral activity from which the individual cannot be aroused.</td>
</tr>
<tr>
<td>Common iliac arteries</td>
<td>Two large arteries originating from the aortic bifurcation at the level of the 4th lumbar vertebra.</td>
</tr>
<tr>
<td>Common iliac vein</td>
<td>The left and right common iliac veins lie on either side of the pelvis, and meet in the lower back, at the level of the fifth lumbar vertebra, to form the inferior vena cava, the main vein returning blood from the legs &amp; lower trunk to the heart.</td>
</tr>
<tr>
<td>Co-morbidity</td>
<td>The presence of one or more disorders (or diseases) in addition to a primary disease or disorder or the effect of such additional disorders or diseases.</td>
</tr>
<tr>
<td>Congenital</td>
<td>Existing at or dating from birth.</td>
</tr>
<tr>
<td>Congenital nephrotic syndrome</td>
<td>A generic term for several conditions characterised by abnormally functioning glomeruli in the kidneys and which are present at birth.</td>
</tr>
<tr>
<td>Congenital obstructive uropathy</td>
<td>Any condition present at birth in which drainage of urine from the kidney is obstructed at a point between the kidney pelvis and urethra.</td>
</tr>
<tr>
<td>Coning/coned (Otherwise known as ‘transforaminal herniation’)</td>
<td>A shorthand term used to describe the downward displacement of the brain stem into the foramen magnum (the hole in the base of the skull). It is caused by raised intracranial pressure and can kill.</td>
</tr>
<tr>
<td>Contractile Proteins</td>
<td>The proteins responsible for the contraction of muscle tissue.</td>
</tr>
<tr>
<td>Convulsion</td>
<td>An involuntary contraction or series of contractions of the voluntary muscles, also called a seizure.</td>
</tr>
<tr>
<td>Corpus callosum</td>
<td>A wide, flat bundle of neural fibres beneath the cortex connecting the left and right cerebral hemispheres and facilitating inter-hemispheric communication.</td>
</tr>
<tr>
<td>Cortex</td>
<td>The tissues forming the outer part of an organ e.g. the cerebral cortex of the brain.</td>
</tr>
<tr>
<td>Cranial</td>
<td>Adjective relating to the cranium or skull.</td>
</tr>
<tr>
<td>C-reactive protein (CRP)</td>
<td>A globulin found in the blood in some cases of inflammation.</td>
</tr>
<tr>
<td>Creatinine</td>
<td>A product of protein which can be measured in blood and urine. The higher the blood creatinine (and the lower the urinary creatinine) the poorer the kidney function. By calculating the ‘creatinine clearance’ a measure of kidney function can be obtained.</td>
</tr>
<tr>
<td>Term</td>
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<tr>
<td>Cross-matching</td>
<td>A method of comparing a patient’s blood or tissue with that of a potential donor to ensure organ compatibility.</td>
</tr>
<tr>
<td>Crystalloid</td>
<td>A substance that in solution can pass through a semipermeable membrane and be crystallized. The physical opposite of a crystalloid is a colloid, which does not dissolve and does not form true solutions.</td>
</tr>
<tr>
<td>CT (computerised tomography) scan</td>
<td>An imaging technique relying on a computerised analysis of multiple x-rays, taken at different levels and reconstructed to depict a two- or three-dimensional image.</td>
</tr>
<tr>
<td>Cushing response</td>
<td>A physiological nervous system response to increased intracranial pressure (ICP) resulting in widening pulse pressure, irregular breathing and a reduction of the heart rate. It is usually seen in the terminal stages of acute head injury and may indicate imminent brain herniation.</td>
</tr>
<tr>
<td>Cyanosis</td>
<td>The appearance of a blue or purple coloration of the skin or mucous membranes due to reduced oxygen levels within the tissues close to the skin surface.</td>
</tr>
<tr>
<td>Cyclase</td>
<td>An enzyme that catalyses a chemical reaction to form a compound.</td>
</tr>
<tr>
<td>Cycles of dialysis</td>
<td>In peritoneal dialysis, fluid is run into the peritoneal cavity (inside of the abdomen) left for a time and then run out again. The process is repeated with each repetition being referred to as a cycle.</td>
</tr>
<tr>
<td>Cyclimorph</td>
<td>Medication containing morphine and cyclizine. Morphine belongs to a group of strong painkilling medicines called opioids and cyclizine is an anti-sickness medicine.</td>
</tr>
<tr>
<td>Cyclizine</td>
<td>An antihistamine drug used to treat nausea, vomiting and dizziness.</td>
</tr>
<tr>
<td>Cyclosporine</td>
<td>An immunosuppressant drug used in organ transplantation to prevent rejection.</td>
</tr>
<tr>
<td>Cystatin C</td>
<td>A protein which when measured in a blood sample provides an accurate assessment of kidney function.</td>
</tr>
<tr>
<td>Cytology</td>
<td>The medical and scientific study of cells.</td>
</tr>
<tr>
<td>Cytomegalovirus (CMV) titre</td>
<td>A common virus but one which rarely causes disease in healthy people. It is, however, potentially dangerous for those whose immune system is not working well, either from disease or the use of immunosuppressive drugs eg those who have received transplants. To determine if a transplant donor or recipient has been infected, the concentration of antibody to the virus can be measured. This is called CMV titre.</td>
</tr>
<tr>
<td>Cytoscopy</td>
<td>An examination of the inside of the bladder and urethra.</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
</tr>
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<td>-----------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Decerebrate movement</td>
<td>The cerebrum is the part of the brain controlling all voluntary activity. If the cerebrum is not functioning adequately as a result of disease, toxin, seizures etc. characteristic muscle spasms can result in movement of an individual, intermittently or continuously into abnormal posture.</td>
</tr>
<tr>
<td>Decompensation</td>
<td>Inability of the heart to maintain adequate circulation, manifested by difficulty in breathing, venous engorgement and oedema.</td>
</tr>
<tr>
<td>Deep white matter</td>
<td>Brain tissue composed of myelin-coated nerve cell fibres. White matter carries information between the nerve cells in the brain and the spinal cord. The inner portion of the cerebrum is composed of white matter.</td>
</tr>
<tr>
<td>Dehydration</td>
<td>A deficiency of fluid in the body caused by insufficient intake, excessive output or both. Minor degrees of dehydration are common in illness and may be of no consequence. However an increase in dehydration, especially in combination with abnormality of blood chemistry (eg high or low sodium) may result in a deterioration of various body functions.</td>
</tr>
<tr>
<td>Dentate nucleus</td>
<td>The largest single structure linking the cerebellum to the rest of the brain. It is located within the deep white matter of each cerebellar hemisphere.</td>
</tr>
<tr>
<td>Desmopressin acetate/DDAVP</td>
<td>A drug used to regulate urine production.</td>
</tr>
<tr>
<td>Dextrose</td>
<td>An alternative term for ‘glucose’.</td>
</tr>
<tr>
<td>Dextrostix</td>
<td>A blood test used to measure levels of sugar in the bloodstream.</td>
</tr>
<tr>
<td>Dialysate</td>
<td>A fluid used for peritoneal dialysis (see Cycles).</td>
</tr>
<tr>
<td>Diastole</td>
<td>The period of time when the heart fills with blood after systole (contraction).</td>
</tr>
<tr>
<td>Diazepam (Diazemuls)</td>
<td>A benzodiazepine (psychoactive) drug commonly used in the treatment of anxiety, insomnia and seizures. Diazepam can be administered as a slow intravenous injection or as a continuous intravenous (‘IV’) infusion.</td>
</tr>
<tr>
<td>Diencephalon lesion</td>
<td>Any tissue abnormality in that part of the brain which includes the thalamus.</td>
</tr>
<tr>
<td>Diffuse oedema</td>
<td>Oedema is an abnormal accumulation of fluid within the body. It can be localised or involve the whole body.</td>
</tr>
<tr>
<td>Dilutional hyponatraemia</td>
<td>See hyponatraemia</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
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</tr>
<tr>
<td>Dioralyte</td>
<td>A proprietary powder containing glucose and salts in concentrations which, when dissolved in water, represent the best way of restoring by mouth fluids lost through diarrhoea, vomiting etc.</td>
</tr>
<tr>
<td>Disseminated intravascular coagulation (DIC)</td>
<td>A medical condition which develops when the normal balance between bleeding and clotting is disturbed.</td>
</tr>
<tr>
<td>Distension</td>
<td>The state of being distended or swollen.</td>
</tr>
<tr>
<td>Diuresis</td>
<td>Urine production as an aspect of fluid balance.</td>
</tr>
<tr>
<td>Dopamine</td>
<td>A drug used in resuscitation and intensive care and given by IV infusion. It is a heart stimulant and in low doses may increase the blood supply to vital organs by dilating blood vessels.</td>
</tr>
<tr>
<td>Double or triple lumen line</td>
<td>A cannula or catheter with two or three separate channels allowing separate routes for sampling, measurement and drug delivery.</td>
</tr>
<tr>
<td>Dura mater or dura</td>
<td>The outermost of the three layers of the meninges surrounding the brain and spinal cord.</td>
</tr>
<tr>
<td>Dysplasia</td>
<td>An abnormality in the development of tissue or an entire organ.</td>
</tr>
<tr>
<td>Dysplastic kidneys</td>
<td>Kidneys containing abnormal tissue. The condition arises before birth and the kidneys are often very small and function poorly.</td>
</tr>
<tr>
<td>Dysuria</td>
<td>Painful or difficult urination.</td>
</tr>
<tr>
<td>Effacement</td>
<td>The shortening or thinning of a tissue.</td>
</tr>
<tr>
<td>Electroencephalography (EEG)</td>
<td>The recording of electrical activity across the scalp.</td>
</tr>
<tr>
<td>Electrolytes</td>
<td>The elements of the common salts in blood ie sodium, potassium, chloride and bicarbonate.</td>
</tr>
<tr>
<td>Embolus</td>
<td>Any detached travelling intravascular mass carried by circulation, which is capable of clogging arterial capillary beds.</td>
</tr>
<tr>
<td>Emesis</td>
<td>Vomiting.</td>
</tr>
<tr>
<td>Encephalitis</td>
<td>The inflammation or infection of the brain usually caused by a viral or bacterial infection.</td>
</tr>
<tr>
<td>Encephalopathy</td>
<td>Brain disease, damage, or malfunction. Encephalopathy can present a very broad spectrum of symptoms ranging from memory loss or subtle personality change to dementia, seizures, coma or death.</td>
</tr>
<tr>
<td>Endonucleases</td>
<td>The enzymes that cleave the bond within a polynucleotide chain.</td>
</tr>
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## GLOSSARY OF MEDICAL TERMS

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Endoscopy</td>
<td>An examination inside the body using an endoscope, an instrument used to examine the interior of a hollow organ or cavity of the body. Unlike most other medical imaging devices, endoscopes are inserted directly into the organ.</td>
</tr>
<tr>
<td>Endothelium</td>
<td>The thin layer of cells that line the interior surface of blood and lymphatic vessels.</td>
</tr>
<tr>
<td>Endotracheal tube</td>
<td>A catheter that is inserted into the trachea for the primary purpose of establishing and maintaining a patent airway.</td>
</tr>
<tr>
<td>Enteral Feeding</td>
<td>The act of giving a patient a liquid, low residue food through a naso- or oro-gastric feeding tube.</td>
</tr>
<tr>
<td>Enteroviruses</td>
<td>A family of viruses which tend to invade the central nervous system through the gut.</td>
</tr>
<tr>
<td>Eosinophilic</td>
<td>The staining of certain tissues or cells, after they have been washed with eosin, a dye.</td>
</tr>
<tr>
<td>Epidemiology</td>
<td>That branch of medicine dealing with the study of the causes, distribution and control of disease within populations.</td>
</tr>
<tr>
<td>Epidural</td>
<td>A form of regional analgesia involving an injection of drugs through a catheter placed into the epidural space.</td>
</tr>
<tr>
<td>Epilepsy</td>
<td>A recurrent and paroxysmal disorder of sudden onset and spontaneous cessation caused by occasional, sudden, excessive, rapid and local discharge of nerve cells in the grey matter (cortex) of the brain.</td>
</tr>
<tr>
<td>Epileptogenic</td>
<td>Capable of producing epileptic seizures.</td>
</tr>
<tr>
<td>Erythrocyte</td>
<td>A red blood cell.</td>
</tr>
<tr>
<td>Erythropoietin</td>
<td>The hormone that regulates red blood cell production.</td>
</tr>
<tr>
<td>Excitotoxicity</td>
<td>The pathological process by which nerve cells are killed by excessive stimulation by neurotransmitters such as glutamate.</td>
</tr>
<tr>
<td>Expiration</td>
<td>The movement of air out of the bronchial tubes and through the airways. Breathing out.</td>
</tr>
<tr>
<td>External iliac artery</td>
<td>Each of the two common iliac arteries (see above) divide into two in order to form the external iliac arteries which run from the lower back to the groin where they continue as femoral arteries.</td>
</tr>
<tr>
<td>Extracellular fluid</td>
<td>The fluid outside body cells. That within blood vessels is intravascular and the remainder is interstitial.</td>
</tr>
<tr>
<td>Extra-ocular</td>
<td>Relating to the six muscles that control the movements of the eye.</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
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</tr>
<tr>
<td>Extraperitoneal procedure</td>
<td>An operation in which the peritoneal cavity is not entered. The peritoneum is a membrane which envelopes the inner surface of the abdomen.</td>
</tr>
<tr>
<td>Exudation</td>
<td>The process by which some of the constituents of blood pass slowly through the walls of small blood vessels in the course of inflammation.</td>
</tr>
<tr>
<td>Faecolith</td>
<td>A hard mass of faecal matter.</td>
</tr>
<tr>
<td>Femoral artery</td>
<td>A general term for the large arteries in the thigh.</td>
</tr>
<tr>
<td>Fentanyl</td>
<td>A potent, synthetic narcotic analgesic with a rapid onset and short duration of action.</td>
</tr>
<tr>
<td>Fibrinogen</td>
<td>A soluble plasma glycoprotein, synthesised by the liver, which is converted into fibrin during blood coagulation.</td>
</tr>
<tr>
<td>Fixed, dilated pupils</td>
<td>The pupils of the eyes contract and dilate in response to light and the distance of focus. Severe damage to the brain stem results in a failure in these responses and the pupils remain large.</td>
</tr>
<tr>
<td>Fixing of the brain</td>
<td>The process by which the brain is treated in a solution of formalin for up to two weeks in order to assist neuropathological examination.</td>
</tr>
<tr>
<td>Flumazenil</td>
<td>A medicine used to reverse the effects of benzodiazepines after sedation, general anesthesia or overdose.</td>
</tr>
<tr>
<td>Fluoroscopy</td>
<td>An imaging technique commonly used to obtain real-time moving x-ray images of internal body structures.</td>
</tr>
<tr>
<td>Foley catheter</td>
<td>A flexible tube passed through the urethra and into the bladder.</td>
</tr>
<tr>
<td>Foramen magnum</td>
<td>A large hole in the base of the skull. It where the brainstem merges into the upper part of the spinal cord.</td>
</tr>
<tr>
<td>Fractional excretion rate</td>
<td>A rate calculated as the proportion of sodium passing through the kidney and filtered into the urine. It is useful in evaluating acute kidney failure.</td>
</tr>
<tr>
<td>Free radicals</td>
<td>Where radicals are atoms, molecules, or ions with unpaired electrons or an open shell configuration, free radicals may have positive, negative, or zero charge. With some exceptions, the unpaired electrons cause radicals to be highly chemically reactive.</td>
</tr>
<tr>
<td>Free water</td>
<td>The theoretical proportion of water in blood or urine which can be recognised or calculated as containing no dissolved solutes.</td>
</tr>
<tr>
<td>Frontal white matter</td>
<td>The nerve fibres within the frontal lobe of the brain.</td>
</tr>
<tr>
<td>Full blood picture</td>
<td>A laboratory blood test to determine the proportions of all the components of blood.</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
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</tr>
<tr>
<td>Fundoplication</td>
<td>Suturing the fundus of the stomach around the gastroesophageal junction to treat gastroesophageal reflux. It can be performed by open surgery or laparoscopy.</td>
</tr>
<tr>
<td>Fundoscopy</td>
<td>A test permitting examination of the inside the fundus of the eye and other structures using an ophthalmoscope (or funduscope).</td>
</tr>
<tr>
<td>Fundus</td>
<td>The place on the retina opposite the pupil through which nerve fibres and blood vessels traverse the retina.</td>
</tr>
<tr>
<td>Ganglion</td>
<td>A biological tissue mass, most commonly a mass of nerve cell bodies.</td>
</tr>
<tr>
<td>Gastroenteritis</td>
<td>Infection or irritation of the digestive tract.</td>
</tr>
<tr>
<td>Gastroesophageal reflux disease</td>
<td>The chronic symptoms of or mucosal damage caused by stomach acid rising from the stomach into the oesophagus.</td>
</tr>
<tr>
<td>Gastrointestinal losses</td>
<td>The loss of fluid and electrolytes from the gut, usually by the production of faeces or, in abnormal circumstances, by vomiting and/or diarrhoea.</td>
</tr>
<tr>
<td>Gastro-intestinal tract</td>
<td>The tubular passage of mucous membrane extending from the mouth to the anus.</td>
</tr>
<tr>
<td>Gastrostomy tube &amp; button</td>
<td>A plastic tube inserted through the wall of the abdomen into the stomach for feeding. The tube ends at a flat disc sewn onto the abdomen (the button) to which a feeding tube can be attached.</td>
</tr>
<tr>
<td>Gentamycin</td>
<td>An antibiotic, given by intravenous or intramuscular injection, used in the treatment of significant infection by certain bacteria, such as pseudomonas and klebsiella.</td>
</tr>
<tr>
<td>Glasgow Coma Score</td>
<td>An internationally accepted measure of consciousness, the lower the score the lower the level of consciousness.</td>
</tr>
<tr>
<td>Glial</td>
<td>The non-neuronal cells that provide support and protection for neurons in the brain and for those neurons in other parts of the nervous system such as in the autonomous nervous system.</td>
</tr>
<tr>
<td>Gliosis</td>
<td>The proliferation of astrocytes in damaged areas of the central nervous system.</td>
</tr>
<tr>
<td>Glomerular filtration rate (GFR)</td>
<td>The rate at which the kidneys filter out fluid free from fats, protein or cells is termed the GFR and is a measure of the adequacy of kidney function.</td>
</tr>
<tr>
<td>Glomerulus</td>
<td>One of the 2 million filtering units in the kidney into which blood comes into contact.</td>
</tr>
<tr>
<td>Glutamate</td>
<td>Alternative word for glutamic acid which is a non-essential amino acid. In neuroscience, glutamate is an important neurotransmitter and plays an important role in learning and memory.</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
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</tr>
<tr>
<td>Glycolysis</td>
<td>The metabolic pathway converting glucose into pyruvate (an organic acid).</td>
</tr>
<tr>
<td>Glycopyrrolate</td>
<td>An atropine-like drug used to increase heart rate, commonly to oppose the action of certain other anaesthetic drugs which have the opposite effect.</td>
</tr>
<tr>
<td>Grey matter</td>
<td>A major component of the central nervous system, consisting of neuronal cell bodies, in contrast to white matter, which does not.</td>
</tr>
<tr>
<td>Guarding</td>
<td>A sign often detected during an examination for physical pain whereby the patient involuntarily contracts muscles.</td>
</tr>
<tr>
<td>Gyrus</td>
<td>A ridge on the cerebral cortex. It is generally surrounded by one or more sulci.</td>
</tr>
<tr>
<td>Haematemesis</td>
<td>The vomiting of blood.</td>
</tr>
<tr>
<td>Haematocrit</td>
<td>A measure of the proportion of blood which is solid (that is consisting of blood cells) and liquid (plasma) and determined by spinning a small blood sample in a centrifuge. It is used as a crude measure of hydration.</td>
</tr>
<tr>
<td>Haematoma</td>
<td>A localised collection of blood outside the blood vessels, usually in liquid form within the tissue. This distinguishes it from an ecchymosis, which is the spread of blood under the skin in a thin layer, commonly called a bruise.</td>
</tr>
<tr>
<td>Haemodynamics</td>
<td>The study of the forces and physical mechanisms concerned with the circulation of the blood.</td>
</tr>
<tr>
<td>Haemoglobin</td>
<td>The red pigment in blood which carries oxygen to tissues and takes away carbon dioxide.</td>
</tr>
<tr>
<td>Haemoptysis</td>
<td>The coughing up of blood or bloody sputum from the lungs or airway.</td>
</tr>
<tr>
<td>Haemorrhage</td>
<td>The escape of blood from any blood vessels, normally in response to trauma.</td>
</tr>
<tr>
<td>Haemorrhagic shock</td>
<td>Shock resulting from reduction of the volume of blood in the body due to haemorrhage.</td>
</tr>
<tr>
<td>Hagen–Poiseuille equation</td>
<td>A physical law providing the pressure drop for a fluid flowing through a long cylindrical pipe. The assumptions of the equation are that the flow is laminar, viscous and incompressible and the flow is through a constant circular cross-section which is substantially longer than its diameter.</td>
</tr>
<tr>
<td>Halothane</td>
<td>An inhalational general anaesthetic.</td>
</tr>
</tbody>
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<th>Term</th>
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</thead>
<tbody>
<tr>
<td>Hand ventilated</td>
<td>The artificial ventilation produced by squeezing a rubber bag connected to a mask or tube delivering air and/or oxygen to a patient.</td>
</tr>
<tr>
<td>Hartmann’s solution</td>
<td>An intravenous solution containing sodium chloride (salt), sodium lactate, potassium &amp; calcium chloride. The sodium concentration is similar to that of the blood.</td>
</tr>
<tr>
<td>Hepatocyte</td>
<td>A cell of the main tissue of the liver.</td>
</tr>
<tr>
<td>Hepals (Heparin sodium)</td>
<td>A flushing solution used to maintain the patency and prevent blockages within intravenous devices.</td>
</tr>
<tr>
<td>Herniation and compression of the brain stem</td>
<td>See coning.</td>
</tr>
<tr>
<td>Herpes</td>
<td>Any one of several viral diseases causing the eruption of small blister like vesicles on the skin or mucous membranes.</td>
</tr>
<tr>
<td>Heterogeneous</td>
<td>Relating to lack of uniformity of or within a substance. Its opposite is homogeneous, where there is uniformity in composition or character.</td>
</tr>
<tr>
<td>Heterozygous</td>
<td>The two different genes controlling a specified inherited trait.</td>
</tr>
<tr>
<td>Hindbrain</td>
<td>That part of the brain which includes the medulla, pons and cerebellum.</td>
</tr>
<tr>
<td>Hippocampus</td>
<td>A major component of the brain. It belongs to the limbic system and plays important roles in the consolidation of information from short-term memory to long-term memory.</td>
</tr>
<tr>
<td>Histological slides</td>
<td>Thin slices of tissue applied to a microscopic slide which are then viewed through a microscope.</td>
</tr>
<tr>
<td>Histology</td>
<td>The microscopic study of tissue and organs at the cellular level.</td>
</tr>
<tr>
<td>Histopathology</td>
<td>The microscopic examination of tissue in order to detect the manifestations of disease.</td>
</tr>
<tr>
<td>Homeostasis</td>
<td>The property of a system that regulates its internal environment to maintain a stable, constant condition.</td>
</tr>
<tr>
<td>Homocysteine</td>
<td>A non-protein amino acid.</td>
</tr>
<tr>
<td>Human leucocyte antigen (HLA)</td>
<td>Complex antigens, being proteins capable of inciting an immune reaction and found in most tissues of the body, are important in determining organ transplant compatibility. Incompatibility between donor and recipient HLA can cause rejection.</td>
</tr>
</tbody>
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<tbody>
<tr>
<td>Human plasma protein fraction (HPPF)</td>
<td>A mixture of albumin, other proteins and saline used in the emergency treatment of bleeding until replacement donor blood becomes available.</td>
</tr>
<tr>
<td>Hydrolysis</td>
<td>A chemical reaction during which molecules of water are split.</td>
</tr>
<tr>
<td>Hyperammonaemia</td>
<td>An abnormally high level of ammonia in the blood.</td>
</tr>
<tr>
<td>Hypercapnia</td>
<td>Also known as hypercarbia, a condition where there is excess carbon dioxide (CO₂) dissolved in the blood.</td>
</tr>
<tr>
<td>Hypercarbia</td>
<td>See Hypercapnia above.</td>
</tr>
<tr>
<td>Hypercoagulability</td>
<td>An abnormality of blood coagulation that increases the risk of thrombosis (blood clots in blood vessels).</td>
</tr>
<tr>
<td>Hyperkalemia</td>
<td>The condition in which the concentration of the electrolyte potassium (K⁺) in the blood is elevated.</td>
</tr>
<tr>
<td>Hypernatraemia</td>
<td>A concentration of sodium in the blood which is higher than normal. It is caused either by excessive salt intake or by water loss in excess of that of salt.</td>
</tr>
<tr>
<td>Hypertension</td>
<td>A state of raised blood pressure.</td>
</tr>
<tr>
<td>Hypertonic infusion</td>
<td>The delivery of an intravenous fluid which has a higher osmotic pressure than blood. Osmotic pressure develops when there are more molecules on one side of a semi-permeable membrane, such as a cell wall, than the other. The result is that water tends to flow through the membrane into the more concentrated solution until the concentrations are equal on both sides of the membrane.</td>
</tr>
<tr>
<td>Hypertonicity</td>
<td>The state of being hypertonic or having extreme muscular or arterial tension.</td>
</tr>
<tr>
<td>Hypervolemia (fluid overload)</td>
<td>The condition of an excess of fluid in the blood.</td>
</tr>
<tr>
<td>Hypocapnia</td>
<td>The presence of abnormally low levels of carbon dioxide in blood.</td>
</tr>
<tr>
<td>Hypoglycemia</td>
<td>A state produced by a lower than normal level of blood glucose.</td>
</tr>
<tr>
<td>Hypokalaemia</td>
<td>The condition of below normal levels of potassium in the blood serum.</td>
</tr>
<tr>
<td>Hyponatraemia</td>
<td>A serum concentration of sodium below the normal range which may be produced by dilution of the blood, excessive water retention, excessive sodium loss or occasionally inadequate salt intake.</td>
</tr>
<tr>
<td>Hypothalamus</td>
<td>The part of the fore-brain containing nerve centres for the regulation of vital processes e.g. body temperature and sexual function.</td>
</tr>
<tr>
<td>Hypothermia</td>
<td>A core body temperature of less than 35 degree Celsius.</td>
</tr>
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<tr>
<td>Hypotonic</td>
<td>A solution which has a greater osmotic pressure than another.</td>
</tr>
<tr>
<td>Hypovolaemia</td>
<td>A reduction in the volume of circulating blood causing the body to compensate by increasing the heart rate in order to pump more blood and by contracting small blood vessels to divert flow to major vessels and vital organs. Ultimately, this ‘compensation’ cannot be maintained and the patient goes into shock.</td>
</tr>
<tr>
<td>Hypoxia</td>
<td>A reduction in the amount of oxygen available in the body so as to adversely affect normal vital organ function (typically used with reference to the brain).</td>
</tr>
<tr>
<td>Hypoxic damage</td>
<td>The damage caused to any organ by the effect of hypoxia (see above).</td>
</tr>
<tr>
<td>Hypsarrhythmia</td>
<td>An abnormal pattern seen on EEG and frequently encountered in cases of infantile spasm. Diagnostic of status epilepticus.</td>
</tr>
<tr>
<td>Iatrogenic</td>
<td>Induced by a physician.</td>
</tr>
<tr>
<td>Idiopathic</td>
<td>An adjective to indicate that which arises spontaneously or from an obscure or unknown cause.</td>
</tr>
<tr>
<td>Ileus</td>
<td>An intestinal obstruction causing colic, vomiting and constipation.</td>
</tr>
<tr>
<td>Iliac fossa</td>
<td>The internal concavity of the iliac bone of the pelvis. It contains within it organs such as the ilium, caecum and appendix. The right iliac fossa is the most common site of pain and tenderness in acute appendicitis.</td>
</tr>
<tr>
<td>Infarcted</td>
<td>Tissue that has died through failure of its blood (and therefore oxygen) supply.</td>
</tr>
<tr>
<td>Infusion</td>
<td>The intravenous or subcutaneous injection of one of a variety of solutions used in the treatment of dehydration and/or electrolyte imbalance or as a vehicle for medication.</td>
</tr>
<tr>
<td>Ingestion</td>
<td>The oral taking of substances into the body.</td>
</tr>
<tr>
<td>Intercurrent</td>
<td>A disease or condition affecting a person already suffering from something else.</td>
</tr>
<tr>
<td>Insensible losses</td>
<td>Fluids lost as sweat, in the breath or in the normal stool.</td>
</tr>
<tr>
<td>Inspiration</td>
<td>The movement of air from the external environment through the air ways and into the alveoli of the lungs (breathing in).</td>
</tr>
<tr>
<td>Interstitial fluid</td>
<td>See extracellular fluid.</td>
</tr>
<tr>
<td>Intestinal colick</td>
<td>Associated with severe abdominal pain.</td>
</tr>
<tr>
<td>Intracellular fluid</td>
<td>See extracellular fluid.</td>
</tr>
</tbody>
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## GLOSSARY OF MEDICAL TERMS

<table>
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<tr>
<th>Term</th>
<th>Definition</th>
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<tbody>
<tr>
<td>Intracerebral</td>
<td>Occurring or situated within the cerebrum.</td>
</tr>
<tr>
<td>Intracranial</td>
<td>Within the skull.</td>
</tr>
<tr>
<td>Intracranial hypertension</td>
<td>Abnormally high blood pressure within the skull.</td>
</tr>
<tr>
<td>Intracranial pressure (ICP)</td>
<td>The pressure inside the skull and thus within the brain tissue and cerebrospinal fluid (CSF).</td>
</tr>
<tr>
<td>Intraluminal</td>
<td>Within the space of an object or structure.</td>
</tr>
<tr>
<td>Intraperitoneal space</td>
<td>See extraperitoneal.</td>
</tr>
<tr>
<td>Intrauterine</td>
<td>Of or related to the uterus.</td>
</tr>
<tr>
<td>Intravascular</td>
<td>Of or relating to the blood vessels.</td>
</tr>
<tr>
<td>Intravenous</td>
<td>Inside a vein.</td>
</tr>
<tr>
<td>Intubated</td>
<td>The introduction of a tube (endotracheal or ET tube) through the mouth or nose and into the larynx in order to provide an airway when resuscitating or artificially ventilating a patient.</td>
</tr>
<tr>
<td>Ion</td>
<td>An atom or molecule in which the total number of electrons is not equal to the total number of protons, giving it a net positive or negative electrical charge.</td>
</tr>
<tr>
<td>Ipsilateral cranial nerve</td>
<td>The cranial nerve which is on the same side as another structure.</td>
</tr>
<tr>
<td>Ischaemia</td>
<td>A restriction in blood supply, generally due to factors in the blood vessels, with resultant damage or dysfunction of tissue.</td>
</tr>
<tr>
<td>Ischaemic-hypoxic damage</td>
<td>A brain injury resulting from reduction in blood flow (ischaemia) &amp; lack of oxygen (hypoxia). It is usually caused by cardiac arrest or profound hypotension.</td>
</tr>
<tr>
<td>Isotonic solution</td>
<td>A solution with broadly the same osmolar pressure (and thus the same sodium concentration) as blood plasma.</td>
</tr>
<tr>
<td>Jugular vein</td>
<td>Any of several large veins of the neck which drain blood from the head.</td>
</tr>
<tr>
<td>Jugular venous pressure</td>
<td>The indirectly observed venous pressure wave occurring in the external jugular veins of the neck.</td>
</tr>
<tr>
<td>Ketones</td>
<td>Poisonous acidic chemicals produced by the body when fat instead of glucose is burned for energy.</td>
</tr>
<tr>
<td>Lactic acidosis</td>
<td>A physiological condition characterized by low pH in body tissues and blood accompanied by an accumulation of lactate.</td>
</tr>
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<tr>
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<tbody>
<tr>
<td>Laminar</td>
<td>Flat.</td>
</tr>
<tr>
<td>Laparotomy</td>
<td>The surgical opening of the abdomen.</td>
</tr>
<tr>
<td>Leigh's disease</td>
<td>A rare neurometabolic disorder affecting the central nervous system and characterized by movement disorders.</td>
</tr>
<tr>
<td>Leucocytes</td>
<td>White blood cells</td>
</tr>
<tr>
<td>Leukoaraiosis</td>
<td>Nonspecific changes in the cerebral white matter.</td>
</tr>
<tr>
<td>Leukoencephalopathy</td>
<td>Any of a group of diseases affecting the white matter of the brain.</td>
</tr>
<tr>
<td>Ligation</td>
<td>The creation of a ligature or suture typically tied around a vessel to seal it off.</td>
</tr>
<tr>
<td>Liver function test</td>
<td>Any one of several tests used to evaluate various functions of the liver, including metabolism, storage, filtration and excretion.</td>
</tr>
<tr>
<td>Lumbar</td>
<td>The region of the back lying lateral to the lumbar vertebrae.</td>
</tr>
<tr>
<td>Lumbar epidural</td>
<td>The placement of a cannula into the epidural space (near but outside the spinal cord) through which drugs can be delivered to produce anaesthesia of the lower part of the body without necessarily having to render the patient unconscious.</td>
</tr>
<tr>
<td>Lumen line</td>
<td>A line inserted into a tubular structure, such as an artery or intestine.</td>
</tr>
<tr>
<td>Lymph nodes</td>
<td>The swellings which occur at various points in the lymphatic system through which lymph (a watery fluid derived from blood and absorbed food material) drains.</td>
</tr>
<tr>
<td>Macrophages</td>
<td>Those cells whose role it is to engulf and digest cellular debris and pathogens.</td>
</tr>
<tr>
<td>Macroscopic</td>
<td>Observable by the naked eye.</td>
</tr>
<tr>
<td>Macular rash</td>
<td>A skin eruption where the lesions are flat and less than 1cm in diameter.</td>
</tr>
<tr>
<td>Maintenance rate</td>
<td>The IV fluid rate which provides for ongoing and insensible losses in a patient who is not dehydrated and not suffering other abnormal body fluid loss. It is calculated by reference to weight or body surface area.</td>
</tr>
<tr>
<td>Major surgery</td>
<td>(a) A surgical operation within the abdominal, pelvic, cranial, or thoracic cavities.</td>
</tr>
<tr>
<td></td>
<td>(b) A procedure which constitutes a hazard to life or the function of an organ or of tissue.</td>
</tr>
<tr>
<td></td>
<td>(c) Any surgical procedure that involves general anaesthesia or respiratory assistance.</td>
</tr>
</tbody>
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<tbody>
<tr>
<td>Mallory Weiss tear</td>
<td>A small tear in the distal oesophageal mucosa.</td>
</tr>
<tr>
<td>Mammillary bodies</td>
<td>A pair of small round bodies, located on the undersurface of the brain and forming part of the limbic system.</td>
</tr>
<tr>
<td>Mannitol</td>
<td>An osmotic diuretic being a solution of very high molecular weight and designed to provoke rapid excretion of free water through the kidney when given intravenously. It is used in emergency treatment of cerebral oedema and raised intracranial pressure.</td>
</tr>
<tr>
<td>McBurney's point</td>
<td>A site of extreme sensitivity in acute appendicitis and situated in the normal area of the appendix.</td>
</tr>
<tr>
<td>Mean Arterial Pressure (MAP)</td>
<td>The average arterial blood pressure in an individual during a single cardiac cycle.</td>
</tr>
<tr>
<td>Measles</td>
<td>An infection caused by a virus giving rise to a characteristic skin rash known as an exanthem.</td>
</tr>
<tr>
<td>Mediastinum (&quot;mediastinal&quot;)</td>
<td>A non-delineated group of structures in the thorax and surrounded by loose connective tissue.</td>
</tr>
<tr>
<td>Medulla oblongata</td>
<td>The lower half of the brainstem.</td>
</tr>
<tr>
<td>Medullary</td>
<td>Of or relating to the medulla (inner core) if any body part or organ.</td>
</tr>
<tr>
<td>Medullary Cystic (kidney disease)</td>
<td>An inherited kidney disorder characterized by cysts in both kidneys and tubulointerstitial sclerosis, leading to end-stage renal disease.</td>
</tr>
<tr>
<td>Membrane pump</td>
<td>A diaphragm pump.</td>
</tr>
<tr>
<td>Meninges</td>
<td>The three membranes that envelop the brain and spinal cord.</td>
</tr>
<tr>
<td>Meningitis</td>
<td>An infection or inflammation of the meninges (see above).</td>
</tr>
<tr>
<td>Meningococcal</td>
<td>Of or relating to the meningococcus bacterium, which causes cerebrospinal meningitis.</td>
</tr>
<tr>
<td>Meningoencephalitis</td>
<td>A condition which simultaneously both resembles meningitis, which is an infection or inflammation of the meninges and encephalitis, which is an infection or inflammation of the brain.</td>
</tr>
<tr>
<td>Mesenchyme</td>
<td>A type of undifferentiated loose connective tissue. The term mesenchyme refers to the morphology of embryonic cells.</td>
</tr>
<tr>
<td>Mesenteric adenitis</td>
<td>Inflammation of any of the several folds of the peritoneum which connect the intestines to the dorsal wall.</td>
</tr>
<tr>
<td>Metabolic acidosis</td>
<td>A pH imbalance in which the body has accumulated excess acid and has inadequate bicarbonate to neutralize it.</td>
</tr>
<tr>
<td>Metabolic coupling</td>
<td>The transfer between tissue cells in contact of low molecular weight metabolites such as amino acids.</td>
</tr>
</tbody>
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<tr>
<td>Metabolic disease</td>
<td>Any of the diseases or disorders that disrupt normal metabolism ie the process of converting food to energy on a cellular level.</td>
</tr>
<tr>
<td>Metabolic regulation</td>
<td>The process of metabolism which allows organisms to respond and interact with their environment.</td>
</tr>
<tr>
<td>Metabolism</td>
<td>The chemical reactions occurring in living organisms to sustain life.</td>
</tr>
<tr>
<td>Methylprednisolone</td>
<td>A synthetic drug typically used for its anti-inflammatory effects.</td>
</tr>
<tr>
<td>Microbiology</td>
<td>The branch of biology concerned with the study of microorganisms, including bacteria and viruses.</td>
</tr>
<tr>
<td>Microglia</td>
<td>A type of cell that is the resident of the brain and spinal cord and acts as the first and main form of active immune defence in the central nervous system.</td>
</tr>
<tr>
<td>Microvascular</td>
<td>Of or relating to the small blood vessels.</td>
</tr>
<tr>
<td>Midazolam</td>
<td>A short-acting drug in the benzodiazepine (psychoactive) class used in the treatment of acute seizures, insomnia for inducing sedation before medical procedures.</td>
</tr>
<tr>
<td>Mitochondrion (plural mitochondria)</td>
<td>A membrane-enclosed organelle found in most eukaryotic cells. Mitochondria are sometimes described as &quot;cellular power plants&quot; because they generate adenosine triphosphate (ATP) which is used as a source of chemical energy.</td>
</tr>
<tr>
<td>Mmol/l</td>
<td>Millimoles per litre. A millimole is one thousandth of a mole. A mole is the amount of any substance that contains 60,000,000,000,000,000,000,000,000,000 molecules or atoms.</td>
</tr>
<tr>
<td>Monro-Kellie principle</td>
<td>The hypothesis that the cranial compartment is incompressible and the volume inside the cranium is fixed. The cranium and its constituents (blood, CSF, &amp; brain tissue) create a state of volume equilibrium so that any increase in volume of one of the cranial constituents must be compensated by a decrease in the volume of another.</td>
</tr>
<tr>
<td>Multivariate</td>
<td>Of or relating to a number of different variations.</td>
</tr>
<tr>
<td>Mumps</td>
<td>An acute inflammatory contagious disease caused by a paramyxovirus and characterized by swelling of the salivary glands and sometimes also of the pancreas, ovaries or testes.</td>
</tr>
<tr>
<td>Myelin</td>
<td>An electrically insulating material that forms a layer or myelin sheath, usually around only the axon of a neuron. It is essential for the proper functioning of the nervous system.</td>
</tr>
<tr>
<td>Myelinolysis</td>
<td>A neurological disease caused by severe damage of the myelin sheath.</td>
</tr>
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<tr>
<td>Myogenic</td>
<td>Of or giving rise to the formation of muscle tissue.</td>
</tr>
<tr>
<td>Na+ and K+ electrodes</td>
<td>The parts of a piece of laboratory apparatus which measure concentrations of sodium (Na+) and potassium (K+).</td>
</tr>
<tr>
<td>Nail bed stimuli</td>
<td>Pressure to the nail bed provokes pain. An individual's response depends upon brain function, so the test is used to assess the severity of coma.</td>
</tr>
<tr>
<td>Necrosis</td>
<td>The premature death of cells and living tissue, caused by factors external to the cell or tissue.</td>
</tr>
<tr>
<td>Neonatal</td>
<td>Of or relating to the first 28 days of an infant's life.</td>
</tr>
<tr>
<td>Neonate</td>
<td>Refers to an infant in the first 28 days after birth.</td>
</tr>
<tr>
<td>Neostigmine</td>
<td>A drug used by anaesthetists to reverse the action of certain muscle relaxants (e.g. atracurium). It acts within a minute of being injected intravenously and lasts 20-30 minutes. It is used at the end of an operation to enhance recovery.</td>
</tr>
<tr>
<td>Nephrogenic diabetes insipidus</td>
<td>A condition in which the kidney is unable to respond to the hormone vasopressin (ADH). Patients cannot retain water so are at risk of dehydration. It is usually congenital and is characterised by excessive passage of urine (polyuria) and thirst (polydipsia) leading to episodes of hypernatraemia, dehydration, fever, constipation and vomiting.</td>
</tr>
<tr>
<td>Nephrology</td>
<td>The branch of medicine concerned with the study and management of kidney disease.</td>
</tr>
<tr>
<td>Nephrons</td>
<td>The 2 million individual microscopic filtering units of the kidneys which consist of glomeruli and tubules.</td>
</tr>
<tr>
<td>Nephrostogram</td>
<td>A radiograph of the kidney after a contrast agent has been administered through a nephrostomy tube.</td>
</tr>
<tr>
<td>Nephrostomy</td>
<td>An artificial opening created between the kidney and the skin which allows for the drainage of urine directly from the upper part of the urinary system.</td>
</tr>
<tr>
<td>Neuroblastoma</td>
<td>A malignant growth comprising embryonic nerve cells.</td>
</tr>
<tr>
<td>Neuroimaging</td>
<td>Non-invasive methods of visualizing the central nervous system, especially the brain, by various imaging modalities.</td>
</tr>
<tr>
<td>Neurology</td>
<td>The branch of medical practice concerned with the study of the nervous system and its disorders.</td>
</tr>
<tr>
<td>Neuromuscular</td>
<td>Of or relating to nerves and muscles.</td>
</tr>
</tbody>
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</thead>
<tbody>
<tr>
<td><strong>Neuromuscular blockade</strong></td>
<td>The process by which drugs are delivered to induce temporary muscle paralysis. Always given in conjunction with drugs to induce sleep and prevent pain.</td>
</tr>
<tr>
<td><strong>Neuron</strong></td>
<td>An electrically excitable cell that processes and transmits information by electrical and chemical signalling.</td>
</tr>
<tr>
<td><strong>Neuronal migration defect (or disorder)</strong></td>
<td>A congenital brain abnormality caused by the abnormal migration of neurons in the developing brain and nervous system.</td>
</tr>
<tr>
<td><strong>Neurones</strong></td>
<td>Also known as a nerve cell, this is a basic cellular building block of the nervous system which contains billions of neurones.</td>
</tr>
<tr>
<td><strong>Neuropathology</strong></td>
<td>The study of diseased nervous system tissue, usually conducted by small surgical biopsies or brain autopsy.</td>
</tr>
<tr>
<td><strong>Neuropathy</strong></td>
<td>Damage to nerves of the peripheral nervous system.</td>
</tr>
<tr>
<td><strong>Neuropeptides</strong></td>
<td>Any of several types of molecules found in brain tissue, composed of short chains of amino acids including endorphins and vasopressin.</td>
</tr>
<tr>
<td><strong>Neuroradiology</strong></td>
<td>The branch of radiology concerned with diagnosing diseases of the nervous system.</td>
</tr>
<tr>
<td><strong>Neurosurgery</strong></td>
<td>Any surgery involving the brain, spinal cord or peripheral nerves.</td>
</tr>
<tr>
<td><strong>Neutrophils</strong></td>
<td>White blood cells with cytoplasmic granules that consume harmful bacteria, fungi and other foreign materials.</td>
</tr>
<tr>
<td><strong>Nifedipine</strong></td>
<td>A medicine used to lower hypertension and treat angina (chest pain).</td>
</tr>
<tr>
<td><strong>Non-convulsive / non-fitting Status Epilepticus</strong></td>
<td>A series of rapidly repeating seizures without convulsive motor activity. Consciousness is not regained between seizures.</td>
</tr>
<tr>
<td><strong>Non-pulsatile</strong></td>
<td>The term ‘pulsatile’ indicates a state of rhythmic pulsation e.g. the heart beat. A non-pulsatile wave form implies interruption to the expected rhythm pattern.</td>
</tr>
<tr>
<td><strong>Norepinephrine</strong></td>
<td>Also called noradrenaline it is a molecule with multiple roles including those of hormone and a neurotransmitter.</td>
</tr>
<tr>
<td><strong>Normotensive</strong></td>
<td>Of or relating to normal values of blood pressure.</td>
</tr>
<tr>
<td><strong>Nuclei</strong></td>
<td>The control centre of a cell containing the cell's chromosomal DNA.</td>
</tr>
<tr>
<td><strong>Nucleolysis</strong></td>
<td>The process by which the nucleus of a displaced intervertebral disc is dissolved by disease.</td>
</tr>
<tr>
<td><strong>Nutrison</strong></td>
<td>A nutritional supplement containing protein, carbohydrates, fats, vitamins &amp; minerals which provides 750 kilocalories per 500 mls.</td>
</tr>
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<tr>
<td>Obstetrics</td>
<td>The branch of medicine concerned with pregnancy and childbirth, including the study of the physiologic and pathologic function of the female reproductive tract &amp; the care of the mother and foetus throughout pregnancy, childbirth and the recuperative period following delivery.</td>
</tr>
<tr>
<td>Obstructive uropathy</td>
<td>A condition in which the flow of urine is blocked, causing it to back up and injure one or both kidneys.</td>
</tr>
<tr>
<td>Occipital horn syndrome</td>
<td>A deficiency in copper excretion causing skeletal deformity.</td>
</tr>
<tr>
<td>Occipital lobe</td>
<td>The visual processing centres situated at the back of the cerebral hemispheres of the brain.</td>
</tr>
<tr>
<td>Oedema or Oedematous</td>
<td>The excessive accumulation of serous fluid in the intercellular spaces of tissue.</td>
</tr>
<tr>
<td>Oliguria</td>
<td>A significant reduction from normal in the volume of urine passed.</td>
</tr>
<tr>
<td>Ondanestron</td>
<td>An antiemetic for the treatment of nausea and vomiting.</td>
</tr>
<tr>
<td>Opioid</td>
<td>A psychoactive chemical that works by binding to opioid receptors providing pain relief.</td>
</tr>
<tr>
<td>Orchidopexy</td>
<td>A surgical procedure to move an undescended testicle into the scrotum and permanently fix it there.</td>
</tr>
<tr>
<td>Organelle</td>
<td>A specialised part of a cell with a specific function and usually separately enclosed within its own lipid bilayer.</td>
</tr>
<tr>
<td>Organic acid</td>
<td>An acid containing one or more carbon atoms.</td>
</tr>
<tr>
<td>Organic aciduria</td>
<td>Excessive excretion of one or more organic acids in the urine.</td>
</tr>
<tr>
<td>Ornithine transcarbamylase (OTC) deficiency</td>
<td>A rare metabolic urea-cycle disorder. The urea cycle is a series of five liver enzymes that rid the body of ammonia. When one of these enzymes is missing or deficient, ammonia accumulates in the blood and travels to the brain, causing coma, brain damage and death.</td>
</tr>
<tr>
<td>Osmolality</td>
<td>A measure of the osmoles (the number of moles of a chemical compound that contribute to a solution's osmotic pressure) of solute per kilogram of solvent (osmol/kg or Osm/kg).</td>
</tr>
<tr>
<td>Osmolarity</td>
<td>Osmolarity is an estimation of the osmolar concentration of plasma and is proportional to the number of particles per litre of solution; it is expressed as mmol/L.</td>
</tr>
<tr>
<td>Osmosis</td>
<td>The passage of water molecules through a semi-permeable membrane such as a cell wall. This occurs when one fluid contains fewer molecules of dissolved solids than the other.</td>
</tr>
</tbody>
</table>
# Glossary of Medical Terms

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</tr>
</thead>
<tbody>
<tr>
<td>Osmotic disequilibrium syndrome</td>
<td>Where the osmotic equilibrium normally present between two fluid compartments is no longer present.</td>
</tr>
<tr>
<td>Osmotic fluid shift</td>
<td>The movement of water across a semi permeable membrane which has the result of tending to equalise the osmotic pressure across the membrane.</td>
</tr>
<tr>
<td>Osmotic myelinolysis</td>
<td>A neurological disease caused by severe damage to the myelin sheath of nerve cells in the brainstem.</td>
</tr>
<tr>
<td>Osmotic oedema</td>
<td>Oedema caused through osmosis.</td>
</tr>
<tr>
<td>Otic</td>
<td>Of or relating to, or located near to, the ear.</td>
</tr>
<tr>
<td>Oxidative</td>
<td>Alternative term for redox- which describes all chemical reactions in which atoms have their oxidation state changed.</td>
</tr>
<tr>
<td>Oxygen saturation</td>
<td>Oxygen is carried in the blood bound to haemoglobin. If all the available haemoglobin is attached to oxygen then that represents 100% saturation. If the patient is deprived of oxygen so that blood mixes with arterial blood, then the saturation will fall. Saturation is normally above 95% and offers a guide to the adequacy of a patient's oxygenation.</td>
</tr>
<tr>
<td>Oxygenation</td>
<td>Saturation with oxygen.</td>
</tr>
<tr>
<td>Pancreatitis</td>
<td>Inflammation of the pancreas.</td>
</tr>
<tr>
<td>Papilloedema</td>
<td>Swelling of the optic disc due to raised intra-cranial pressure.</td>
</tr>
<tr>
<td>Paraventricular</td>
<td>Alongside a ventricle.</td>
</tr>
<tr>
<td>Paravertebral plexus</td>
<td>A network of nerves creating a nerve trunk travelling along the length of the vertebral column.</td>
</tr>
<tr>
<td>Parenchymal</td>
<td>The bulk of a substance.</td>
</tr>
<tr>
<td>Parenteral</td>
<td>Taken into the body or administered in a manner other than through the digestive tract eg intravenous or intramuscular injection.</td>
</tr>
<tr>
<td>Parietal</td>
<td>Anything pertaining to the wall of a cavity.</td>
</tr>
<tr>
<td>Pathogenesis</td>
<td>The mechanism by which a disease is caused.</td>
</tr>
<tr>
<td>Pathology</td>
<td>The science of the causation and effect of disease.</td>
</tr>
<tr>
<td>Pathophysiology</td>
<td>The physiological processes associated with disease or injury.</td>
</tr>
<tr>
<td>PCO2</td>
<td>An abbreviation for the partial pressure of carbon dioxide. It is commonly measured in blood to determine the adequacy of respiration.</td>
</tr>
</tbody>
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<td>Peduncle</td>
<td>A stem, through which a mass of tissue is attached to a body eg cerebral peduncles.</td>
</tr>
<tr>
<td>Peptides</td>
<td>Short polymers of amino acid monomers linked by peptide bonds. They are distinguished from proteins on the basis of size, typically containing less than 50 monomer units.</td>
</tr>
<tr>
<td>Percutaneous nephrolithotomy</td>
<td>A surgical procedure to remove stones from the kidney by way of a small puncture incision.</td>
</tr>
<tr>
<td>Perfusion</td>
<td>The transfer of fluid through a tissue eg blood through a kidney.</td>
</tr>
<tr>
<td>Peribronchial thickening</td>
<td>The build-up of excess fluid or mucus in the small airway passages of the lung causing localized lung collapse.</td>
</tr>
<tr>
<td>Perinatal</td>
<td>The period immediately before and after birth.</td>
</tr>
<tr>
<td>Peripheral perfusion</td>
<td>The amount of blood circulating in small arteries, arterioles and capillaries. If the circulation is placed under stress and insufficient blood is pumped then these small blood vessels close down in order to preserve blood supply to vital organs.</td>
</tr>
<tr>
<td>Perirenal fat</td>
<td>A structure between the renal fascia and renal capsule of the kidney.</td>
</tr>
<tr>
<td>Perisylvian Syndrome</td>
<td>An extremely rare neurological disorder characterized by partial paralysis of muscles on both sides of the face, tongue, jaws and throat giving rise to difficulties in speaking, swallowing and/or epilepsy.</td>
</tr>
<tr>
<td>Peritoneal dialysis</td>
<td>Dialysis is an intervention whereby surplus fluid and waste in the blood is removed, should the kidneys be unable to perform this task.</td>
</tr>
<tr>
<td>Peritoneal dialysis catheter</td>
<td>A plastic tube inserted through skin and muscle into the peritoneal cavity. Dialysis takes place through this catheter.</td>
</tr>
<tr>
<td>Peritoneal dialysis cycler PAC-X</td>
<td>A machine which automatically performs the cycles of peritoneal dialysis allowing patients to undergo treatment overnight and so reducing interference with daytime activity.</td>
</tr>
<tr>
<td>Peritonitis</td>
<td>Inflammation of the peritoneum.</td>
</tr>
<tr>
<td>Periumbilical</td>
<td>Located near the central area of the abdomen</td>
</tr>
<tr>
<td>Perivascular</td>
<td>The periphery of the circulatory system and typically the blood vessels.</td>
</tr>
<tr>
<td>pH</td>
<td>A measure of the acidity or basicity of an aqueous solution. Pure water is said to be neutral, with a pH close to 7.0 at 25 °C (77 °F). Solutions with a pH less than 7 are said to be acidic and solutions with a pH greater than 7 are basic or alkaline. Blood pH is a guide to cell functioning.</td>
</tr>
</tbody>
</table>
### Glossary of Medical Terms

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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</thead>
<tbody>
<tr>
<td>Phenotype</td>
<td>An individual’s characteristics as determined by the interaction between his genotype and the environment.</td>
</tr>
<tr>
<td>Phenytoin sodium</td>
<td>A commonly used antiepileptic.</td>
</tr>
<tr>
<td>Phonology</td>
<td>The discipline of linguistics concerned with speaking.</td>
</tr>
<tr>
<td>Physiological</td>
<td>Pertaining to the normal functioning of an organ as governed by the interaction between its physical and chemical conditions.</td>
</tr>
<tr>
<td>Pial</td>
<td>Of or relating to the pia mater or pia, the delicate innermost layer of the meninges (the membranes surrounding the brain &amp; spinal cord).</td>
</tr>
<tr>
<td>Plantar reflex</td>
<td>A reflex elicited when the sole of the foot is stimulated with a blunt instrument. Whilst normally a downward response, an upward movement may indicate disease of the brain or spinal cord.</td>
</tr>
<tr>
<td>Pneumonic</td>
<td>Pertaining to pneumonia, an infection of the lung.</td>
</tr>
<tr>
<td>Pneumothorax</td>
<td>Each lung is coated with a membrane (pleura) which is continuous over the inner surface of the chest (thorax). As the lungs expand &amp; contract with breathing, the two layers of the pleura slide over each other and there is no real space between them. If the lung is punctured air enters this potential space and because it is under pressure, the lung under it collapses. This is termed pneumothorax ('air in the chest cavity').</td>
</tr>
<tr>
<td>Polyuria/Polyuric</td>
<td>The production of an excessive amount of urine as seen with chronic renal failure, diabetes mellitus or diabetes insipidus.</td>
</tr>
<tr>
<td>Pons in toto</td>
<td>A portion of the hindbrain connecting the cerebral cortex to the medulla oblongata. It also serves as a communications and coordination centre between the two hemispheres of the brain.</td>
</tr>
<tr>
<td>Post-mortem</td>
<td>An examination of the dead body to determine the cause of death.</td>
</tr>
<tr>
<td>Posterior cranial fossa</td>
<td>A part of the intracranial cavity, located between the foramen magnum and tentorium cerebelli containing the brainstem and cerebellum.</td>
</tr>
<tr>
<td>Posterior reversible encephalopathy syndrome (PRES)</td>
<td>A syndrome characterised by headache, confusion, seizures and visual loss. It may occur in consequence of a number of causes.</td>
</tr>
<tr>
<td>Postictal Acute Encephalopathy</td>
<td>A sudden degenerative disease of the brain which appears post-seizure.</td>
</tr>
<tr>
<td>Post-ictal</td>
<td>Following a seizure</td>
</tr>
<tr>
<td>Prednisone (prednisolone)</td>
<td>A potent steroid medication given by mouth for its anti-inflammatory and/or immunosuppressive properties. The intravenous version is methylprednisolone.</td>
</tr>
</tbody>
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# GLOSSARY OF MEDICAL TERMS

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<tbody>
<tr>
<td>Prodrome</td>
<td>An early symptom (or set of symptoms) which might indicate the onset of a specific disease before more definite symptoms occur.</td>
</tr>
<tr>
<td>Prolene</td>
<td>A synthetic suture used for skin closure and general soft tissue approximation and ligation.</td>
</tr>
<tr>
<td>Prophylactic</td>
<td>Any medical or public health procedure undertaken to prevent, rather than treat a disease.</td>
</tr>
<tr>
<td>Protease</td>
<td>Any enzyme that conducts proteolysis ie the protein catabolism by hydrolysis of the peptide bonds linking amino acids together in the chain of the protein.</td>
</tr>
<tr>
<td>Proteinuria</td>
<td>The presence of excessive amounts of protein in the urine.</td>
</tr>
<tr>
<td>Pseudolaminar necrosis</td>
<td>The uncontrolled death of cells in the cerebral cortex of the brain. It is seen in the context of cerebral hypoxic-ischemic insults e.g. strokes.</td>
</tr>
<tr>
<td>Pulmonary</td>
<td>Of, relating to, or affecting the lungs.</td>
</tr>
<tr>
<td>Pulmonary interstitial Oedema</td>
<td>An oedema caused when the capacity of the lymphatics to drain the interstitial fluid is exceeded.</td>
</tr>
<tr>
<td>Pulmonary oedema</td>
<td>The presence of excessive fluid within the lung tissue.</td>
</tr>
<tr>
<td>Purkinje cells</td>
<td>A class of neurons located in the cerebellar cortex.</td>
</tr>
<tr>
<td>Pyelogram</td>
<td>A procedure for obtaining x-ray images of the urinary tract. A radio-opaque medium is injected into a vein and when excreted by the kidneys it shows on x-rays. Any abnormality in the structure or foreign body is outlined by the dye.</td>
</tr>
<tr>
<td>Pyknosis</td>
<td>The irreversible condensation of the nucleus of a cell undergoing necrosis</td>
</tr>
<tr>
<td>Pyloric stenosis</td>
<td>A narrowing of the passage between the stomach and the small intestine. The condition affecting infants during the first weeks of life can be surgically corrected.</td>
</tr>
<tr>
<td>Pyrexia (or fever)</td>
<td>A fever characterised by an elevation of temperature above the normal range of 36.5–37.5°C.</td>
</tr>
<tr>
<td>Pyruvic acid</td>
<td>An organic acid having an important role in several metabolic pathways.</td>
</tr>
<tr>
<td>Radial artery</td>
<td>The artery that arises from the brachial artery at the level of the neck of the radius. It is felt in the wrist as ‘the pulse.’</td>
</tr>
<tr>
<td>Radiology</td>
<td>A medical specialty employing the use of imaging to both diagnose and treat disease.</td>
</tr>
<tr>
<td>Raised intracranial pressure</td>
<td>See cerebral oedema</td>
</tr>
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<tr>
<td>Rarefaction</td>
<td>The reduction of a medium's density or the opposite of compression.</td>
</tr>
<tr>
<td>Rebound</td>
<td>A reverse response occurring upon withdrawal of a stimulus.</td>
</tr>
<tr>
<td>Rebound tenderness</td>
<td>A clinical sign detectable upon physical examination of the abdomen. It refers to pain upon <em>removal</em> of pressure rather than the <em>application</em> of pressure to the abdomen.</td>
</tr>
<tr>
<td>Recannalise</td>
<td>The process of restoring flow to or reuniting an interrupted bodily tube e.g. an artery.</td>
</tr>
<tr>
<td>Red blood cells (erythrocytes)</td>
<td>Bi-concave non-nucleated cells containing the red pigment haemoglobin which carries oxygen and carbon dioxide between the lungs and the body tissues.</td>
</tr>
<tr>
<td>Red cell distribution width (RDW)</td>
<td>A measure of the variation in size of red blood cells.</td>
</tr>
<tr>
<td>Rehydration</td>
<td>The process of restoring water balance to the body tissues and fluids. Rehydration can be by oral intake or by the intravenous infusion of fluids.</td>
</tr>
<tr>
<td>Renal</td>
<td>Relating to the kidney.</td>
</tr>
<tr>
<td>Renal &amp; extra renal losses</td>
<td>Fluid leaving the body as urine is renal loss and all other losses (sweat, vapour in breath, fluid in faeces etc) are extrarenal.</td>
</tr>
<tr>
<td>Renal arteries</td>
<td>The vessels which emerge from the aorta to supply blood to the kidneys. Sometimes there is more than one such artery leading to each kidney.</td>
</tr>
<tr>
<td>Renal dysplasia</td>
<td>See dysplastic kidneys</td>
</tr>
<tr>
<td>Renal tubule</td>
<td>See acute tubular necrosis.</td>
</tr>
<tr>
<td>Reperfusion</td>
<td>Damage to tissue caused when blood supply returns to tissue after a period of ischemia or lack of oxygen. The absence of oxygen and nutrients from blood during the ischemic period creates a condition whereby the restoration of circulation results in inflammation and oxidative damage.</td>
</tr>
<tr>
<td>Replacement rate (for IV fluids)</td>
<td>In the calculation of intravenous fluid rates it is usual to replace abnormal losses already experienced, for example by vomiting; to allow for the normal fluids required by the body and to make up for continuing abnormal losses, for example by diarrhoea. These are respectively, replacement, maintenance and continuing losses.</td>
</tr>
<tr>
<td>Respiratory arrest</td>
<td>The cessation of breathing.</td>
</tr>
<tr>
<td>Respiratory pressure waves</td>
<td>The component of a pulsatile pressure wave provoked by the lungs expanding and contracting.</td>
</tr>
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<tr>
<td>Respiratory rate</td>
<td>The rate at which air passes into and out of the lungs. This occurs 18 times a minute in a healthy adult at rest.</td>
</tr>
<tr>
<td>Resuscitation</td>
<td>Methods of revival for a patient in cardiac or respiratory failure.</td>
</tr>
<tr>
<td>Reticular formation</td>
<td>That part of the brain concerned with the waking/sleeping cycle and the filtering of incoming stimuli.</td>
</tr>
<tr>
<td>Retromandibular vein</td>
<td>A vein formed by the union of the superficial temporal and maxillary veins which descends in the substance of the parotid gland beneath the facial nerve.</td>
</tr>
<tr>
<td>Reye's syndrome</td>
<td>A metabolic disorder principally affecting the liver and brain, marked by the rapid development of life-threatening neurological symptoms.</td>
</tr>
<tr>
<td>Right &amp; left fundi</td>
<td>A fundus (pleural fundi) usually refers the interior surface of the eye opposite the lens and includes the retina and optic disc. It can be viewed through an ophthalmoscope.</td>
</tr>
<tr>
<td>Rotavirus</td>
<td>A genus of viruses of the family Reoviridae having a wheel-like appearance and causing acute infantile gastroenteritis and diarrhoea.</td>
</tr>
<tr>
<td>Routes of Medication</td>
<td>The method by which medication is administered to a patient eg <em>Topical</em> where a substance is applied to a localized area of the body, <em>Oral</em> being through the mouth or <em>Per Rectum</em>, through the rectum.</td>
</tr>
<tr>
<td>Salaam attacks (or infantile spasms)</td>
<td>A rare type of epilepsy usually starting in the first eight months of life.</td>
</tr>
<tr>
<td>Schwartz formula</td>
<td>A method of calculating glomerular filtration rate (see above) in a child with reference to blood levels of creatinine and height.</td>
</tr>
<tr>
<td>Sclerosis</td>
<td>A hardening of tissue or other anatomical features.</td>
</tr>
<tr>
<td>Scoliosis</td>
<td>A condition in which there is curvature of the spine.</td>
</tr>
<tr>
<td>Scrub nurse</td>
<td>An operating theatre nurse who has access to the instruments and the exposed parts of the body (‘the operative field’). Accordingly and in order to be sterile, they ‘scrub’ their hands and arms prior to surgery, wear a sterile gown and gloves and are masked. They may not touch any unsterile area during the procedure.</td>
</tr>
<tr>
<td>Sentinel Event</td>
<td>Any unanticipated event in a healthcare setting resulting in death or serious physical or psychological injury to a patient which is unrelated to the natural course of illness.</td>
</tr>
<tr>
<td>Sepsis</td>
<td>A bacterial infection in the bloodstream or body tissues.</td>
</tr>
<tr>
<td>Septicaemia</td>
<td>A systemic disease caused by the multiplication of microorganisms in the blood. Also called blood poisoning or septic fever.</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Serology</td>
<td>The scientific study of blood serum and other bodily fluids. Used in practice to refer to the diagnostic identification of antibodies in the serum.</td>
</tr>
<tr>
<td>Sickle cell disease</td>
<td>A group of inherited blood disorders characterized by chronic anaemia, acute episodes of limb or joint pain and occurring with complications due to associated organ and tissue damage.</td>
</tr>
<tr>
<td>Sodium chloride 0.18% / dextrose 4%</td>
<td>A solution for IV use containing 30 mmol/litre of sodium and chloride or one-fifth of the concentration in ‘natural body fluids’ such as blood.</td>
</tr>
<tr>
<td>Sodium measurement (mmol/litre)</td>
<td>The concentration of sodium in solution is expressed as the number of milliosmoles in each litre (mOsmol/L). An osmole is a unit used to define chemicals which can contribute to osmosis and represents the number of osmotically active particles which, when dissolved in 22.4 L of solvent at 0 degrees Centigrade, exert an osmotic pressure of 1 atmosphere. A milliosmole is 1/1000 of an osmole.</td>
</tr>
<tr>
<td>Sodium thiopentone (STP)</td>
<td>A rapid-onset short-acting drug used to induce general anaesthesia.</td>
</tr>
<tr>
<td>Sodium valproate</td>
<td>An anti-convulsive drug.</td>
</tr>
<tr>
<td>Sphenopalatine artery</td>
<td>An artery of the head.</td>
</tr>
<tr>
<td>Status epilepticus</td>
<td>Repeated epileptic fits without return to consciousness in between. Breathing stops between each fit and the body is deprived of oxygen causing damage to the brain.</td>
</tr>
<tr>
<td>Stenosis</td>
<td>An abnormal narrowing in a blood vessel or other tubular organ or structure.</td>
</tr>
<tr>
<td>Stereomicroscope</td>
<td>An optical microscope, often referred to as the &quot;light microscope&quot; to magnify small samples.</td>
</tr>
<tr>
<td>Sternomastoid</td>
<td>A paired muscle in the superficial layers of the anterior portion of the neck. It acts to flex and rotate the head.</td>
</tr>
<tr>
<td>STP</td>
<td>Abbreviation of sodium thiopentone, a drug used to induce anaesthesia intravenously. Also an acronym for Standard Temperature &amp; Pressure.</td>
</tr>
<tr>
<td>Striatum</td>
<td>A subcortical part of the forebrain.</td>
</tr>
<tr>
<td>Stroke</td>
<td>The sudden and localised death of brain cells due to inadequate blood flow.</td>
</tr>
<tr>
<td>Subacute</td>
<td>A description applied to a disease, the duration of which persists between the acute and chronic.</td>
</tr>
</tbody>
</table>
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<tr>
<th>Term</th>
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<tbody>
<tr>
<td>Subarachnoid</td>
<td>The space within the brain between the arachnoid membrane and the pia mater (the delicate innermost layer of the meninges).</td>
</tr>
<tr>
<td>Subclavian</td>
<td>The area beneath the clavicle (collar bone).</td>
</tr>
<tr>
<td>Subclinical</td>
<td>Without clinical presentation</td>
</tr>
<tr>
<td>Subcutaneous</td>
<td>Any part of the body found beneath the skin.</td>
</tr>
<tr>
<td>Sub-dural empyema</td>
<td>An intracranial focal collection of purulent material located between the dura mater and the arachnoid mater</td>
</tr>
<tr>
<td>Subependymal zone</td>
<td>The cell layer surrounding the lateral ventricles in the brain.</td>
</tr>
<tr>
<td>Subpial</td>
<td>Within the space of the brain that separates the pia from the underlying neural tissue.</td>
</tr>
<tr>
<td>Subventricular</td>
<td>A paired brain structure situated throughout the lateral walls of the lateral ventricles of the brain.</td>
</tr>
<tr>
<td>Sulci</td>
<td>Depressions or fissures in the surface of an organ, especially the brain.</td>
</tr>
<tr>
<td>Superior sagittal sinus</td>
<td>A space located within the head along the attached margin of falx cerebri. It allows blood to drain from the lateral aspects of anterior cerebral hemispheres to the confluence of sinuses.</td>
</tr>
<tr>
<td>Supraorbital</td>
<td>The region immediately above the eye sockets.</td>
</tr>
<tr>
<td>Suprapubic</td>
<td>Relates to the abdomen in its lower part, immediately above the pubic bones.</td>
</tr>
<tr>
<td>Suprapubic catheter</td>
<td>See Catheter</td>
</tr>
<tr>
<td>Surgical cut-down</td>
<td>A minor surgical procedure whereby a small incision is made in the skin and the underlying tissues are separated so as to expose a blood vessel and so enable the insertion of a cannula into the vessel.</td>
</tr>
<tr>
<td>Synapse</td>
<td>A junctional structure in the nervous system that permits a neuron to pass an electrical or chemical signal to another cell.</td>
</tr>
<tr>
<td>Syncope</td>
<td>A short loss of consciousness caused by a temporary lack of oxygen in the brain.</td>
</tr>
<tr>
<td>Syncytium</td>
<td>A multinucleate cell which can result from multiple cell fusions of uninuclear cells (i.e. cells with a single nucleus).</td>
</tr>
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### Glossary of Medical Terms

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<tr>
<td>Syndrome of inappropriate antidiuretic hormone secretion (SIADH)</td>
<td>The Antidiuretic hormone (ADH) is produced by the pituitary gland and has the effect of inhibiting urine production and causing water retention. It is released in response to a range of stimuli including damage to the brain, lung disease, individual drugs, surgery, trauma and in relation to certain glandular disorders. The effect of a SIADH is retention of fluid leading to falls in blood osmolality and blood sodium levels relative to the amount of water present. This will result in dilutional hyponatraemia.</td>
</tr>
<tr>
<td>Syntax</td>
<td>The study of the principles and rules for constructing phrases and sentences in natural languages. The term <em>syntax</em> is also used to refer directly to the rules and principles that govern the sentence structure of language.</td>
</tr>
<tr>
<td>Tachypnoea</td>
<td>Rapid breathing.</td>
</tr>
<tr>
<td>Temporal</td>
<td>Referring or relating to the muscles, bone or blood vessels around the temple.</td>
</tr>
<tr>
<td>Tentorium</td>
<td>The internal framework of supporting tissue within the skull formed by ingrowths of the exoskeleton.</td>
</tr>
<tr>
<td>Tetraplegic</td>
<td>Paralysis of all four limbs, also known as quadriplegic.</td>
</tr>
<tr>
<td>Thalamus</td>
<td>One of two masses of grey matter (brain cells or neurons) lying on either side of the third ventricle of the brain. Important for sensory impulses.</td>
</tr>
<tr>
<td>Theatre runner</td>
<td>See Circulating Nurse.</td>
</tr>
<tr>
<td>Thoracic</td>
<td>Relating to the chest.</td>
</tr>
<tr>
<td>Thromboembolism</td>
<td>A clot in the blood that blocks a blood vessel.</td>
</tr>
<tr>
<td>Thrombosis</td>
<td>The formation of a blood clot within the vessels or heart.</td>
</tr>
<tr>
<td>Titre</td>
<td>The concentration of a substance in a solution or the strength of such a substance determined by titration.</td>
</tr>
<tr>
<td>Tonic</td>
<td>Characterised by continuous tension or contraction of muscles, as a convulsion or spasm.</td>
</tr>
<tr>
<td>Tonsillectomy</td>
<td>The surgical removal of the tonsils.</td>
</tr>
<tr>
<td>Torsion</td>
<td>Where a cord or vessel twists thereby cutting off blood supply to a particular area of the body.</td>
</tr>
<tr>
<td>Toxicology</td>
<td>The scientific study of poisons, their detection, effects and methods of counteraction.</td>
</tr>
<tr>
<td>Toxin</td>
<td>A poison, especially a protein or conjugated protein produced by certain animals, higher plants and pathogenic bacteria.</td>
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<tr>
<td>Trachea</td>
<td>The medical term for ‘windpipe’.</td>
</tr>
<tr>
<td>Transducer</td>
<td>Any part of the body which converts one form of energy into another.</td>
</tr>
<tr>
<td>Transureteroureterostomy</td>
<td>A ureterostomy is a surgical operation in which the ureter is brought to the body surface to drain, often because of an obstruction in its lower part or in the bladder. If the operation is performed through an endoscope passed through the urethra and bladder into the ureter it is a transureteric operation.</td>
</tr>
<tr>
<td>Trigeminal nerve (the fifth cranial nerve)</td>
<td>A nerve containing both sensory and motor fibres. It is responsible for sensation in the face and certain motor functions such as biting, chewing and swallowing.</td>
</tr>
<tr>
<td>Tympanometry</td>
<td>An examination used to test the condition of the middle ear and the mobility of the eardrum and/or the conduction bones by creating variations of air pressure in the ear canal.</td>
</tr>
<tr>
<td>Uncal</td>
<td>Pertaining to the uncus, being the hook-like anterior end of the hippocampal gyrus on the temporal lobe of the brain.</td>
</tr>
<tr>
<td>Upper respiratory infection</td>
<td>Any infection of the upper respiratory tract.</td>
</tr>
<tr>
<td>Upregulation</td>
<td>The increase of a cellular component.</td>
</tr>
<tr>
<td>Uraemia</td>
<td>The illness accompanying kidney failure (also called renal failure), confirmed by an increase in blood urea, a nitrogenous waste product associated with the failure of this organ.</td>
</tr>
<tr>
<td>Urea</td>
<td>A crystalline substance of the chemical formula CO (NH2)2, derived from protein. It is the chief waste product discharged from the body in the urine.</td>
</tr>
<tr>
<td>Urea cycle defect</td>
<td>A disorder caused by a deficiency of one of the enzymes in the urea cycle responsible for removing ammonia from the blood stream.</td>
</tr>
<tr>
<td>Ureteric catheter</td>
<td>See Catheter</td>
</tr>
<tr>
<td>Ureteric stents</td>
<td>A semi rigid hollow tube which can be placed in a hollow organ, such as the ureter so as to bypass or prevent obstruction.</td>
</tr>
<tr>
<td>Ureterostomy</td>
<td>The creation of a stoma (a new, artificial outlet) for a ureter or kidney. The procedure is performed to divert the flow of urine away from the bladder when the bladder is absent or not functioning.</td>
</tr>
<tr>
<td>Ureters</td>
<td>The tubes which carry urine from the kidneys to the bladder.</td>
</tr>
<tr>
<td>Urethral catheter</td>
<td>See Catheter</td>
</tr>
<tr>
<td>Urethral valve</td>
<td>An obstructing membrane in the posterior male urethra occurring as an abnormality in development.</td>
</tr>
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<tr>
<td>Urinalysis</td>
<td>A contraction of urine analysis, or tests for pH (acidity) or the presence of protein, sugar or ketones.</td>
</tr>
<tr>
<td>Urinary tract</td>
<td>The passage from the pelvis of the kidney through the ureters, bladder and urethra to the external urinary opening.</td>
</tr>
<tr>
<td>Urinary tract infection (UTI)</td>
<td>An infection of one or more structures in the urinary system.</td>
</tr>
<tr>
<td>Uropathy</td>
<td>A disease of the urinary system.</td>
</tr>
<tr>
<td>Vacuolation</td>
<td>A small cavity in the cytoplasm of a cell, bound by a single membrane and containing water, food, or metabolic waste.</td>
</tr>
<tr>
<td>Valium</td>
<td>See ‘diazepam’.</td>
</tr>
<tr>
<td>Vancomycin</td>
<td>An antibiotic infused intravenously in the treatment of serious infections.</td>
</tr>
<tr>
<td>Varicella</td>
<td>A highly infectious viral disease, known commonly as chickenpox.</td>
</tr>
<tr>
<td>Vascular</td>
<td>Relating to the blood vessels.</td>
</tr>
<tr>
<td>Vascular anastomosis</td>
<td>Connecting two blood vessels (or the cut ends of one vessel) together.</td>
</tr>
<tr>
<td>Vasoconstriction</td>
<td>The narrowing of the blood vessels resulting from contraction of the muscular wall of the vessels.</td>
</tr>
<tr>
<td>Vasodilation</td>
<td>The widening of blood vessels resulting from relaxation of smooth muscle cells within the vessel walls.</td>
</tr>
<tr>
<td>Vasopressin</td>
<td>A hormone secreted by the posterior lobe of the pituitary gland that acts to constrict blood vessels and raise blood pressure. It reduces the excretion of urine and is also called antidiuretic hormone.</td>
</tr>
<tr>
<td>Vena cava (pl. venae cavae)</td>
<td>Two large vessels which open into the right atrium of the heart and return venous blood from the whole body (except the lungs). That which drains vessels from the head, neck and upper limbs is called the superior vena cava and that draining from the trunk and lower limbs is the inferior vena cava.</td>
</tr>
<tr>
<td>Venous blood</td>
<td>The blood found in the veins.</td>
</tr>
<tr>
<td>Venous sinus</td>
<td>A large vein or channel for the circulation of venous blood.</td>
</tr>
<tr>
<td>Ventilation</td>
<td>A procedure, usually carried out in an intensive care unit, by which a device called a ‘ventilator’ takes over a patient’s breathing.</td>
</tr>
<tr>
<td>Ventilatory support</td>
<td>Breathing assistance to enable sufficient air entry into their lungs, commonly achieved by the use of a mechanical ventilator delivering oxygen and air through an endotracheal tube.</td>
</tr>
</tbody>
</table>
# GLOSSARY OF MEDICAL TERMS

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ventricle</td>
<td>The pumping chambers of the heart.</td>
</tr>
<tr>
<td>Ventricular system</td>
<td>A set of structures containing cerebrospinal fluid in the brain. It is</td>
</tr>
<tr>
<td></td>
<td>continuous with the central canal of the spinal cord.</td>
</tr>
<tr>
<td>Vesicoureteral reflux</td>
<td>An abnormal movement of urine from the bladder into ureters or kidneys.</td>
</tr>
<tr>
<td>Vessel occlusion</td>
<td>A blockage in a blood vessel usually with a clot. An occluded vessel</td>
</tr>
<tr>
<td></td>
<td>creates eddies in the normally laminar flow of blood currents.</td>
</tr>
<tr>
<td>Virology</td>
<td>The study of viruses and viral diseases.</td>
</tr>
<tr>
<td>Viscosity</td>
<td>A measure of the resistance of a fluid deformed by either shear or</td>
</tr>
<tr>
<td></td>
<td>tensile stress, but commonly and for fluids only, viscosity is</td>
</tr>
<tr>
<td></td>
<td>descriptive of &quot;thickness&quot; or &quot;internal friction&quot;.</td>
</tr>
<tr>
<td>Vitreous humour</td>
<td>The clear gel that fills the space between the lens and the retina of the</td>
</tr>
<tr>
<td></td>
<td>eyeball.</td>
</tr>
<tr>
<td>Voltarol (diclofenac)</td>
<td>A proprietary brand of non-steroidal anti-inflammatory drug taken to</td>
</tr>
<tr>
<td></td>
<td>reduce inflammation and as an analgesic to reduce pain.</td>
</tr>
<tr>
<td>White blood cells (leucocytes)</td>
<td>The cells within the blood which contain no haemoglobin and are</td>
</tr>
<tr>
<td></td>
<td>therefore colourless. They are important in the prevention and</td>
</tr>
<tr>
<td></td>
<td>response to infection.</td>
</tr>
<tr>
<td>White cell count (WCC)</td>
<td>A blood test which determines the number of white blood cells in a</td>
</tr>
<tr>
<td></td>
<td>blood sample.</td>
</tr>
<tr>
<td>Zeroing</td>
<td>A monitor such as that measuring central venous pressure (CVP) is</td>
</tr>
<tr>
<td></td>
<td>conventionally operated so that zero represents the level of the right</td>
</tr>
<tr>
<td></td>
<td>atrium, the chamber into which the venae cavae return blood. Should that</td>
</tr>
<tr>
<td></td>
<td>level change, for example if the bed or trolley on which the patient lies</td>
</tr>
<tr>
<td></td>
<td>is raised or lowered, then the device has to be adjusted or rezeroed to</td>
</tr>
<tr>
<td></td>
<td>maintain the zero point.</td>
</tr>
</tbody>
</table>
## INQUIRY COSTS

<table>
<thead>
<tr>
<th>Area of Expenditure</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inquiry Legal Team</td>
<td>4,718,361</td>
</tr>
<tr>
<td>Inquiry Administration</td>
<td>1,993,385</td>
</tr>
<tr>
<td>Families Legal Costs</td>
<td>2,558,596</td>
</tr>
<tr>
<td>Oral Hearing ICT Costs</td>
<td>1,066,689</td>
</tr>
<tr>
<td>Accommodation</td>
<td>1,674,702</td>
</tr>
<tr>
<td>Other Costs</td>
<td>1,802,835</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>13,814,568</strong></td>
</tr>
</tbody>
</table>

These figures include estimates to the end of December 2017. There will be further expenditure by the Inquiry after publication to include winding up costs and placing the Inquiry record with the Public Records Office of Northern Ireland.